Knowledge Transfer, Organisational Learning, and the Performance of International Strategic Alliances
A Co-evolutionary Perspective

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Abstract

This research aims to unpack the paradoxes in cross-border knowledge transfer and learning processes and their impacts on the performance of international strategic alliances. This research thus develops a co-evolutionary view on international strategic alliance performance and empirically investigates the interplay between contextual and processual antecedents of alliance performance.

By large-scale and cross-sectional survey research on a sample of 671 Taiwanese information and communication technology manufacturers with international strategic alliance experience, this research finds that an alliance is likely to be considered as unsuccessful if there is large institutional distance between the countries from where the partner firms originate, because such difference could simultaneously fortify the transferor's protectiveness behaviour towards knowledge transfer and the recipient's ambiguous perception towards the transferred knowledge. This, in turn, weakens the recipient's potential absorptive capacity and decreases the amount of knowledge acquired through international cooperation. Yet this research also discovers that relational capital accumulated by the partner firms along with cooperation could facilitate the cross-border knowledge transfer processes, as with a more harmonious relationship between the partners, the transferor's protectiveness behaviour towards knowledge transfer would be unnecessary and thus be lessened, and the recipient's ambiguous perception towards the transferred knowledge would be diminished as well. This could subsequently enhance the recipient's potential absorptive capacity and the amount of knowledge acquired, leading to a greater notion of a successful international strategic alliance. Notably, this research validates the fact that alliance performance is not purely determined by the extent of knowledge acquisition but by the partner's realised absorptive capacity to transform and exploit the acquired knowledge into the alliance context.

This research contributes to advancing the alliance literature by rejuvenating a co-evolutionary perspective on international strategic alliance performance based on the synthesis of the organisational learning, institution- and knowledge-based, and relational theories. It also contributes to consolidating a novel extension in the knowledge transfer and organisational learning literature by unpacking the paradoxes in

cross-border knowledge transfer and learning processes as the results of the mixed effects derived from the interplay between contextual and processual antecedents of alliance performance. Moreover, it contributes to enriching the methodological gap in the existing management literature by utilising a relatively new statistical approach (i.e., Partial Lease Squares path modelling) to analyse the non-normalised empirical data and the higher-order measurement models with formative nature. Finally, this research offers managerial implications for alliance managers to better understand the criteria of foreign partner selection as well as the approaches of overseeing, managing and evaluating the determinants, patterns and consequences of the knowledge transfer processes and the underlying mechanisms of organisational learning processes across national boundaries.

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List of Contents

List of Figures

List of Tables

Chapter 1: Introduction

1.1. Rationale of the Research

International strategic alliances between firms are in fashion. Nokia cooperates with Microsoft to regain market share in the smartphone industry, Google and Sony develop cloud-based products and services with the Android platform, and Apple is given potential synergies from partnering with Intel to evolve its innovative products. The accelerating rate of alliance formation over the past few decades has inspired voluminous research to investigate the various motives of firms taking part in cross-border collaborations. The most predominant rationales suggested by the resource- and knowledge-based theorists (Barney, Ketchen and Wright, 2011; Grant, 2002) are the needs to assess, acquire and control competitive resources, knowledge and capabilities from foreign partners.

Evidence is also repeatedly exhibited in the prior research that knowledge transfer and learning across organisational or national boundaries are beneficial for firms to enhance new product developments (Yli-Renko, Autio and Sapienza, 2001), innovation and technological discoveries (Kafouros, 2008), labour productivity (Siler, Wang and Liu, 2003), customer satisfaction (Tsang, Nguyen and Erramilli, 2004), financial profitability (Lyles and Salk, 1996), market shares and growth (Lunnan and Haugland, 2008), and network position (Liu, Ghauri and Sinkovics, 2010). International strategic alliances, which form a fundamental stage of the internationalisation process of the firm (Yeniyurt, Townsend, Cavusgil and Ghauri, 2009), have thus become an indispensable means for firms to regain and maintain competitive advantage in global markets.

Despite the proliferation of alliance formation, however, the average life span of alliances is just 5 to 7 years (Ernst and Bamford, 2005) and nearly 80% of alliances ultimately end in a sale by one of the partners (Bleeke and Ernst, 2002). In this vein, achieving sound alliance performance has been a major concern. The fundamental problem is that there is more than one parent (Killing, 1982), which might result in the potential divergence of strategic objectives of alliances between partner firms. According to a survey conducted by Dyer, Kale and Singh (2004), over 82% of the firms undertaking strategic alliances admitted that there are two different ways of achieving the same growth goals if the cooperation involves at least two partners. Such

a cooperative puzzle would be even more perplexing if cross-border knowledge transfer and learning processes are engaged in the collaborations across national boundaries.

Indeed, considerable research has attributed alliance instability to be the intrinsic competition over knowledge-based resources between partner firms (e.g., Hamel, 1991; Lang, 2001; Zeng and Hennart, 2002), whilst a far more limited amount has delved into examining the issues of knowledge transfer and organisational learning through international strategic alliances. Essentially, the concepts of knowledge transfer and organisational learning are two sides of a coin, but most prior research has focused on one side with the biased presumption that either process can be completed without the other within international strategic alliances (e.g., Inkpen, 2008; Simonin, 1999a, b).

Although the benefits of cross-border knowledge transfer or learning have been documented in many settings (e.g., Bresman, Birkinshaw and Nobel, 2010; Friesl, 2011; Simonin, 2004), the 'dark sides' of such transferring or receiving processes have very often been neglected in the prior literature. Given some attempts have been made by researchers to explain the confounding circumstances during knowledge transfer and learning processes, such as 'boundary paradox'(Quintas, Lefrere and Jones, 1997: 389) and 'causal ambiguity paradox' (King and Zeithaml, 2001: 76), the current understanding of how and why cross-border knowledge transfer and learning would fail is not substantial.

The role of management knowledge is a crucial and under-researched phenomenon of globalisation (Buckley and Ghauri, 2004). With respect to redressing the aforementioned imbalances in the existing literature, this research aims to unpack the paradoxes in cross-border knowledge transfer and learning processes and their impacts on the performance of international strategic alliances. Specifically, this research seeks to contribute to the existing, albeit significantly fragmented, literature on alliance performance (Hennart and Zeng, 2005; Steensma and Corley, 2000). With this premise, a further collective review on the knowledge transfer, organisational learning and alliance literature reveals manifold research gaps, evoking the genesis of research questions in the following effort.

1.2.   Research Gaps

Research on knowledge transfer has been burgeoning since the 1990s and substantial studies have proposed and examined a variety of determinants of successful knowledge transfer both within and across organisational boundaries (e.g., Cui, Griffith, Cavusgil and Dabic, 2006; Gupta and Govindarajan, 2000; Kachra and White, 2008). These determinants, categorised by van Wijk, Jansen and Lyles (2008), include knowledge, organisational, and dyad- or network-level characteristics. With few exceptions (e.g., Lyles and Salk, 1996; Perez-Nordtvedt, Kedia, Datta and Rasheed, 2008), most researchers have failed to examine these determinants simultaneously. The understandings of how knowledge is created, retained, retrieved and applied, and how the interplay of the different factors affects cooperative outcomes in international strategic alliances, remained largely unexplored (Meier, 2011). The ignorance of possible relationships among these determinants could render a biased assumption that knowledge transfer is influenced by a set of irrelevant factors. Notably, rare research has diagnosed the impediments of knowledge transfer, especially the noxious factors affecting the condition when knowledge is transmitted and absorbed by partner firms in the contexts of international strategic alliances.

Despite the extensive recognition in the alliance literature that learning is the primary motive of strategic alliance formation (e.g., Hamel, 1991; Inkpen, 1998; Tsang, 1999), surprisingly, little research has empirically examined the various aspects of organisational learning processes within international strategic alliances: where organisational learning occurs, how it feeds into knowledge transfer processes, and how it influences the varied alliance performance. Also, it has been found that most prior studies (e.g., Argote and Ingram, 2000; Mowery, Oxley and Silverman, 1996; Szulanski, 2000) have not been able to make a clear distinction between knowledge transfer and organisational learning and often inter-changed both terminologies to explain the phenomena that are highly relevant but fundamentally different. Despite the strategic importance of knowledge transfer and learning in the case of partnerships, furthermore, prior literature has been restricted by the widespread reliance on anecdotes and assertion rather than statistical evidence (Mowery et al., 1996). The empirical investigation into knowledge transfer and organisational learning through international strategic alliances thus becomes the core of this research.

Besides, prior alliance research has widely drawn upon the developed world (e.g., Glaister and Buckley, 1998; Simonin, 1999a, b, 2004; Yeniyurt et al., 2009). Given that increasing attention has been paid to the underdeveloped or emerging markets in the recent literature (e.g., Ang and Michailova, 2008; Hitt, Dacin, Levitas, Arregle and Borza, 2000), a relatively confined focus has been placed on the comparative study of different economies in the international contexts. In fact, the analysis of globalisation, with a focus on economic geography, arising from the changing strategy and the external impact of international business entities on the world economy can be a 'big question' (Buckley and Ghauri, 2004: 81). The comparative study of different locations is essential as the nature of international strategic alliances is formed by partner firms with divergent national backgrounds; yet the association of country-of-origin factors (Wang, Clegg and Kafouros, 2009) with international strategic alliance research has been significantly underexplored. Indeed, prior research on knowledge flows has centred on a single country (Kafouros, Buckley and Clegg, 2012) and therefore overlooked the impacts on cooperative performance arising from the institutional and competitive environments of the countries from where partner firms originate.

Besides the bounded context and scope of the alliance research, additionally, it has been lamented by Hennart (2006) and Bell, den Ouden and Ziggers (2006) that the dynamics of alliance cooperation have been neglected. Most alliance researchers have pursued the understanding of the alliance formation, motivations, structures and outcomes (e.g., Glaister and Buckley, 1998; Kauser and Shaw, 2004; Nielsen, 2007). However, relatively few researchers have contributed to the exploration of alliance mechanisms, the processes through which alliance undertakings are specified, assigned, implemented, integrated, reformed and evaluated by partner firms. Although some efforts have been made by Das and Teng (2002) and Ring and Van de Ven (1994) to map out the alliance developmental processes, in a broader sense, neither research has context-orientated – how external/ macro environments from where the partner firms originate affect the evolution of an international strategic alliance. The failure to consider the co-evolution of partner firms, alliances and their external contexts poses an improbable bias of presuming alliances to be closed entities.

1.3. Research Objectives and Questions

Acknowledging the research gaps in the knowledge transfer, organisational learning and alliance literature, this research intends to develop a co-evolutionary view on international strategic alliance performance with respect to exploring the paradoxes in cross-border knowledge transfer and learning processes and their impacts on alliance performance.

Particularly, this research is interested in reconceptualising the current understanding of the co-evolution of international strategic alliances by empirically investigating the simultaneous interactions among partner firms, alliances and their external contexts. Positioning on the process-dependent view of alliance developments (e.g., Das and Teng, 2002; Ring and Van de Ven, 1994), this research advocates the need to incorporate contextual factors with processual antecedents of international strategic alliance performance. This is because the prior research on alliance performance has been critically fragmented, as observed by Hennart and Zeng (2005) and Steensma and Corley (2000), and an advancement of the co-evolutionary view on the performance of international strategic alliances is necessary to wrap up such fragmentation. Notably, the investigation into the interactions between contextual and processual antecedents of alliance performance is vital because it could unpack the reasons why firms behave differently during cooperation and how these behaviours and perceptions influence the cooperative outcomes.

Indeed, in an empirical study on the country-of-origin effects on foreign direct investment in China, Wang et al. (2009) found that there are significant differences in behaviour between investors from non-Chinese Western source countries and those from Hong Kong, Macau and Taiwan. With the aim to unpack the paradoxes n cross-border knowledge transfer and learning processes and their impacts on the performance of international strategic alliances, this research endeavours to advance a co-evolutionary view on alliance performance by empirically investigating the following research questions: *what are the contextual and processual antecedents of international strategic alliance performance and what are the underlying relationships among these antecedents and their impacts on the alliance performance?*

1.4.   Structure of the Thesis

To answer these research questions, first of all, a systematic review on the major contributing perspectives on the co-evolution of international strategic alliances is offered in **Chapter 2**. The origin of the co-evolutionary perspectives is initially introduced. Building upon the literature reviewed, this research reconceptualises the co-evolution of international strategic alliances and applies it to advance the existing knowledge about the antecedents of international strategic alliance performance. Subsequently, an umbrella of international strategic alliance theories, particularly in the domains of internationalisation and strategy research, are critically reviewed to screen and to constitute the appropriate theoretic lenses for the formulation of the co-evolutionary perspective on international strategic alliance performance in this research.

In **Chapter 3**, a much narrower focus of literature review is further placed on cross-border knowledge transfer and learning research to map out the underlying evolution of international strategic alliances. Firstly, the theoretical backgrounds of knowledge transfer and organisational learning are collectively reviewed. Next, a systematic and extensive review on the patterns, determinants and consequences of knowledge transfer is provided before introducing and positing the meditating role played by the organisational learning mechanism in the relationship between knowledge transfer and alliance performance. Ultimately, the contextual and processual antecedents of international strategic alliance performance as identified and hypothesised along with the previous sections are further categorised into knowledge, organisational, relational and contextual characteristics in order to accomplish the co-evolutionary framework for the purpose of empirical investigation.

With respect to the empirical research settings, **Chapter 4** deliberates on the chosen methods for data collection and analysis. The research design and its justifications are firstly addressed. Based on the review of the methodological gaps in cross-border knowledge transfer and learning literature, a causal research design on large-scale and cross-sectional survey research is adopted in this research. To remain exempt from the potential problems arising from common method variance, a mixed-mode survey research design proposed by Dillman, Smyth and Christian (2009) is applied to collect the primary data from both web-based and mail questionnaires, as well as the secondary data from The Global Information Technology Report 2010-2011 (Dutta and Mia, 2011) and Hofstede's (2011) cultural dimension indices. Due to the involvement of both

formative and reflective measurement models proposed in this research, the empirical data is analysed by the conjunction of IBM SPSS Statistics 19 package (SPSS) and SmartPLS 2.0 (SmartPLS) applications. Finally, a detailed discussion of the statistical techniques to assess research reliability and validity is presented.

Having justified the research methodology, **Chapter 5** provides empirical findings obtained from a systematic succession of statistical assessments towards hypotheses testing. Initially, a sequence of assessment techniques of confirmatory factor analysis on the measurement models are performed by SmartPLS to examine whether the specific sets of the assigned measures reflect the underlying assumptions of both formative and reflective constructs proposed in this research. Moreover, the descriptive statistics on the sample characteristics and cross-border comparisons are conducted via SPSS to offer a comprehensive presentation of the collected data. Lastly, a series of statistical criteria of Partical Least Squares (PLS) path modelling is executed to assess the structural model fits as well as the individual, mediating and moderating effects in the research framework.

Chapter 6 as the concluding chapter in this thesis provides a summary of the research in the first place, including the rationale, objectives, theoretical foundations and empirical settings. Drawing upon the statistical results of the structural model assessment in the previous chapter, a detailed analysis of hypotheses testing by relating the prior literature on knowledge transfer, organisational learning and alliances is further discussed. After addressing the significance of this research, both theoretical and managerial implications of the research findings are subsequently suggested. Finally, a number of limitations of the research and recommendations for the future research directions are expressed.

Chapter 2: The Co-evolution of International Strategic Alliances

Research on international strategic alliances is not a new challenge. A detailed taxonomy of international strategic alliance literature includes the choice of alliances compared with alternative governance modes in the international contexts (e.g., Nielsen, 2007; Tse, Pan and Au, 1997); the incentive, antecedents and structures of international strategic alliances (e.g., Arino, 2003; Glaister and Buckley, 1998); the determinants of success, failure and instability of international strategic alliance performance (e.g., Kauser and Shaw, 2004; Dussauge and Garrette, 1995); and the guidelines for better management of inter-firm relationships across national boundaries (e.g., Cullen, Johnson and Sakano, 2000; Sirmon and Lane, 2004). The blossoming research on international strategic alliances reflects the importance of international collaborations in business practices, whereas the existing literature on international strategic alliances has been equivocal, without an overarching framework as a synthesis of the phenomena.

The major concern is the neglect of the time dimension in the exploration of international strategic alliances in the prior literature. 'Our theories and research designs often leave the time and pacing of change imprecise or ambiguous' lamented Aldrich (2001: 116) and this is egregiously true for alliance research (Salk, 2005). Most research on international strategic alliances assumed them to be static and closed entities, ignoring the fact that they are highly evolutionary and unstable (Das and Teng, 2002) in response to their external environments, either domestic or international contexts. Despite the process-oriented implications in some prior studies in terms of explaining how alliances develop over time (e.g., de Rond and Bouchikhi, 2004; Kumar and Nti, 1998; Ring and Van de Ven, 1994), the understandings of how and why changes take place in international strategic alliances and how partner firms respond to these changes arising from the external environments have remained confined. Singular absent from the literature is the research on the co-evolution of international strategic alliances – the simultaneous interaction among partner firms, alliances, and their external contexts.

To resolve the problems confronting the aforementioned attempts in the international strategic alliance literature, a well-developed theoretical framework is necessary to guide such an endeavour. As a result, this chapter aspires to reconceptualise a co-

evolutionary view on international strategic alliances by linking contextual (macro/ external/ country-level) factors with processual (micro/ internal/ firm-level) antecedents of international strategic alliance performance. The investigation into the interaction between contextual and processual antecedents is critical to unpack the reasons why alliance partners behave and perceive differently during cooperation and how these behaviours and perceptions influence the alliance performance. In doing so, this chapter reviews the origin of the co-evolutionary literature in order to re-define the co-evolution of international strategic alliances and to apply such co-evolutionary view on the exploration of the antecedents of international strategic alliance performance. To consolidate the theoretical framework, this chapter also reviews international strategic alliance theories in the arenas of internationalisation and strategy research. Moreover, the justifications of the integration of alliance theories in the development of the theoretical framework are provided.

2.1.   The Origin of Co-evolutionary Perspectives

The idea of co-evolution has its roots in the biology over a century ago when biologists believed that human beings do not evolve simply through a process of natural selection by their environments but that their capacities to learn can moderate environmental impacts (Rodrigues and Child, 2008). Such Darwinian evolution sense provides a practical analogy for the analysis of organisational adaptation and is often used as a metaphorical term in the management literature. For instance, Hannan and Freeman (1989) argued that firms with the best fits to their environments surviving in markets often possess certain characteristics whereas those without them would go bankrupt. These characteristics, further suggested by March (1991), are exploration and exploitation attributes of organisational learning. Exploration refers to experimenting with new ideas, paradigms, technologies, strategies and knowledge in relation to searching for alternatives to update the obsolete practices; whist exploitation refers to improving existing capabilities, processes and technologies, rationalising and decreasing costs for efficiency. The survival and prosperity of an organisation is the reflection of its ability to 'engage in enough exploitation to ensure the organisation's current viability and engage in enough exploration to ensure its future viability' (Levinthal and March, 1993: 105).

Ring and Van de Ven (1994) applied the evolutionary concept to alliance research and proposed that the developments of a strategic alliance are reflected by the processes in

which partner firm negotiate, implement and adjust the terms of the alliance as it unfolds over time. Echoing this proposition, Gulati (1995) considered alliance performance as a function of repeated multiple transactions between partner firms. Doz (1996) even regarded the relationships between initial conditions and consequences of strategic alliances as the representations of different learning processes. Additionally, Larsson, Bengtsson, Henriksson and Sparks (1998) explored strategic alliances as dynamic processes with power, opportunism, suspicion and asymmetric learning strategies over time and found that these inter-organisational learning dilemmas to be determinants of alliance performance. Likewise, Kumar and Nti (1998) developed a dynamic theory of strategic alliances by modelling certain developmental paths and evolutionary processes of knowledge-intensive learning alliances as the emergence of partner interactions. The capacity to perform well in cooperation is thus likely to be affected by a combination of internal factors (Rodrigues and Child, 2008), especially the factors related to joint learning processes within an alliance.

Rooted in the aforementioned evolutionary literature, the co-evolutionary perspectives consider organisations and environments as co-evolving in relation to each other. Despite the different contextual focuses between the evolutionary and co-evolutionary perspectives, they are conditioned by a degree of path-dependency regarding organisational learning as the core of organisational adaptations to either internal (evolution) or both internal and external circumstances (co-evolution). Nonetheless, the substance of co-evolution has been inconclusive in the prior literature since researchers have had disparate levels and units of analysis on which they focused for purposes of explanation. For examples, Levinthal and Myatt (1994) pioneered empirical study of the co-evolutionary perspectives and discovered that the evolution of the mutual fund industry was the result of co-evolution of distinctive firm capabilities and of industrial activities; whereas Lewin and Volberda (1999) proposed co-evolution as an explanatory factor in the strategy research to examine the simultaneous changes among macro-, micro-, and meso-level environments around an organisation. Yet not until McKelvey (1997) advocated that the evolution of organisations cannot be studied separately from the simultaneous developments of their environments, did the importance of the co-evolutionary perspectives on strategic alliance research become progressively recognised by the subsequent researchers.

Koza and Lewin (1998) initiated a co-evolutionary view on strategic alliances and specified that alliances are embedded in the partner firms' strategic portfolios and co-evolve with the firms' strategies, the institutional, organisational and competitive environments, and with management intents for the alliances. Lewin, Long and Carroll (1999) explained that the co-evolution of new organisational forms, such as strategic alliances, can mutate and emerged from the existing populations of organisations through co-evolving with managerial actions and with its competitive, institutional influences and extra-institutional changes (i.e., technological, socio-political and other environmental phenomena). They posited a research framework of analysis, focusing on firms, in which there are on-going recursive processes associating the evolution of external environments with those of the firms themselves (Rodrigues and Child, 2008). A few years later, Das and Teng (2002) explored the dynamics of alliance conditions in the alliance development process and re-defined co-evolution of strategic alliances as the simultaneous development of organisations, alliances and the environment, independently and interactively. Focusing on firm-level analysis, Ul-Haq (2005) developed a co-evolutionary perspective on strategic alliances in the banking sector and argued that the developments of a strategic alliance are the functions of the co-evolution of the partner firms, their strategic intents, and the abilities of the alliance to continue to deliver benefits as compared with a go-it-alone approach. Acknowledging the ex-ante dynamics of alliance initiation, Yeniyurt et al. (2009) suggested that international strategic alliance formation embodies a co-evolutionary process of change, where managerial adjustment is based on environmental factors as well as on experience and learning.

These distinguishing perspectives on the co-evolution of strategic alliances lead to the divergent but potentially complementary insights into the development of a co-evolutionary view on international strategic alliance performance in this research. Although the co-evolutionary view on international strategic alliances remained uncharted in the existing literature, a general assumption of the varied co-evolutionary perspectives on strategic alliances appears to be that alliances, partner firms, and their external environments co-evolve in relation to each other. In this regard, the performance of an alliance is fairly deterministic, with its external environments as the principle change agents, and with the collective actions by partner firms as its internal adaptation to guide an ever more sophisticated, fitter cooperative experience.

2.2. A Co-evolutionary View on International Strategic Alliance Performance

Adapting from Das and Teng's (2002) and Lewin and Volberda's (1999) definitions, this research reconceptualises the co-evolution of international strategic alliances as the simultaneous interactions among partner firms (micro-level environment), alliances (meso-level environment), and their contexts (macro-level environment), domestically and internationally. Given the growing recognition of the importance of macro-level factors (e.g., Bennett, Parker, Steward, Vaiya and Liu, 2001; Buckley and Ghauri, 2004; Wang and Kafouros, 2009) in the international business research, with few exceptions (e.g., Koza and Lewin, 1998; Lewin et al., 1999), prior alliance research with the co-evolutionary perspectives has analysed examples of competitive firms and industries that are not subject to high levels of direct institutional influences; not to mention that no research has explored the impacts of institutional factors on the evolution of international strategic alliances. It is well understood that an international strategic alliance is formed by partner firms from different countries; the consideration of country-of-origin factors (Wang et al., 2009) is therefore a prerequisite to develop a co-evolutionary view on international strategic alliance performance.

Paralleling Buckley and Ghauri's (2004) advocate of the importance of understanding the relationship between the evolving strategies of multinational enterprises, the changing economic geography of the world economy and globalisation, this research argues that not only do the processual factors embedded within and across organisational boundaries but also the contextual factors derived from the institutional heterogeneities between the countries from where the partner firms originate have significant influences on the performance of international strategic alliances. Besides the inter-partner relationships at meso-level environments, which have been widely discussed in the relational/ network literature to study inter-firm collaborations (e.g., Chen and Chen, 2002; Dyer and Singh, 1998), this research proposes cross-border knowledge transfer and learning as fundamental processual elements at micro-level environments to sustain the international strategic alliance operations. With respect to the contextual factors at macro-level environments, this research focuses on the relative interactions of institutional conditions in the differing contexts of the partner firms within an international strategic alliances, and proposes institutional distance (Kostova,

1996; Kostova and Roth, 2002; Kostova and Zaheer, 1999) as the major contextual antecedent of international strategic alliance performance.

Consequently, a co-evolutionary view on international strategic alliance performance is nurtured in this research. Specifically, this research on the one hand identifies inter-partner relationships and cross-border knowledge transfer and learning processes as critical processual antecedents of international strategic alliance performance; on the other hand, it extends the existing boundaries of alliance research by proposing institutional distance as the key contextual antecedent of international strategic alliance performance. This reconceptualisation of the co-evolutionary view on international strategic alliance performance outlines the theoretical framework (Figure 1) to answer the research questions; yet the understanding of how contextual factors co-evolve with processual antecedents of international strategic alliance performance is still vague at this stage. Correspondingly, a critical review on a range of international strategic alliance theories from the domains of internationalisation and strategy research is essential with respect to screening and comprising the appropriate theoretic lenses to consolidate the hypotheses development in the co-evolutionary framework.

Figure 1: A Co-evolutionary View on International Strategic Alliance Performance
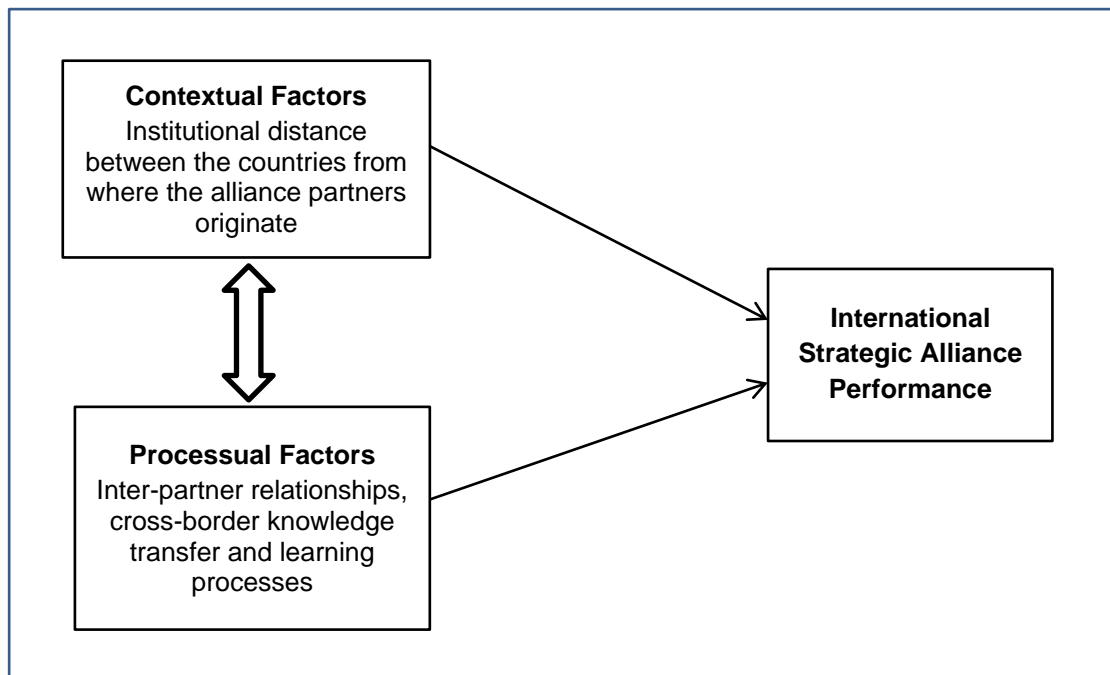
2.3.   Theories in International Strategic Alliance Research

2.3.1.   Internationalisation Theories

Since the debate on foreign direct investment in the late 1960s, vigorous developments of internationalisation theories have offered critical insights into international strategic alliance research. These theories, including market imperfections theory (Hymer, 1960), internalisation theory (Buckely and Casson, 1976), the eclectic paradigm (Dunning, 1979), transaction cost economics (Williamson, 1985), and institutional theory (Scott, 1995), encompassed extensive discussion on the assumptions of market imperfections, bounded rationality, opportunism, uncertainty and other conditions that affect the firm's choice to form international strategic alliances.

Both market imperfections and internalisation theories agree that when the do-it-alone strategy of monopolistic advantage exploitation is not applicable for the firm to compete with its competitors in the foreign market, where the market imperfections are minimised to exempt it from the need for internalisation, it would leverage its monopoly power with the help from foreign partners (Buckley and Ghauri, 1999; Hymer, 1960). Separate from such singular perspective on foreign entry mode choices, transaction cost economics argues that an international strategic alliance is formed only when the transaction costs regarding the exchange activities or processes are minimised for each partner (Combs and Ketchen, 1999); yet it is criticised by institutional theorists for the naïve assumption of secure and sound institutional environments in explaining the internationalisation of the firm (e.g., Meyer, 2001; Tse et al., 1997; Williamson, 1985). By forming international strategic alliances, moreover, Dunning's (1993) eclectic paradigm suggests that the firm can take advantage of common governance structures across borders, especially those which rely on the relational assets created by the partners, and thus facilitate access to the resources or knowledge controlled by each other. However, its mistreatment of country-level attributes (i.e., institutional factors) of the ownership, but rather the location advantage (Rugman, 2010) makes it a relatively weak theoretical ground to study international strategic alliances.

Contrary to Dunning's electric paradigm, institutional theory is concerned with the negative impacts of the contextual variations across institutional environments and defines the institutional context in a given country as the 'set of fundamental political, social and legal ground rules that establish the basis for production, exchange and distribution' (Davis and North, 1971: 6). Firms can only conform to social expectations

when they are rewarded for doing so through increased legitimacy, resources and organisational success or survival (Baum and Oliver, 1991; DiMaggio and Powell, 1983). Foreign entry mode choices are therefore perceived as the consequences of organisational responses to isomorphic pressures from the firm's environmental and organisational practices and routines (DiMaggio and Powell, 1983; Scott, 1995; Yiu and Makino, 2002). The negative pressures exerted by industries, governments and cultures thus have significant influences on both domestic and foreign partners within international strategic alliances (Thatcher, Foster and Zhu, 2006). Contrary to the aforementioned internationalisation theories, notably, the institutional theory provides greater implications on the impacts of country-level factors on international collaborations between firms.

Institutions are defined as 'the human devised constraints that structure human interactions' (North, 1990: 3), or more specifically as 'regulatory, normative, and cognitive structures and activities that provide stability and meaning to social behaviours' (Scott, 1995: 33). Institutions embody 'rules of the game' (North, 1990: 3) and therefore exercise constraint and control, and enable economic activities and affect both domestic and foreign firms' behaviours in various ways in a given country. In light of the institutional theory, three types of institutions have been identified to affect firms' behaviours in doing business in a given country: regulatory institutions refer to political environments, including laws and regulations that construct and constitute the grounds of organisational and industrial actions and ensure stability and order in societies (North, 1990; Scott and Meyer, 1994); normative institutions represent the shared understanding and meaning or the 'logic of appropriateness' (March, 1981) that is embedded in the forms of national cultures, values, norms and belief systems (Yiu and Makino, 2002); and cognitive institutions are 'the widely shared cognitive structures by which actors of a given organisational field or societal entity interpret and make sense of their world' (ibid: 671). By these definitions, institutional theorists tended to assume firms as passive players, contending that firms are functioned within a social framework of norms, values and taken-for-granted assumptions about what constitutes appropriate or acceptable economic behaviours (Oliver, 1997); but they discounted the ways by which firms could be strategically proactive in their adaptations to environmental and institutional influences (Ang and Cummings, 1997).

In this void, neo-institutional theorists have proposed the institution-based view as the third leg for a strategy tripod, complementing by the other relatively long-lasting theories – industry- and resource-based views (Peng, Sun, Pinkham and Chen, 2009), and argued that institutions are no longer background conditions but rather are active factors that 'directly determine what arrows a firm has in its quiver as it struggles to formulate and implement strategy' (Ingram and Silverman, 2002: 20). Hence, unlike the conventional institutional theorists suggesting that international strategic alliances are formed when the institutional environments in host countries permit them to do so, neo-institutional theorists argue that they are formed to achieve and maintain institutional legitimacy through continuous adaptations to the environmental influences arising from regulatory, normative and cognitive institutions in foreign markets. Although both theorists agree with the negative roles played by institutions in host countries, compared with the conventional institutional theory, the institution-based view pays more attention to the process-orientated perspective on the developments of international strategic alliances and implies that they are reflected by the foreign partners' adaptations to institutional environments in host countries. As the primary objective in this research is to understand how country-level factors co-evolve with processual antecedents of international strategic alliance performance, the institutional theory, which is further elevated as the institution-based view (Peng, Wang and Jiang, 2008), parallels the theoretical foundation of the contextual antecedents of alliance performance in the co-evolutionary framework for the purpose of hypotheses development.

2.3.2. Strategy Theories

While internationalisation theories largely place emphasis on the country-level factors influencing firms to undertake the various foreign entry mode choices, strategy theories as the other main stream of international strategic alliance research, such as the resource dependence theory (Pfeffer and Salancik, 1978), resource- (Barney, Wright and Ketchen, 2001) and knowledge-based (Kogut and Zander, 1992), and relational views (Dyer and Singh, 1998), focus more on the justifications of the firm-level strategies to elucidate the various phenomena of international strategic alliances.

Building on Hymer's (1970) premise, Amit and Schoemaker (1993) defined the resource-based view as a theory of rents based on resource market imperfections, and thereby those resources which are rare, valuable, imperfectly imitable and non-substitutable are strategic assets for firms to enable value-creating strategies (Barney et

al., 2001; Prahalad and Hamel, 1990). Fundamentally, the theory is developed to understand how the superior performance of a firm relative to its competitors can be generated by the unique bundle of resources within the firm. Montgomery and Wernerfelt (1988) first associated the theory with alliance research by proposing that a firm might appropriate substantial rents as trading partners of resource owners, provided that relationship-specific investments tied the parties together. Accordingly, international strategic alliances are reflected as popular means for firms to obtain critical resources from external partners in the global markets.

Unlike the resource-based view, however, resource dependence theory focuses on the relative power positions between firms (Davis and Cobb, 2009; Pfeffer and Salancik, 1978). The theory explains that firms manage their dependencies in the face of uncertainty and that, as the environments become more uncertain and dependencies increase, firms will seek closer relationships to improve information exchange, commitment, legitimacy and exchange stability (Fink, Edelman, Hatten and James, 2006). This indicates that international strategic alliances are initiated when both foreign and domestic firms are mutually dependent on resources, but the partner possessing more important resources retains strategic control over the others (Yan and Gray, 1994, 2001). Although it was indicated that strategic alliances are more likely to be formed if a firm's resources are characterised by imperfect mobility, imperfect imitability, and imperfect substitutability (Das and Teng, 2000), neither the resource-based view nor the resource dependence theory have been able to specify which critical resources encouraged firms to share between each other through cross-border cooperation.

Complementing this research gap, the knowledge-based theory specifies knowledge-based resources as the most strategically distinctive resources of the firm to create and sustain competitive advantage because they are inherently difficult to imitate, mobile and substitute by other firms, and thus facilitate strategic differentiation and superior performance of the firm (DeCarolis and Deeds, 1999; McEvily and Chakravarthy, 2002; Wiklund and Shepherd, 2003). Following Polanyi's (1962) classifications in knowledge, Nonaka (1994) distinguished two types of knowledge-based resources: explicit knowledge refers to the knowledge that is codified and transmittable via formal and systematic communication, whereas tacit knowledge is completely outside the routine that is often 'rooted in action, commitment, and involvement in a specific context' (ibid: 16), and thus makes it difficult to formalise and communicate. The dichotomous

taxonomy between explicit and tacit knowledge is clear but it does not proffer how to organise and manage the different types of knowledge by firms. Although Nonaka and Takeuchi (1995) further advocated that organisational knowledge is a kind of never-ending spiral process from tacit to explicit and then from explicit to tacit, they provided no indication of when and where the nature of the knowledge would be evolved and changed.

The importance of knowledge has also been rooted in the internationalisation process literature, which suggests that the internationalisation of the firm often follows a sequence of evolutionary stages, and meanwhile that the firm accumulates knowledge through experience (Hollensen, 2007; Johanson and Vahlne, 1990; Rugman, 1980). The knowledge gained from experience then enables the firm to make rational decisions necessary to expand international business operations (Massingham, 2004), including capturing foreign market opportunities and building its superior network position among its competitors in the foreign markets. In this regard, international strategic alliances can be considered as one form of the internationalisation processes undertaken by firms to acquire indispensable knowledge from their partners if they are incapable of, or maybe they are capable of but constrained by time and cost, generating such knowledge directly from their own experience. Since knowledge-based theorists reckon the existence of the firm depends on its superior ability to integrate multiple knowledge streams, apply existing knowledge to tasks, as well as create new knowledge (Grant, 1996a, b; Kearns and Sabherwal, 2007), the nature of international strategic alliances can thereby be explained as the functions of cross-border knowledge transfer and learning between the partner firms so as to achieve the cooperative objectives (Reus, Ranft, Lamont and Adams, 2009).

Whereas the knowledge-based view deems knowledge-based resources as competitive advantage and further proposes knowledge transfer and learning as the major motives of alliance formation, the relational view suggests that a firm's critical resources may extend beyond its boundaries and be embedded in inter-firm routines and processes and thus sources of inter-organisational competitive advantage are the result of relation-specific assets, knowledge-sharing routines, complementary resources/ capabilities and effective governance (Dyer and Singh, 1998). Despite the similar theoretic focus on social context with the resource dependence theory, a power-based theory on asymmetric resource distribution and power imbalance, the relational view as a trust-

based theory is concerned about the fair investment of relational-specific resources and the development and governance of knowledge sharing routines for cooperation. The relational view has thus gained popularity in alliance research as it perceives inter-organisational relationships as focal units of analysis to understand the sources of competitive advantage from dyad/ network routines and processes. Specifically, it regards international strategic alliances as the functions of accumulation of relational-specific resources and the developments of knowledge sharing routines between firms across national boundaries.

As the aim of this research is to unpack the paradoxes in cross-border knowledge transfer and learning processes within international strategic alliances, the knowledge-based and relational theories recognising knowledge sharing routines between firms as the main rationales of alliance formation are most applicable to examine the research questions. Building upon the co-evolutionary perspectives (e.g., Das and Teng, 2002; Koza and Lewin, 1998; Rodrigues and Child, 2008), this research incorporates the organisational learning with the knowledge-based and relational views to unfold the underlying mechanisms of alliance operations so as to identify the key processual antecedents of international strategic alliance performance.

2.3.3. The Integration of Alliance Theories and Its Justifications

The proliferation of international strategic alliances parallels an impressive literature on alliance formation, motivations, structures and outcomes, with relatively limited attentions to its process dynamics and evolution. One of the major challenges in alliance research, however, is complexity (Hennart, 2006), because alliances involve phenomena at the alliance level, at that of the partner firms, and at that of the external environments. The constitution of the theoretical foundations of the co-evolutionary view on international strategic alliance performance thus requires an integrative theory of alliances, which was suggested by Salk (2005) as connecting theory with empirical investigation across levels of analysis.

This research advocates the need to integrate country-of-origin factors with firm-level strategies with respect to advance a co-evolutionary view on international strategic alliances. Particularly, this research argues that the diffusion of an alliance co-evolves not only with the collective learning between partner firms through intensive interaction along with cooperation but also with the external environments from where the partners

originate. Based on this argumentation, this research comments that no individual internationalisation or strategy theory as reviewed in the earlier section could complete the co-evolutionary view on international strategic alliances. Whilst internationalisation theories mainly pay attention to country-level determinants of foreign entry mode choices undertaken by firms, strategy theories focus more on firm-level rationale to form international strategic alliances with foreign partners. In this regard, the necessity to integrate internationalisation with strategy theories to consolidate the co-evolutionary view on international strategic alliance performance is justified in this research.

Particularly, this research observes that most internationalisation theories perceive external conditions, either market imperfections or institutional frameworks, as focal determinants of internationalisation of the firm. As the co-evolutionary perspective on strategic alliances considers firms as living entities adapting to the external environments, the institution-based view (Peng et al., 2008) assuming firms as proactive players adapting to the institutional influences derived from external environments is applicable to examine the impacts of contextual variation on international strategic alliance performance in this research. Despite the lack of considerations of the contextual factors, this research finds that the strategy theories drawing upon international strategic alliances offer constructive explanations on the internal developments of the partner firms and pay much attention to the mutually-dependent partnerships. Unlike the resource-based view and the resource dependence theory, the knowledge-based and relational views specify the features of resources, such as knowledge, complementary and relational assets, to build and retain the interdependencies between alliance partners. As a result, the integration of the compatible theories is essential to formulate the theoretical framework in this research with respect to better understanding how partner firms, alliances and their external environments co-evolve in relation to each other.

Table 1: A Comparative Review on International Strategic Alliances Theories

Theory	Conditions/ motivations of international strategic alliance formation	Applicability to the co-evolutionary framework on international strategic alliances	Inapplicability to the co-evolutionary framework on international strategic alliances
Market Imperfections Theory (Axinn and Matthyssens, 2002; Hymer, 1960)	Firms form international strategic alliances to enable their monopolistic advantage exploitation in foreign markets.	• Market imperfections in a given country are the environmental attributes for foreign firms to cooperate with local partners	• One-side perspective on the motives of foreign partners • Lack of specifications on which unique resources of the firm contribute to its monopolistic advantage in foreign markets • Lack of process-orientation on the developments of international strategic alliances
Internalisation Theory (Buckley and Casson, 1976; Buckley and Ghauri, 1999)	Firms form international strategic alliances when the do-it-alone strategy of monopolistic advantage exploitation is not applicable to competing with their competitors in foreign markets, where the liabilities of foreignness are minimised to exempt them from the needs of internalisation.	• Market environments in a given country determine firms' strategies: firms internalise production to reduce liabilities of foreignness ↔ when liabilities of foreignness do not exist firms would not need to internalise the production • Firms' propriety knowledge is the core of monopolistic advantage exploitation in foreign markets	• One-side perspective on the motives of foreign partners • Lack of process-orientation on the developments of international strategic alliances
Dunning's Eclectic Paradigm (Dunning, 1979, 1980, 1981, 1988, 1993, 2001)	Firms form international strategic alliances to take advantages of common governance structures, such as relational assets created by partners, to facilitate resources/ knowledge transfer.	• Locations as environmental attributes for firms to exploit competitive advantage in foreign markets	• Mistreatment of country-level factors as ownership but rather locational advantage for firms • Lack of process-orientation on the developments of international strategic alliances
Transaction Cost Economics (Klein, Crawford and Alchian, 1978; Williamson, 1985)	Firms form international strategic alliances when the transaction costs regarding exchange processes and activities are minimised for each partner.	• Mutually-dependent perspective on international strategic alliance formation: transaction costs are concerned with both domestic and foreign partners in international strategic alliances • Process-orientation on the developments of international strategic alliances in which they are manifested by a sequence of transactions, activities, and processes between domestic and	• A rather static assumption on external environments of international strategic alliances • Lack of specifications on which unique resources of the alliance partners induce the transactions between each other

		foreign partners • Country-level factors matter (e.g., country risk)	
Institutional Theory (North, 1990; Scott, 1995)	Firms form international strategic alliances when the institutional environments in host countries permit them to do so.	• Institutions (regulatory, normative and cognitive) are environmental impediments for firms to exploiting competitive advantage in foreign markets	• One-side perspective on the motives of foreign partners • Firms as static entities confront the institutional influences in external environments in host countries • Lack of process-orientation on the developments of international strategic alliances
Institution-based View (Mahoney, 2005; Peng et al., 2008, 2009)	Firms form international strategic alliances to achieve and maintain institutional legitimacy through continuous adaptations to the environmental influences in host countries.	• Firms as proactive players adapt to the institutional changes in external environments in host countries • Process-orientation on the developments of international strategic alliances in which they are manifested by the foreign partners' adaptations to institutional environments in host countries • Institutions in host countries matter	• One-side perspective on the motives of foreign partners
Resource-based View (Amit and Schoemaker, 1993; Wernerfelt, 1984)	Firms form international strategic alliances to create competitive advantage through acquiring complementary resources from their partners.	• Mutually-dependent perspective on international strategic alliance formation: mutual dependencies on resources that cannot be purchased in the domestic markets but are available to be provided by foreign partners • Complementary resources are the cores of international collaborations • Process-orientation on the developments of international strategic alliances in which they are manifested by resource exchanges, exploitation and cooperation between partners	• Lack of considerations of factors derived from competitive and institutional environments from where alliance partners originate • Lack of specifications of which unique resources encourage firms to share with each other during collaborations
Resource Dependency Theory (Davis and Cobb, 2009; Pfeffer and Salancik, 1978)	Firms form international strategic alliances to reduce the environmental complexities derived from foreign and domestic markets and to mutually depend on partners' resources, but the partners owning more important resources retain strategic control	• Mutual-dependent perspective on international strategic alliance formation: interdependencies on resources between alliance partners but the relative power positions of the partners, depending on the importance of resources,	• Lack of specifications on which unique resources of the alliance partners lead to interdependent partnerships • Lack of specifications on which noxious environmental factors induce international

	over the others.	matter • Country-level factors matter (e.g., environmental uncertainties)	collaborations • Lack of process-orientation on the developments of international strategic alliances: the theory assumes inter-firm cooperation as the one-time event without considering it as reciprocal dependencies of a firm on the other
Knowledge-based View (Eisenhardt and Santos, 2002; Grant, 1996a,b, 2002)	Firms form international strategic alliances to create competitive advantage through acquiring knowledge-based resources from their partners when they are incapable of, or they are capable of but constrained by time and cost, generating such knowledge-based resources directly from their own internationalisation experience.	• Mutually-dependent perspective on international strategic alliance formation: mutual dependencies on knowledge-based resources for internationalisation between alliance partners • Knowledge is the key to regain and sustain global competitiveness • Process-orientation on the developments of international strategic alliances in which they are manifested by cross-border knowledge transfer and learning processes between partners	• Lack of considerations of factors derived from competitive and institutional environments from where alliance partners originate
Relational View (Borgatti and Cross, 2003; Dyer and Singh, 1998)	Firms form international strategic alliances to accumulate relational-specific resources and to develop knowledge sharing routines with the help of foreign partners.	• Mutual-dependent perspective on international strategic alliance formation: relational-specific resources are only built and attained with the engagement of all alliance partners • Relationship quality is the key in the developments of international strategic alliances • Process-orientation on the developments of international strategic alliances in which they are manifested by knowledge sharing routines between the partners	• Lack of considerations of factors derived from competitive and institutional environments from where alliance partners originate

Building upon Lewin, Weigelt and Emery's (2004) and Volberda and Lewin's (2003) adaption-selection studies, this research consolidates the theoretical foundations of the co-evolutionary framework on international strategic alliance performance by further grouping the chosen alliance theories into three layers with respect to better explaining the interaction among partner firms, alliances, and their domestic and international contexts. In the first place, this research adopts the organisational learning (Zahra and George, 2002) and knowledge-based view (Grant, 1996a, b) to map out the underlying mechanisms of alliance operations in order to explain the heterogeneities of alliance partners' behaviours and perceptions towards knowledge transfer and learning processes. Secondly, this research applies the relational view (Dyer and Singh, 1998) to examine the inter-firm relationships and their impacts on the knowledge transfer and learning processes through international strategic alliances. Finally, this research employs the institution-based view (Peng et al., 2008) to analyse the interactions between exogenous discontinuities originating from the diverse institutional contexts from where alliance partners originate and their impacts on the partners' behaviours and perceptions towards knowledge transfer and learning processes. Accordingly, all macro- (i.e., the institution-based view), meso- (i.e., relational view) and micro-level (i.e., the organisational learning and knowledge-based view) theories are integrated to comprise a co-evolutionary framework of international strategic alliance performance (Figure 2).

Grounding on the synthesis of the organisational learning, knowledge- and institution-based, and relational theories, this research suggests that the formation of international strategic alliances relies on the demand of transferring and learning complementary knowledge-based resources between foreign and domestic firms with heterogeneous contexts. If the partner firms can understand the underlying mechanisms of alliance operations (processual factors) – cross-border knowledge transfer and organisational learning processes and inter-partner relationships – and the exogenous variables affecting the evolution of these operations (contextual factors), both the firms' and the alliance's capabilities can be greatly enhanced.

Figure 2: The Integration of Alliance Theories in the Co-evolutionary Framework

34
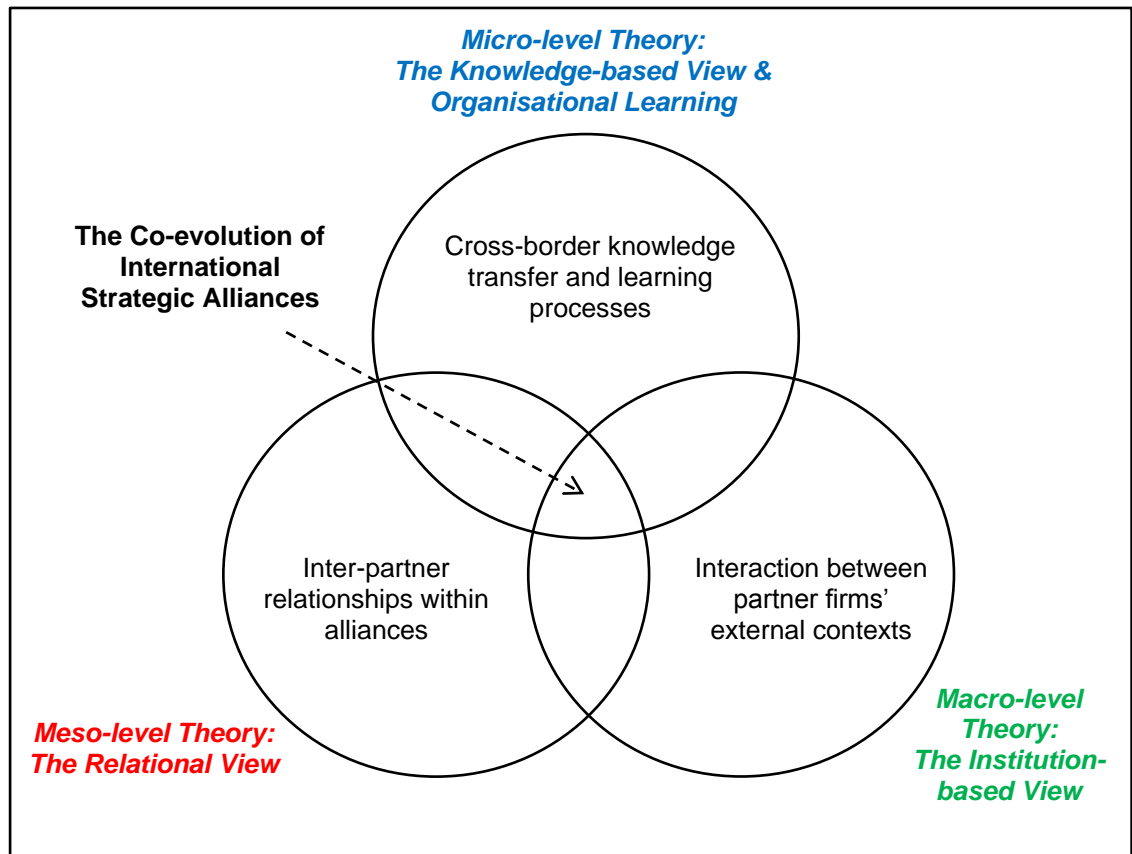
Chapter 3: The Co-evolutionary Framework and Hypotheses

By the synthesis of the organisational learning (Zahra and George, 2002), knowledge- (Grant, 1996a, b) and institution-based (Peng et al., 2008) and relational theories (Dyer and Singh, 1998), the co-evolutionary perspective on international strategic alliances is reconceptualised in the previous chapter to support the investigation into contextual and processual antecedents of international strategic alliance performance in this research. The examination of both contextual and procussual factors on alliance performance parallels Wang, Deng, Kafouros and Chen's (2011) analytical logic in an empirical research on the spillover effects of foreign direct investment, in which the authors suggested that both R&D intensity in a given industry (contextual factor) and pace and irregularity of foreign entry (processual factors) have significant impacts on the relationship between the level of foreign presence and the productivity of host-country firms. To map out the alliance mechanisms for hypotheses development in the co-evolutionary framework, a systematic and collective review on the knowledge transfer and organisational learning literature is at the core of this chapter.

3.1. Knowledge Transfer and Organisational Learning as Alliance Mechanisms

The turbulence in global economy has made organisational knowledge a critical element for sustaining competitive advantage of the firm. Acquiring or assessing knowledge from beyond the firm's boundary has become a focal strategy for adding depth and breadth to its knowledge-based capabilities (Choo and Bontis, 2002). The growing importance of cross-border knowledge transfer and learning is recognition that competitive advantage can no longer be solely ascribed to internal idiosyncrasies, but rather depends on resources and capabilities exchanged or acquired from international networks (Mathews, 2003; Squire, Cousins and Brown, 2009). Research on knowledge transfer and organisational learning has been burgeoning since 1990; yet exploration of such issues within international contexts is a relatively recent phenomenon (Bresman et al., 2010).

Kogut (1988) pioneered alliance learning research by explicitly demonstrating an organisational learning imperative on joint ventures' formation. Inkpen (1998, 2000) argued that alliances provide firms with a unique opportunity to leverage their strengths

with the help of partners. Doz (1996) and Simonin (1997) empirically examined the impact of collaborative experience as a form of knowledge developed between alliance partners. With few exceptions (e.g., Buckley, Glaister, Klijn and Tan, 2009), researchers have failed to make a clear distinction between knowledge transfer and organisational learning and simply inter-changed both terms to explain the phenomena that are highly relevant yet fundamentally different.

The most widely acknowledged definition of knowledge transfer is 'the process through which one unit is affected by the experience of another' (Argote and Ingram, 2000: 151), and thus inter-organisational knowledge transfer takes place when specific knowledge is passed on from one firm to the other (Buckley et al., 2009). Knowledge acquisition, which has been a popular phenomenon closely linked with organisational learning literature, is defined as 'the direct (learning) experience of the organisation and its members' (Lyles and Salk, 1996: 879) and can be reflected upon and measured by the various types of new knowledge acquired from the external sources, such as technological, marketing, managerial, new product development and manufacturing expertise and techniques (ibid).

Unlike knowledge transfer primarily concerning the two-way processes between firms, knowledge acquisition focuses more on the choices and consequences related to the recipient firm solely. Since knowledge transfer requires the integration of differentiated knowledge, it manifests itself through changes in the knowledge bases, levels of innovativeness, or performance of the recipients (Easterby-Smith, Lyles and Tsang, 2008; van Wijk et al., 2008). In the case of international strategic alliances, cross-border knowledge acquisition can thereby be perceived as the manifestation of the result of knowledge transfer between partner firms across national boundaries.

Knowledge transferred is said to be completed when learning takes place and when the recipient understands the intricacies and implications associated with that knowledge so as to apply it (Ko, Kirsch and King, 2005). However, even if the knowledge is transferred from one firm to the other, it cannot be guaranteed that the knowledge is fully acquired as expected. Harrigan (1985) expressed the similar concern and noted that a firm would learn nothing from its excellent partners if there is a lack of receiving mechanism to confront to the transferred knowledge.

Organisational learning, which is defined as 'the process of improving actions through better knowledge and understanding' (Fiol and Lyles, 1985: 803), is thus suitable for epitomising such receiving mechanism of the firm. It contributes to an increase in an organisation's stock of knowledge and very often takes place via knowledge transfer from entities outside organisational boundaries (Perez-Nordtvedt et al., 2008). Akin to the process-orientated assumption of knowledge transfer, researchers have generally acknowledged organisational learning as a multi-faceted process by which the organisational knowledge base is developed, improved, and shaped (e.g., Dodgson, 1993; Fiol and Lyles, 1985).

In line with Lyles's (1994) notion that organisational learning is concerned with the development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future actions, this research proposes that organisational learning is a parallel mechanism to the knowledge transfer process between firms. Yet unlike knowledge transfer, which pays attention to the process between a contributor (transferor) and an adopter (recipient) over knowledge-based resources and capabilities, organisational learning is central to the survival, adaptation and renewal of a firm (recipient) through exploring and exploiting the new knowledge from its partner (Bapuji and Crossan, 2004; Darr and Kurtzberg, 2000; March, 1991). Consequently, knowledge transfer and organisational learning can be characterised as two sides of a coin in which they are distinctive in the activities and contexts involved but well-attached to elucidate the underlying mechanisms of alliance operations (Figure 3).

Figure 3: Knowledge Transfer and Organisational Learning as the Alliance Mechanisms
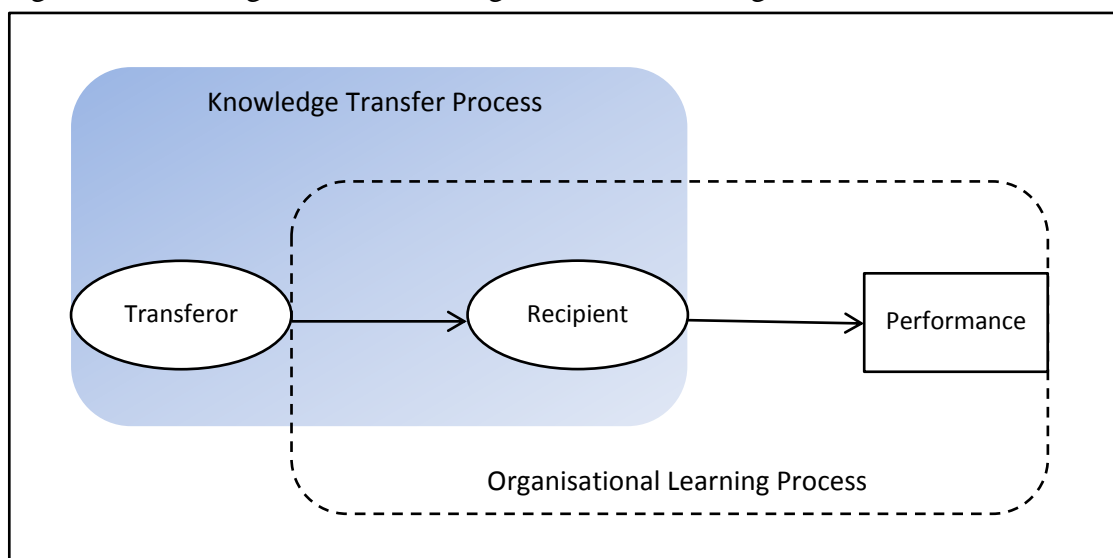
3.2. Theoretical Backgrounds of Knowledge Transfer and Organisational Learning

Knowledge transfer and organisational learning research have their roots in Shannon and Weaver's (1949) mathematical theory of communication. Since then, multiple theoretical lenses have been utilised by researchers to explain and examine inter-organisational knowledge transfer and learning, including the game theory, transaction cost economics, social exchange theory, organisational learning, absorptive capacity, knowledge-based and relational views of the firm.

The issue of partner opportunisms in knowledge transfer and learning through strategic alliances has been the primary discussion in the economics literature (e.g., Cress and Martin, 2006; North, 1994; Jimenez-Martinez, 2006). Economists advocate that knowledge is shared with another firm subject to adequate compensation for the effort expended in the transferring process (Kachra and White, 2008). Proceeding as the science of strategy, the game theory analyses the situations in which people's fortunes are interdependent and the outcomes of one's strategy depend on the strategy or the choice of others (Samieh and Wahba, 2007). Akin to the prisoners' dilemma of collective action in the game theory, inter-organisational knowledge transfer involving firms with information asymmetry on the other's behaviour very often could cause conflicting interests in learning, which in turn might terminate the partnership.

Similar to the game theory that offers insights into the explanations of partner opportunism in strategic alliances, the transaction cost economics presents useful tactics through which partner firms can maintain the collaborations, given that the potential for opportunistic behaviours is acknowledged. Specifically, the transaction cost economics suggests that the partnership can be prolonged by economic commitments, which create a 'locked-in condition' (Katz, 1989) between partners, and thus ensure the continuance and natural forbearance of the cooperation (Buckley and Casson, 1988; Young-Ybarra and Wiersema, 1999).

Applying the game theoretic and transaction cost perspectives on strategic alliance structuring, Parkhe (1993) suggested that narrow self-interests in learning can lead to a dysfunctional partnership and imped knowledge transfer outcomes. However, both game theory and transaction cost economics do not provide plausible explanations of

why partner firms possess self-interests and what factors might increase or decrease such opportunistic behaviours within collaborations nor capture managerial relationships that exist between firms during the formation and post-formation phases of strategic alliances (Muthusamy and White, 2005).

Whereas economists assume that firms' behaviours towards knowledge transfer are motivated by self-interests, the social exchange theorists believe that knowledge transfer can be motivated by a broad array of interests and those self-interests and group-interests can coexist (Kachra and White, 2008). The question of how characteristics of social network affect knowledge transfer and learning has been receiving growing attention (e.g., Albino, Garavelli and Gorgoglione, 2004; Argote and Ingram, 2000). In the context of inter-organisational relationships, social exchange refers to a situation in which the actions of a firm provide the rewards or punishments for the actions of another firm and vice versa in repeated interactions (Blau, 1964). Drawing on the social exchange theory, Muthusamy and White (2005) found that social exchanges such as reciprocal commitment, trust and mutual influence between firms are positively related to knowledge transfer and learning in strategic alliances. Correspondingly, growing attention has been paid to examining the impacts of relational factors on inter-organisational knowledge transfer and learning.

Researchers adopting the relational view argued that the focus of enquiry should be on the process of knowing and the capability to act, and considered knowledge as being processual, provisional and highly context dependent (Hayes and Walsham, 2005). Brown and Duguid (1998) coined the phrase 'knowledge stickiness' and advocated that knowledge is socially embedded within practices. As such, increasing empirical studies on the relational perspective indicate that the relationship quality, such as tie strength and trust between firms, is positively associated with knowledge transfer and organisational learning (e.g., Narteh, 2008; Reagans and McEvily, 2003; Squire et al., 2009). Indeed, knowledge is essentially related to human actions (Lyles and Salk, 1996). Without trustworthy relationship between firms, knowledge would not be able to be created and amplified (Nonaka and Takeuchi, 1995).

Unlike the social exchange theory focusing on the recursive relationship between firms, the relational view suggests that relationship is important in any type of cooperative activities, regardless of the uni- or multi-dimensional knowledge transfer and learning

processes within collaborations. For instance, in an empirical study on knowledge acquisition through international joint ventures, Park, Giroud, Mirza and Whitelock (2008) discovered that knowledge acquisition of Korean parent companies is facilitated by the trust between them and their foreign partners. In the case of international strategic alliances where knowledge transfer and learning between firms can be either single dimension from foreign/ domestic to domestic/ foreign partners or mutual dimension between foreign and domestic firms, the relational view is better suited than the social exchange theory to offer wider theoretical justifications in examining the issue of cross-border knowledge transfer and learning through international strategic alliances in this research.

The categorisation of different types of learning and the activities through which firms access and learn new knowledge and the strategic implications have been the central themes in the organisational learning literature (Easterby-Smith, 1997; Friesl, 2011; Huber, 1991). The concept of organisational learning is essentially concerned with both the function of access to new knowledge and the capabilities for using and building on such knowledge (Inkpen, 2002). Due to the intrinsic notion of change, organisational learning research has been largely related to the questions of how organisations evolve, transform, and renew themselves in order to face the challenges of continuously changing environments (Vera and Crossan, 2005). In a seminal paper on organisational learning, for example, March (1991) distinguished between exploration and exploitation and considered both as focal determinants of organisational adaptation. Building upon this, Inkpen (1998) suggested that acquiring or learning new knowledge from external partners provides the firm with the basics for organisational renewal and sustainable competitive advantage. However, it is noted that researchers on organisational learning have moved from the focus on content, on what should be learned, to the focus on how new knowledge can be acquired, assimilated, and applied by the firm (ibid).

Rooted in the organisational learning literature, the concept of absorptive capacity concerning the ability to recognise the value of new external knowledge and to assimilate and use that knowledge into commercial ends (Cohen and Levinthal, 1990) has therefore been increasingly discussed, adopted and reconceptualised by the succeeding researchers (e.g., van den Bosch, van Wijk and Volberda, 2005; Zahra and George, 2002). In spite of the popularity in the theoretical developments, far more limited empirical studies have been conducted to examine absorptive capacity explicitly

(Easterby-Smith et al., 2008). Moreover, although the relevance between organisational learning and absorptive capacity has been taken for granted, none of the prior research has investigated the relationship between the two within the context of inter-organisational or even international collaborations. Thus the need to position the occurrence of absorptive capacity in the organisational learning process and examine both effects on the alliance performance renders significance in this research.

The strategic importance and implications of knowledge-based resources for the development and maintenance of a firm's competitiveness have been the major concern of the knowledge-based theorists (e.g., Grant, 1996a, b; Kogut and Zander, 1992; Wiklund and Shepherd, 2003). Although the theory implies that the primary role of the firm is acquiring and transferring knowledge (Reus et al., 2009), it has seldom been associated with the issues of cross-border knowledge transfer and learning but rather being immensely applied in the examination of knowledge acquisition across organisational boundaries. For instance, Inkpen (2000) suggested that the acquisition of the new knowledge from the external partners is the lifeblood of experimentation, innovation and change for firms, and thus through forming strategic alliances firms could gain access to their partners' broad knowledge-based resources and capabilities.

Grant and Baden-Fuller (2004) challenged the presumption of the knowledge-based theory that strategic alliances are initiated by the firms' desire to acquire knowledge from their partners by developing the knowledge accessing theory, and argued that the major advantage of alliances over partner firms and markets is in accessing rather than in acquiring knowledge. In conjunction with the organisational learning perspective, the authors further indicated that alliances mainly contribute to the efficiency in the application of knowledge (exploitation) by improving the efficiency with which knowledge is integrated into the existing operations and by increasing the efficiency with which knowledge is utilised (ibid). The argument highlights the importance of knowledge application by the recipient firms within strategic alliances, which is much related to the concept of realised absorptive capacity proposed by Zahra and George (2002).

Nevertheless, the knowledge-based view has been becoming less a challenge to existing theories of the firm and more an integral element of conventional management thinking (Inkpen, 1998). Knowledge as the key to competitive advantage of the firm has been

extensively recognised by the academics and practitioners and very often been presumed as the backbone of knowledge transfer and learning research. Due to its limited theoretical power, which focuses on the explanation that superior performance of the firm is based on its integration of knowledge (Kearns and Sabherwal, 2007), the knowledge-based theory has been increasingly applied by the researchers with other theories to explore knowledge-related phenomena.

Most commonly, scholars used both resource- and knowledge-based views to claim that the creation and accumulation of knowledge-based competencies can yield long-term survival of the firm (e.g., Khamseh and Jolly, 2008; Teece, 2000). Also, some researchers associated the knowledge-based view with alliances' developmental processes and proposed knowledge as the determinant of alliance evolution (e.g., Arino and de la Torre, 1998; Doz, 1996). Similar attention has also been popularly paid by the organisational learning theorists, who advanced the alliance evolution as a changing process (e.g., Guzman and Wilson, 2005; Lee, Bennett and Oaks, 2000).

To complement the research gaps in the knowledge-based theory, this research succeeds Grant and Baden-Fuller's (2004) argument to incorporate the organisational learning perspective to map out the underlying mechanisms of alliance operations. Particularly, this research suggests that knowledge transfer is driven by the partner firm's need to access, acquire and apply the knowledge into the alliance context with respect to achieving the cooperative objective. In this regard, the alliance evolution can be manifested by the on-going processes of knowledge transfer and organisational learning between partner firms. In other words, both knowledge transfer and organisational learning characteristics determine the cooperative outcomes within alliances.

However, as the scope of this research focuses on international strategic alliances where at least one foreign firm and one domestic firm engage in knowledge transfer and organisational learning processes, the investigation into the co-evolution of alliances and their environments, both domestically and internationally, remains critical to unpack the paradoxes in cross-border knowledge transfer and learning in this research. Within the co-evolutionary framework proposed in the earlier section, this research synthesises the organisational learning, relational, and institution- and knowledge-based views to identify the patterns, determinants and consequences of knowledge transfer and

the underlying mechanisms of organisational learning and to hypothesise their impacts on the performance of international strategic alliances in the following manners.

3.3.   The patterns of Knowledge Transfer

3.3.1.   The 'Transferor-Recipient' View on Knowledge Transfer Process

Organisational knowledge as a subject of study has been around for a long time (Easterby-Smith and Lyles, 2005) and its realisation depends mainly on the interpretation, organisation, development, execution and application by people (Guzman and Wilson, 2005) within or across organisations. Human actions, decisions, and behaviours thus present the core of the investigation into the transfer of organisational knowledge. However, most prior research has examined knowledge transfer without considering the actors involved and simply focused on the decomposed process itself. For instance, the majority of researchers have conceptualised knowledge transfer as process-dependent models comprising discrete stages from awareness, acquisition, transformation, association to application (e.g., Liyanage, Elhag, Ballal and Li, 2009; Szulanski, 2000). This view is criticised for the ignorance of the core actors − the transferors and recipients – to elucidate the knowledge transfer processes.

Emerging researchers then adopted 'transferor-recipient' generic models (e.g., Albino, et al., 2004; Cantu, Criado and Criado, 2009; Ko et al., 2005) to reconceptualise knowledge transfer as 'the process through which organisational actors exchange, receive and are influenced by the experience and knowledge of others' (van Wijk et al., 2008: 832) and most centred on the resulting changes of the recipient because they refer to 'dyadic exchanges of organisational knowledge between a source and a recipient unit in which the identity of the recipient matters' (Szulanski, 1996: 28). Despite the process-orientated dimensions of knowledge transfer, prior empirical studies have generally operationalized it as a single dependent variable associated with a range of possible antecedents (e.g., Ko et al., 2005; Sarala and Vaara, 2010; Simonin, 2004) rather than delving into unfolding the underlying mechanisms between the transferor and the recipient, nor examining and explaining the inconsistent results of knowledge transferred and received by the actors.

Instead of being a one-time event, inter-organisational knowledge transfer usually involves frequent and numerous interactions between firms (Nonaka, 1994) and can be perceived as repeated games and change processes across organisational boundaries

(Guzman and Wilson, 2005; Lee et al., 2000). Firms are eager to acquire knowledge from each other whilst at the same time they are urged to transfer the knowledge in response to the other's need. Knowledge transfer is a complex phenomenon and in practice, successful transfer is often not easy to achieve (Easterby-Smith et al., 2008). In the case of international strategic alliances, knowledge transfer can be more complicated because it encompasses different cultures and contexts which influence how partner firms process, interpret, and make sense and use of knowledge (ibid).

Such intricate nature of knowledge transfer across national boundaries requires further investigation into the alliance partners' behaviours and perceptions towards the transferring process. In line with the 'transferor-recipient' model (e.g., Albino et al., 2004; Cantu et al., 2009; Ko et al., 2005), this research evokes the need to distinguish the transferor's and the recipient's attitudes and cognitions towards cross-border knowledge transfer as well as identifying the determinants of such differences so as to unpack the puzzles in the transferring process between partner firms within international strategic alliances.

3.3.2. The Transferor's Behaviour towards Knowledge Transfer

The knowledge-based theorists advocate knowledge-based resources and capabilities as significant contributors to the firm's long-term sustainable competitive advantage because they are inherently difficult to imitate and socially complex, thus facilitating strategic differentiation and superior performance (e.g., Alavi and Leidner, 2001; DeCarolis and Deeds, 1999; Narteh, 2008). Given the positive impacts of the knowledge to a firm, Liyanage et al. (2009) reflected that knowledge is acknowledged as the most critical resource of the firm mainly because of the fear of 'knowledge loss'. Indeed, knowledge is usually equated with power and thus it is not surprising that firms would resist transferring proprietary knowledge to others (Simonin, 1999a). Owing to the knowledge-based competition in the global economy, firms nowadays are not only forced to make strategic decisions of either creating valuable knowledge by themselves or acquiring it from external partners, but also exposed to the risk of knowledge leakage or learning races when engaging in knowledge transfer and organisational learning processes within strategic alliances.

Although knowledge transfer through strategic alliances has become a shot gun approach for a firm to acquire knowledge that it could not easily develop within its

confines (Narteh, 2008), intrinsic competition between alliance partners becomes an inevitable dilemma in knowledge transfer processes, in that one might opportunistically take advantage of the cooperation to learn the other's knowledge, or in some extreme cases, to acquire technological secrets without the other's consent (Doz, 1996; Khanna, Gulati and Nohria, 1998; Muthusamy and White, 2005). If knowledge is duplicated within an alliance, the partner's attractiveness to the other would then diminish. From a competitive perspective, a loss of knowledge by the alliance partner via asymmetrical learning could result in the creation of a new or stronger competitor (Inkpen, 2002; Tsang, 1999). In an empirical study on examining the underlying reasons of the instability of international joint ventures, Inkpen and Beamish (1997) found that a joint venture would become less stable if one partner accumulates the key knowledge-based resources from the other.

Tellingly, strategic alliances create certain conditions that lead partner firms to experience the 'boundary paradox' (Quintas et al., 1997: 389), where they must protect their knowledge from imitation by the others but keep open to knowledge transfer at the same time with respect to accomplishing the cooperative objectives. To offset such dilemma within alliances, the partner firms must decide what degree of their knowledge bases should remain within the private domains and how to ensure that those are securely protected so as to keep the long-term viability of the partnerships (Norman, 2002). The perceived opportunistic behaviour of the alliance partner corresponds to the defensive nature of the transferor's attitude towards knowledge transfer. Knowledge protectiveness as a defensive behaviour of the transferor in the knowledge transfer process is thereby proposed in this research. Adapting Nielsen and Nielsen's (2009) definition, this research designates knowledge protectiveness as the extent of protectiveness employed by the transferor vis-à-vis its knowledge base and it is often considered as an appropriate safeguard against opportunism in the knowledge transfer process.

Given that knowledge protectiveness is considered essential for the stability of some inter-firm collaborations (e.g., Lee, Chang, Liu and Yang, 2007; Norman, 2002), nonetheless, this research proposes that a high level of knowledge protectiveness could cause negative effects on the transferring process. In fact, in an empirical research on intellectual capital protection in international alliances, Baughn, Denekamp, Stevens and Osborn (1997) uncovered that a firm's over-reliance on structural and contractual

means of protection very often would fail to effectively regulate the flows of knowledge to its partner. Grounding on Lyles and Salk's (1996) and Simonin's (1999a, b, 2004) statements, this research suggests that the excessive protective behaviour of the transferor would lead to uncertainties and conflicts between alliance partners because the recipient would sense the causal ambiguity of the transferred knowledge and experience difficulties in absorbing such knowledge. Subsequently, knowledge protectiveness as the safeguarding behaviour of the transferor towards knowledge transfer would hinder organisational learning by the recipient within international strategic alliances (Madhok and Tallman, 1998; Nielsen and Nielsen, 2009).

3.3.3. The Recipient's Perception towards the Transferred Knowledge

As knowledge transfer is dependent on how easily that knowledge can be transported, interpreted and absorbed (Hamel, Doz and Prahalad, 1989), the nature of the knowledge therefore posits as a critical determinant of the transferring outcome. Most prior research has characterised knowledge as explicit or tacit, relying on whether knowledge can be codified and transmitted in a formal and systematic way (e.g., Choi and Lee, 1997; Lee et al., 2007; Nonaka and Takeuchi, 1995); but little research has applied these distinctive concepts to the domain of empirical investigations because knowledge is essentially complex and difficult to measure. From the recipient's standpoint, the acquisition of the transferred knowledge usually involves predicaments because such knowledge is new and exploratory in nature, despite the acknowledged abstract or content of the knowledge. Even if knowledge transfer packages mainly comprise the codified documents and information, such as patents or product formulas, 'explicit knowledge must reply on being tacitly understood and applied' (Polanyi, 1966: 7).

Prior research has shown that articulable knowledge is more effortlessly transferable than less-articulable knowledge (Cummings and Teng, 2003). In other words, the more causal ambiguity of the transferred knowledge, the more difficulties the recipient would undergo in the transferring process. Lippman and Rumelt (1982) pioneered the concept of causal ambiguity in business contexts in terms of reflecting the phenomena surrounding business actions and outcomes that make it difficult for competitors to emulate strategies. Whereas causal ambiguity is a useful barrier to imitation by rivals, Reed and DeFillippi (1990) observed that if it is too great to block managers' understandings of causal relationships or the existence of factor mobility, the firm might not be able to utilise competencies for sustainable competitive advantage. Similar to the

situation of 'boundary paradox' (Quintas et al., 1997: 389) in inter-organisational knowledge transfer processes, the causal ambiguity of knowledge could also cause the 'resource substitution paradox' (McEvily, Das and McCabe, 2000: 305) or the 'causal ambiguity paradox' (King and Zeithaml, 2001: 76) during collaborations, in that while causal ambiguity can slow the diffusion of superior practices and technologies across firms so as to stimulate competitors to forego imitation, it impedes the creation of new knowledge and shortens the sustainability within the firm. Causal ambiguity has therefore been singled out as an important factor affecting knowledge transfer both within and across organisational boundaries (Cummings and Teng, 2003).

For examples, Crossan and Inkpen (1995) associated causal ambiguity with inter-firm knowledge transfer and proposed the negative relationship between the two. In order to enable alliance learning strategies, the problems of knowledge ambiguity are thereby needed to be overcome by partner firms. Likewise, Szulanski (1996) discovered that causal ambiguity is one of the principle impediments of knowledge transfer, including the lack of absorptive capacity of the recipient, the lack of credibility of the source, and the arduousness of the relationship between the source and the recipient. Drawing upon the alliance learning research, Simonin (1999a, b) argued that knowledge ambiguity is affected by a range of antecedents (i.e., tacitness, specificity, complexity, experience, partner protectiveness, cultural and organisational distance) and is negatively related to knowledge transfer within international strategic alliances. Particularly, much prior research has placed emphasis on the cynical role played by causal ambiguity in the acquisition of new knowledge because it prevents firms from effectively and efficiently learning from their external partners (e.g., Huber, 1991; McEvily et al., 2000; van Wijk et al., 2008). This implies that causal ambiguity is more concerned with the recipient's actions and outcomes than those of the transferor in the knowledge transfer process. Hence, knowledge ambiguity is context-dependent on the possession of other knowledge (Lee et al., 2007) and occurs when the knowledge cannot be easily absorbed by the recipient firm in the process of knowledge transfer.

Following the 'transferor-recipient' model of knowledge transfer (e.g., Albino et al., 2004; Cantu et al., 2009; Ko et al., 2005), this research proposes knowledge ambiguity as the corresponding perception of the recipient towards the protectiveness behaviour of the transferor in the transferring process within international strategic alliances. By linking both concepts of 'boundary paradox' (Quintas et al., 1997: 389) and 'causal

ambiguity paradox' (King and Zeithaml, 2001: 76) in the prior literature, this research defines the patterns of knowledge transfer as the different behaviours and perceptions of transferors and recipients during cross-border knowledge transfer processes. Building upon the existing literature (Lee et al., 2007; Simonin (1999a, b, 2004) moreover, a positive relationship between knowledge protectiveness and ambiguity is thereby hypothesised: with greater extent of knowledge protection by the transferor, more ambiguity of the transferred knowledge would be experienced by the recipient in the cross-border knowledge transfer process within an international strategic alliance.

Hypothesis 1: Knowledge protectiveness in positively related to knowledge ambiguity.

3.4.   Determinants of Knowledge Transfer

Given that the paradoxes in cross-border knowledge transfer are identified in the earlier section as knowledge protectiveness and ambiguity, the understanding of how and why alliance partners would experience these paradoxes have not been clearly explained in the existing literature. Following the theoretic conceptualisation in the previous section that the inherent clash of interests between alliance partners results from the different partner's behaviours and perceptions towards knowledge transfer processes, the exploration of the key determinants of knowledge transfer is essential to understand the sequence of underlying mechanisms contributing to the alliance performance. Various antecedents of inter- and intra-organisational knowledge transfer have been identified and discussed in the prior literature. Early research generally centred on knowledge classifications and considered the properties of knowledge, such as tacitness, similarity, specificity, complexity, ambiguity or protectiveness, as important antecedents of knowledge transfer (e.g., Argote and Ingram, 2000; Inkpen and Dinur, 1998; Simonin, 1999a,b; Szulanski, 1996).

Subsequent research urged the need to distinguish the factors relating to the transferor and the recipient contexts and noticed the focal role played by the inter-relationship between alliance partners. While Khamseh and Jolly (2008) argued that knowledge transfer can be affected by a range of antecedents, including the characteristics of required or transferred knowledge, the absorptive capacity and reciprocal behaviour of the recipient, and the nature of cooperative activity, van Wijk et al. (2008) reviewed the prior literature and concluded that there are three broad categories of antecedents of knowledge transfer: knowledge, organisational and network characteristics.

In addition to the knowledge-related, the source, the recipient, and the relational factors, a group of researchers argued that motivational factors, such as teaching and learning intents, present critical antecedents of knowledge transfer (e.g., Easterby-Smith et al., 2008; Ko et al., 2005; Norman, 2002; Simonin, 2004). However, grounding on the organisational learning (Zahra and George, 2002) and knowledge-based (Grant, 1996a, b) theories, this research suggests that the formation of an international strategic alliance is essentially resulted from the need to transfer and to learn the valuable knowledge from the partner firms. In this scenario, the motivational factors might not adequately reflect as determinants but rather as constant/ unvarying factors affecting cross-border knowledge transfer.

Though the research on investigating the antecedents of knowledge transfer seems to be saturated, there are a number of research gaps in the existing literature. Firstly, the majority of the research defined knowledge transfer as single dependent variable and thus ignored the process-nature of knowledge transfer while engaging in diagnosing its antecedents. With one exception, Szulanski (2000) developed the process model of knowledge transfer and analysed how characteristics of the source, the recipient, the context, and the knowledge itself affect knowledge transfer. Interestingly, the author discovered that factors affecting opportunity to transfer, such as reliability of the source, are more likely to predict difficulty during imitation phase; whereas factors affecting the execution of the transfer, such as the recipient's ability to absorb knowledge, are more likely to influence subsequent implementation phases (ibid).

Unlike organisational learning being concerned with accessing, absorbing, acquiring and applying the transferred knowledge into the alliance context (Zahra and George, 2002), this research proposes that knowledge transfer is related to the transferring process between the transferor and the recipient and can be manifested by the different behaviours and perceptions of both actors. Hence, the identification and analysis of knowledge transfer antecedents should focus on the factors resulting in different attitudes of the transferor and the recipient in the transferring process. In other words, those factors attributing to the organisational learning process, such as the properties of the transferred knowledge or the recipient's absorptive capacity, need to be reconsidered and repositioned as the antecedents of organisational learning in the latter phase.

Secondly, little of the existing literature on cross-border knowledge transfer has included the contextual factors, particularly the factors regarding the heterogeneities of the institutional and competitive environments from where the alliance partners originate, given that the importance of co-evolution between alliances and their external environments has been noted by the emergent alliance researchers (e.g., Koza and Lewin, 1998; Yeniyurt et al., 2009). The originalities of partner firms are critical determinants of the cooperative decisions to deploy and develop resources to meet business needs in international collaborations. Evidence can be deduced from an empirical research on Russian-based international strategic alliances where Tallman, Sutcliff and Antonian (1997) uncovered that domestic firms apply various organisational methods to protect their own interests from those of foreign partners.

Consequently, apart from the relational factors, which have been popularly discussed in the prior research (e.g., Easterby-Smith et al., 2008; Squire et al., 2009; Yli-Renko et al., 2001), this research incorporates contextual characteristics with knowledge transfer in order to supplement a co-evolutionary perspective on international strategic alliances. Particularly, this research intends to examine how contextual and relational determinants of knowledge transfer lead to the different behaviours and perceptions of the transferor and the recipient in the transferring process within international strategic alliances.

3.4.1. Relational Determinants of Knowledge Transfer

Since Huber (1991) proposed inter-organisational relationships as the channels through which firms transfer and acquire knowledge, substantial research has perceived knowledge transfers as social and cognitive processes that are significantly affected by the inter-relationships between firms. For instance, Larson (1992) argued that social aspects of exchanges are crucial in understanding the control and coordination of partnerships. Szulanski (1996) suggested that relationship quality, the degree of the inseparable relation between the transferor and the recipient, is positively associated with knowledge transfer. Drawing on the technology transfer research, Johnson (1999) considered relational capital, a firm's ability to interact positively with business community members, as a stimulator in technology management for wealth creation.

In an empirical study on learning and knowledge protection within strategic alliances, Kale, Singh and Perlmutter (2000) found that mutual trust, respect, and friendship that

reside at the individual level between alliance partners positively influence alliance learning. Moreover, Adler (2001) argued that knowledge flows best through trusting communities and believed that social relationships facilitate the transfer of valued resources – especially information and knowledge – by acting as a lubricant (Kachra and White, 2008). Building upon the social exchange view, Muthusamy and White (2005) argued that inter-firm learning is positively influenced by five types of relational factors: reciprocal commitment, ability-based trust, benevolence-based trust, integrity-based trust, and mutual power/ influence.

Narteh (2008) proposed a range of relationship factors, including partner selection, inter cultural fit, method of knowledge transfer, trust, interaction, and business relatedness, as antecedents of the knowledge transfer process in developed/developing country inter-firm collaborations; however, Kachra and White (2008) simply examined how the knowledge transfer decision is stimulated by the social relationship between firms. Van Wijk et al. (2008) pointed out that network properties, such as social ties, trusting relationships, and value systems, are relevant to social resources embedded in partnerships and encompass multi-faceted social contexts. Furthermore, Perez-Nordtvedt et al. (2008) specified that the effectiveness and efficiency of knowledge transfer are strongly related to the relationship quality between firms. Recently, Liu et al. (2010) revealed that relational capital, which is defined as a relational rent generated in an exchange relationship that cannot be generated by either firm in isolation, has a positive effect on knowledge acquisition.

In spite of the various dimensions of relational/ network characteristics, previous research has generally agreed upon the positive role played by them in terms of facilitating resource and knowledge exchange across organisational boundaries. The significant effects of on-going dynamic social interactions on knowledge transfer have been extensively discussed in the literature; notwithstanding, there is limited understanding of how relational underpinnings of alliance operations affect partner firms' behaviours and perceptions towards knowledge transfer. This is because most prior research has not considered the process-nature of knowledge transfer; instead, it has usually simplified knowledge transfer as a dependent variable to examine the influence resulted from a range of assorted relational factors (e.g., Cantu et al., 2009; Dhanaraj, Lyles, Steensma and Tihanyi, 2004; Ko et al., 2005; Muthusamy and White, 2005).

To better realise the impacts of dynamic inter-firm relationships on knowledge transfer processes within international strategic alliances, this research proposes that both transferors' and recipients' attitudes towards knowledge transfer are determined by their relationships, which can be characterised as the extent of relational capital accumulated by alliance partners during collaborations (Johnson, 1999; Kale et al., 2000; Liu et al., 2010). The concept of relational capital is not a new fashion; nevertheless, it is a manifold theoretic construct originating from social capital theory, which is concerned with the structural, relational, and cognitive dimensions of the values of social networks, bonding similar people or bridging between diverse people with norms of reciprocity (De Clercq and Sapienza, 2006; Dekker and Uslaner, 2001).

As one of the dimensional constructs of social capital, relational capital has been increasingly addressed and labelled as an important indicator for the quality of the inter-organisational relationship and the varied characteristics of relational capital have been proposed, such as conflict (Hyder and Ghauri, 2000), control (Chen and Chung, 2008), cooperation (Yan and Gray, 2001), commitment and trust (Dhanaraj et al., 2004). Despite the different constitutions and definitions of relational capital in the prior literature, the nature of the construct is multi-faceted regarding a series of interactions within inter-firm collaborations that promote the positive feelings of the firms and facilitate the processes of knowledge transfer (Johnson, 1999; Kale et al., 2000; Liu et al., 2010).

According to Ring and Van de Ven (1994), firms would be more willing to take actions in communication or information exchanges if less risk is perceived with highly trusted partners. In other words, with a more harmonious relationship between the alliance partners, there should be less of the transferor's tendency to try to control the information that flows to the recipient and to limit knowledge to which the recipient is exposed (Norman, 2002). The attenuation of the transferor's protectiveness behaviour towards knowledge transfer is primarily because the firm believes that a trusted alliance partner is less likely to take advantage of the transferred knowledge in ways that are deleterious to the cooperation. Conversely, if the partner is untrusted, it is expected that the restrictions on knowledge accessibility in the alliance would be greater, in that the transferor might attempt to mitigate the potential opportunism by the recipient during the knowledge transfer process. Paralleling Inkpen's (1998) and Norman's (2001, 2002) research, therefore, this research hypothesises that there is a negative linkage between

relational factors, particularly the relational capital accumulated by alliance partners, and knowledge protectiveness in cross-border knowledge transfer processes.

Hypothesis 2: Relational capital is negatively related to knowledge protectiveness.

Furthermore, relational factors are also suggested to be correlated with the recipient's ambiguous perception towards knowledge transfer. For example, Simonin (1999a, b) discovered that the experience of a firm with its alliance partner's knowledge is negatively associated with the corresponding level of causal ambiguity in the transferring process. As knowledge transfer is concerned with the process through which one firm learns from the experience of another (Easterby-Smith et al., 2008), with more experience obtained from frequent communications, interactions, and reciprocities between alliance partners, fewer difficulties and misunderstandings of the recipient firm would occur while absorbing the transferred knowledge (Inkpen, 1998; Kachra and White, 2008; Lyles and Salk, 1996). In this regard, a negative relation between relational factors, particularly the relational capital accumulated by alliance partners, and knowledge ambiguity is also hypothesised.

Hypothesis 3: Relational capital is negatively related to knowledge ambiguity.

3.4.2. Contextual Determinants of Knowledge Transfer

Though the relational view (Dyer and Singh, 1998) has offered a solid theoretical foundation to complement the existing literature by positing inter-organisational relationships as one of the key antecedents of knowledge transfer, the failure to consider the co-evolution of the partner firms and their external contexts poses an improbable bias of presuming international strategic alliances to be closed entities. Additionally, much prior research has argued that the emergence of international strategic alliances reflects the attempts by firms to cope with discontinuities arising from a volatile interdependent and knowledge-intensive global economy (e.g., Ingram and Silverman, 2002; Sarkar, Echambadi, Cavusgil and Aulakh, 2001); yet the institutional and competitive concerns about cross-border knowledge transfer research have been substantially underexplored. Alternatively, much attention has been paid by the prior research to examining the contrasting impacts of cultural distance on knowledge transfer (e.g., Birkinshaw, Brannen and Tung, 2011; Vaara, Sarala, Stahl and Bjorkman, 2010; Zander and Zander, 2010).

While Bresman et al. (2010) advised that problems associated with knowledge transfer would increase with geographic and cultural distances, Sarala and Vaara (2010) claimed that differences in national cultures could become the sources of knowledge transfer due to the potentially useful diversity of practices, beliefs and values residing in and around partner firms. These inconclusive findings indicate the ambiguous positions when examining cross-border knowledge transfer. From the transferor's viewpoint, cultural differences could be helpful for the recipient firm because they offer potential learning opportunities based on the strategic complementarities (Darr and Kurtzberg, 2000). Even though knowledge transfer is facilitated by cultural differences, from the recipient's perspective, nonetheless, they cannot guarantee that the learning potential could be realised owing to the difficulties and misunderstandings in acquisition of the transferred knowledge (Park et al., 2008). The investigation of contextual factors on cross-border knowledge transfer thus demands explication of the stance, either the transferor's or the recipient's, underpinned the transferring process.

In order for knowledge to be transmitted effectively and efficiently, Guzman and Wilson (2005) maintained that it must be congruent with the existing social context. However, it does not happen easily in conditions in which knowledge transfer is taking place between firms, let alone in cases of international collaborations. In fact, increasing research has noted that knowledge transfer across national boundaries is particularly challenging from an organisational perspective given differences in time, and spatial and cultural distances posing significant barriers to such transfer (e.g., Javidan, Stahl, Brodbeck and Wilderom, 2005; Perez-Nordtvedt et al., 2008; Salk and Lyles, 2007). For example, Cummings and Teng (2003) discovered that knowledge and norm distances are negatively associated with knowledge transfer in the case of international R&D collaborations. Though lacking empirical foundation, Bresman et al. (2010) attributed the problems engaged in knowledge transfer to the emergence of geographic and cultural distances between alliance partners.

In light of the institution-based view, research drawing upon the impacts of country-specific factors, such as bureaucracy, corruption, or intellectual property protection, on the foreign entries' performance in emerging economies has flourished (e.g., Ang and Michailova, 2008; Chan, Isobe and Makino, 2008; Peng, et al., 2009). Apart from the on-going dynamics of relational interactions, this research proposed that the uncertainties derived from the heterogeneities of institutional frameworks between

alliance partners also serves as the critical antecedents of cross-border knowledge transfer. Building upon the emergent institution-based theory (Peng et al., 2008), which emphasises that institutions matter and urges the need to treat them as critical exogenous variables in empirical settings, this research advances the existing literature on knowledge transfer by incorporating institutional factors with knowledge transfer processes in international strategic alliances because those factors 'directly determine what arrows a firm has in its quiver as it struggles to formulate and implement strategy' (Ingram and Silverman, 2002: 20).

Akin to the theoretical development of cultural distance, in a wider sense, institutional distance adapting from Kostova's (1996) definition is described in the present research as the dissimilarities of the regulatory, normative, and cognitive institutions between the countries from where partner firms originate in an international strategic alliances. Since Kostova (1996) coined the term 'institutional distance' and proposed it as the key determinant of transnational transfer of organisational practices within multinational enterprises, subsequent research has actively employed the concept to explore various phenomena in the international contexts, such as entry mode choices (Yiu and Makino, 2002), partner selection of international strategic alliances (Li and Ferreira, 2008), conformation of organisational legitimacy in a host country (Kostova and Zaheer, 1999), and cross-border acquisition (Dikova, Sahib and von Witteloostuijn, 2010). Notwithstanding, these prior studies have supported the empirical evidence of the negative role played by institutional distance in any form of cross-border scenarios.

Accordingly, this research applies institutional distance to unpack the paradoxes in cross-border knowledge transfer. Unlike relational capital as a facilitator, institutional distance as an impediment of knowledge transfer is proposed in this research. In order to extend the current understanding of the antecedents of knowledge transfer in the literature, this research synthesises institutional distance with knowledge transfer processes to explain the reasons why firms behave and perceive differently towards knowledge transfer within international strategic alliances. Paralleling Li and Liu's (2005) research finding that technology gap between foreign and host countries has significant negative impact on foreign direct investment, specifically, this research hypothesises that institutional distance could provoke the transferor's protectiveness behaviour towards knowledge transfer as well as the recipient's ambiguous perception

towards the transferred knowledge, which could further undermine the cooperative outcomes.

With more diverse institutional frameworks between alliance partners, based on the transferor's perspective, more restrictions on knowledge accessibility are needed to safeguard its valuable knowledge from the perceived opportunistic actions, such as imitation or misappropriation by the recipient firm. Whereas from the recipient's point of view, such divergent institutional distance could not only stimulate the ex-ante problems that resulted from the limited access to the knowledge base of the transferor but also lead to the ex-post difficulties in absorbing the transferred knowledge, and thus the recipient would experience causal ambiguity in the transferring process. Indeed, prior research has extensively acknowledged that knowledge transfer is never effortless: language barriers, information lag, regulatory inequality in intellectual property rights, and spatial and cultural differences could result in misinformation and conflicts and therefore impose real costs and puzzles on the partner firms (Buckley and Carter, 2004; Buckley et al., 2009).

Hypothesis 4: Institutional distance is positively related to knowledge protectiveness.

Hypothesis 5: Institutional distance is positively related to knowledge ambiguity.

3.5. Consequences of Knowledge Transfer

Once knowledge has been transferred and absorbed, the question for the alliance partners now becomes: is the access to the other's knowledge sufficient (Inkpen and Madhok, 2001) or more broadly, is the outcome of knowledge transfer satisfactory for all partners? To answer these questions, most prior studies have pinpointed alliance performance as the indicant of knowledge transfer outcomes, in reflections of financial or non-financial measures (e.g., DeCarolis and Deeds, 1999; Lyles and Salk, 1996; van Wijk et al., 2008). However, the linkage between knowledge transfer and alliance performance remains inconclusive in the prior literature because there has been considerable disagreements about the best way(s) to evaluate the consequences of knowledge transfer. For instance, most prior empirical studies on knowledge transfer have focused on examination of financial soundness (e.g., Farrell, Ockowski and Kharabsheh, 2008; Robins, Tallman and Fladmoe-Lindquist, 2002; Zhang, Li, Hitt and Cui, 2007); some have applied the relational perspective to suggest partner satisfaction

and relationships as proper indicators of the long-run viability of the cooperation (e.g., Choi and Beamish, 2004; Lin and Wang, 2008); and few have simply employed the dummy variables such as survival and success to represent the collaborative outcomes (Gaur and Lu, 2007; Meschi and Riccio, 2008).

The first critical unresolved issue in accessing the knowledge transfer outcomes is the difficulties in controlling measurements for alliance performance. This is because there are factors affecting the changes in alliance performance which might not be necessarily relevant to the knowledge transfer process (Easterby-Smith et al., 2008). Hence neither of the aforementioned empirical studies have strong nor convincing evidence of the linkage between knowledge transfer outcomes and alliance performance. Secondly, although learning has been regarded as a practical and feasible collaborative objective through knowledge transfer within alliances in the prior literature (e.g., Doz, 1996; Hamel, 1991; Inkpen, 2008), the causal relationships among knowledge transfer, organisational learning and alliance performance unfortunately have not been clearly examined.

Akin to the process-orientated model of knowledge transfer (Lyles, 1994), this research proposes organisational learning as a paralleling process with knowledge transfer within international strategic alliances. Yet unlike knowledge transfer focusing on the two-way transferring process between a transferor and a recipient, organisational learning is a complex and lengthy mechanism concerned with the subtle endeavour of the recipient solely (Iyer, 2002). Knowledge acquisition as the key functioning of organisational learning mechanism in terms of critically managing the acquired knowledge to meet existing needs and to develop new opportunities (Quintas et al., 1997) is most apposite to epitomise the consequences of knowledge transfer. Since knowledge-based theorists consider knowledge as the key to competitive advantage, subsequent researchers have implied that the more knowledge acquired by a firm the greater the benefits would be for it (e.g., Eisenhardt and Santos, 2002; Reus et al., 2009).

However, it is argued that the success does not necessarily go to the firm that knows most, but rather to the firm that can make the best use of what it knows and knows what is strategically most important to itself (Bou-Llusar and Segarra-Cipres, 2006). Therefore, it is crucial for recipient firms to recognise the types of the acquired knowledge during collaborations. The concept of knowledge is not easily defined. Much

prior research has emphasised the differentiation among knowledge (authenticated information), information (the processed data), and data (raw numbers and facts) and proposed several perspectives to consider knowledge: a state of mind; an object; a process; a condition of having access to information; or a capability (e.g., Alavi and Leidner, 2001; Amidon, 2002; Huang and Yang, 2009). Davenport and Prusak (1998) explained knowledge as a fluid mix of framed experience, values, contextual information, and expert insight that provide a framework for evaluating and incorporating new experience and information. The types of the knowledge acquired by the firm are thereby dependent on the purposes of the cooperation with external partners.

Yet there has been a significant research gap regarding the choices and actions related to knowledge acquisition and application, as well as the types of knowledge firms acquire in the prior literature (Friesl, 2011; Volberda, Foss and Lyles, 2010). With few exceptions, Lane, Salk and Lyles (2001) proposed five types of knowledge learned from foreign parents in international joint ventures, including new technological expertise, new marketing expertise, product development, managerial techniques, and manufacturing process. Complementarily, Tsang (2002) examined knowledge acquisition by foreign partners in international joint ventures and expanded on nine types of the acquired knowledge that is contextually related to the host country's firms, ranging from managerial, environmental, networking, marketing, and technological skills.

To divulge the consequences of knowledge transfer – the knowledge acquired by the recipient firms, either foreign or domestic partners, in international strategic alliances, this research adapts five types of knowledge proposed in the prior literature, encompassing new technological, marketing, product development, managerial, and manufacturing techniques/ expertise (e.g., Liu et al., 2010; Tsang, 2002; Tsang et al., 2004). From the pragmatic perspective, such substantive classifications of knowledge are most relevant to knowledge transfer processes and are crucial to sustaining global competiveness (Bhagat, Kedia, Harveston and Triandis, 2002; Janowicz-Panjaitan and Noorderhaven, 2008); hence, alliance partners can easily assess the transferring outcomes by matching the types of the acquired knowledge and the cooperative objectives before it is too late to estimate the alliance performance by the relatively farfetched indicators, such as innovativeness or financial soundness.

Notably, a growing trend of organisational learning research has been placed on identifying and discussing various factors affecting inter-organisational knowledge acquisition. Lyles and Salk (1996) proposed three categories of antecedents of knowledge acquisition: organisational characteristics, structural mechanisms, and contextual factors, and suggested that the relationship between knowledge acquisition and organisational characteristics, such as absorptive capacity and partner involvement, are positively moderated by structural mechanism (ownership) but negatively moderated by contextual factors, such as cultural conflicts and misunderstanding between firms. Inkpen (1998) argued that knowledge acquisition through international strategic alliances is influenced by the value and accessibility of the knowledge, effectiveness of learning, and managerial and cultural alignment between firms.

Differentiating from the existing literature on knowledge acquisition, this research proposes that the extent of knowledge acquired by a firm is directly determined by its perception towards the transferred knowledge. With more causal ambiguous perception towards the transferred knowledge, mainly due to the highly protective behaviour of the transferor during the knowledge transfer process, less of the knowledge would then be acquired by the recipient firm within international strategic alliances. Indeed, much prior research has indicated that causal ambiguity is negatively associated with the outcomes of knowledge transfer (e.g., Cantu et al., 2009; Simonin, 1999a, b, 2004; Szulanski, 1996), which can be manifested by various morphologies of the knowledge acquired by the firm. Consequently, knowledge ambiguity as the key mediator of institutional distance, relational capital, and knowledge protectiveness on knowledge acquisition is hypothesised in this research.

Hypothesis 6: Knowledge ambiguity is negatively related to knowledge acquisition.

3.6. Organisational Learning Mechanism

Following the process-oriented assumption of knowledge acquisition in the prior literature (Kwan and Cheung, 2006), it is suggested that knowledge must be accessible before it can be acquired; but even if there is a high level of accessibility of the knowledge, resulting from the transferor's transparency towards knowledge transfer, it does not guarantee a successful acquisition by the recipient. This is because some firms, like individuals, may lack the capacity to learn (Inkpen, 2000). Thus the extent to which a firm is able to 'recognise the value of new external knowledge, assimilate it, and apply

it to commercial ends' (Cohen and Levinthal, 1990: 138) is dependent on its absorptive capacity. Within the domain of organisational learning research, increasing numbers of scholars have delved into the development of the absorptive capacity construct and recognised it as a critical contributor to a firm's long-term survival and success because it can reinforce, complement and refocus the firm's knowledge base (e.g., Lane, Koka and Pathak 2006; Lyles and Salk, 1996; Zahra and George, 2002).

Nevertheless, there has been limited in-depth understanding of how absorptive capacity contributes to the alliance performance or more fundamentally, where absorptive capacity affects the organisational learning process with respect to enhancing/ lessening the capability development of the alliance. Also, though much prior research has acknowledged that organisational learning is fairly complex and has produced rich insight in antecedents and outcomes of organisational learning (e.g., Bapuji and Crossan, 2004; Berends and Lammers, 2010; Park et al., 2008), rare empirical studies have delved into examining its underlying mechanisms, particularly the process through which recipient firms assimilate, acquire, transform, and exploit the transferred knowledge into the context of international strategic alliances. The concept of organisational learning process is critical because it reflects the specific learning orientation and practices that determine where the knowledge is learnt and what sort of learning action is taken by firms (Kim, 1998). Such lack of conceptual and empirical comprehension of the underlying correlations among knowledge transfer, organisational learning and alliance performance in the literature maintains a momentous research gap which this research intends to fill. To do so, the theoretical foundations of organisational learning are reviewed and applied to unpack the focal factors engaging in the learning process in this research.

Organisational learning has existed in the lexicon since Cyert and March (1963) pioneered a general theory of organisational learning as part of the model of decision making within the firm and emphasised the roles of rules, procedures, and routines in response to external shocks, which would be adopted if they bring positive impacts to the firm. Subsequently, the concept of organisational learning has been ubiquitously regarded as a discontinuous process of change in cognition and action, embedded in and affected by the institutions of organisation (e.g., Argyris and Schon, 1978; Edmondson, 2002; Vera and Crossan, 2004, 2005). The most influential view on organisational learning was proposed by Huber (1991), who defined it as a decomposed process

starting from knowledge acquisition, information distribution, information interpretation to organisational memory and suggested it occurs when knowledge is processed and a range of potential behaviours increases. In a seminal research on the development of an organisational learning framework, Crossan, Lane and White (1999) developed 4I framework to explicate the learning process, starting from intuiting, interpreting, integrating, to institutionalising. Intuiting refers to the recognition of patterns in data, events and situations at individual level; interpreting means the collective sense-making, sharing and shaping pre-verbal institutions through conversations, metaphors, and imagery at group level; integrating is the process of developing shared understanding and coordinated action through mutual adjustment and reconciliation; and institutionalising is the process of ensuring that actions are routinized, embedding individual- and group-level learning into organisation-level systems, structures, and procedures (Berends and Lammers, 2010). Typically, most prior research has considered organisational learning as manifold phenomena through sequences of actions and events that are contextually embedded (e.g., Lyles and Salk, 1996; Langley, 1999; Van de Ven and Poole, 2005).

Burgeoning attention has therefore been paid by the recent researchers on expressing and exploring the processes/ mechanisms of alliance learning (e.g., Ghosh, 2004; Nielsen and Nielsen, 2009; Tsang, 2002). However, limited advancement has been made by both conceptual and empirical work on the fundamental substance of organisation-level learning through the context of strategic alliances. Within the terminology, the word 'learning' is a live metaphor (Tsoukas, 1991) that refers to the multi-faceted developments of knowledge and usually brings positive impact on the actions undertaken by the organisation, even though the consequences of learning might be negative (Dodgson, 1993). Yet unusually, scarce research has analysed the underlying relationship between organisational learning and alliance performance. Given that Kale and Singh (2007) found the evidence of a positive relationship between a firm's alliance learning process and overall alliance success and defined such learning process as involving articulation, codification, sharing, and internalisation of alliance management know-how, the authors unfortunately did not provide persuasive explanations of how the organisational learning process contributes to the alliance performance. On the one hand, organisational learning is a dynamic process that is concerned with the individual recipient firm only; on the other hand, the performance of strategic alliances, either success or failure, is responsible for all firms engaging in it.

The negligence of such contextual differences in the prior research poses a biased assumption that the more knowledge learned by the partner firm, the better the alliance performance would become, regardless of the possible opportunism by the recipient firm withholding the knowledge.

Paralleling to the process nature of knowledge transfer, organisational learning is conceptualised as a receiving mechanism by which the transferred knowledge is assimilated, acquired, transformed, and exploited in an alliance in this research. The definition is primarily adapted from Zahra and George's (2002) research in which the authors reconceptualised the typology of absorptive capacity as potential and realised and further positioned each as different functionalities but complementarity roles in the organisational routine for developing competitive advantage by a firm. As a result, this research synthesises potential and realised absorptive capacities with knowledge acquisition in order to explore the underlying mechanisms of organisational learning through international collaborations. Recognising the contextual differences between knowledge acquisition and application as mentioned earlier, notably, this research distinguishes potential and realised absorptive capacities by defining the former as a firm's ability to acquire and assimilate the transferred knowledge within the firm context, whereas the latter as a firm's ability to transform and exploit the acquired knowledge into the alliance context.

However, given the size and diversity of the absorptive capacity literature, Lane et al. (2006) criticised most prior research for treating absorptive capacity as a taken-for-granted construct without considering the underlying assumptions. Volberda et al. (2010), in a most recent seminal paper on absorptive capacity, further concluded that the emergence of absorptive capacity literature from the actions and interactions of organisational and inter-organisational antecedents remains unclear. Essentially, organisational learning is guided by pre-existing knowledge (Andersen, 2008) and thus it is both a function of access to new knowledge and the capabilities for using and building on such knowledge (Inkpen, 1998). Not only does learning occur over time and across organisational boundaries, but it also creates a tension between absorbing new learning and applying what has already been learned (Crossan et al., 1999).

Unlike much prior research on alliance learning directed to evolving various terminologies/ morphologies to examine the analogous phenomenon (e.g., Janowicz-

Panjaitan and Noorderhaven, 2008; Kale and Singh, 2007; Nielsen and Nielsen, 2009), this research endeavours to investigate the basic nature of organisational learning through international strategic alliances and incorporates potential and realised absorptive capacities with knowledge acquisition to explain the focal elements involved in organisational learning processes. In line with Dodgson's (1993) and Lane et al.'s (2001) findings, this research proposes organisational learning mechanisms as a sequence of positive impacts on the firm performance; whilst in a wider context, this research argues that organisational learning is an important mediating mechanism between knowledge transfer and alliance performance.

Based on Cohen and Levinthal's (1990) suggestion that prior related knowledge is the most important antecedent of absorptive capacity, this research proposes that the nature of knowledge transfer, particularly the causal ambiguous perception towards the transferred knowledge from the recipient's perspective, is negatively associated with potential absorptive capacity of the firm. Indeed, knowledge must be distributed throughout the alliance to have the largest possible effect on the development of absorptive capacity (Lenox and King, 2004). With the hindrance of knowledge ambiguity, the recipient firm could not utilise its ability to assimilate and acquire the transferred knowledge, which subsequently leads to the limited amount of knowledge acquisition through international strategic alliances.

Hypothesis 7: Knowledge ambiguity is negatively related to potential absorptive capacity.

Furthermore, in an empirical research on learning through international joint ventures, Lane et al. (2001) developed three measures as the processes within absorptive capacity: recognition, assimilation, and utilisation, and discovered that recognition and assimilation (potential absorptive capacity) are positively associated with knowledge acquisition whereas utilisation (realised absorptive capacity) is more linked with the successful firm performance. Thus on the one hand this research proposes a positive relationship between potential absorptive capacity and knowledge acquisition, as more capacity of a firm in absorbing the knowledge, seemingly, more transferred knowledge from its alliance partner would be effectively and efficiently acquired by the firm (ibid).

Hypothesis 8: Potential absorptive capacity is positively related to knowledge acquisition.

On the other hand, this research proposes that the recipient firm's feedback with respect to applying the acquired knowledge into the alliance context is the key to elucidating the underlying association between organisational learning and alliance performance. In other terms, realised absorptive capacity as a crucial moderator in the relation between knowledge acquisition and alliance performance is hypothesised in this research. Without the partner firm's capacity in transforming and exploiting the acquired knowledge into the alliance context, the performance of such alliance cannot be guaranteed to be successful because the firm might possess opportunistic learning strategies to undercut the collective knowledge development in the alliance (Larsson et al., 1998). Accordingly, the conceptual distinction between potential and realised absorptive capacities is advanced: whereas potential absorptive capacity is concerned with an alliance partner's ability to assimilate and acquire the transferred knowledge within its organisational context, realised absorptive capacity is focused on the partner's ability to transform and exploit the acquired knowledge into the alliance context so as to achieve the cooperative objective.

Hypothesis 9: Realised absorptive capacity positively moderates the relationship between knowledge acquisition and international strategic alliance performance.

3.7.   The Theoretical Framework

Having identified the causal relationships among the proposed constructs based on the integration of the organisational learning, the institution- and knowledge-based, and the relational theories in the internationalisation and strategy literature, a co-evolutionary framework encompassing the contextual and processual antecedents of international strategic alliances is developed in this research. Specifically, the processual antecedents of international strategic alliance performance concerning the inter-partner relationships and the knowledge transfer and organisational learning processes between partners are defined in this research. In conjunction with contextual factors, which mainly focus on the institutional distance between the countries from where alliance partners originate, processual factors that involve the knowledge, organisational, and relational characteristics are proposed to posit significant but varied influences on the collaborative outcomes in the context of international strategic alliances. Consequently,

the contextual and processual factors can also be further categorised into the knowledge, organisational, contextual, and relational antecedents of international strategic alliance performance as illustrated in Figure 4.

Building upon the knowledge-based theory (Kogut and Zander, 1992), this research defines knowledge characteristics as the different behaviours and perceptions of the transferor and the recipient towards the knowledge transfer process and identifies them as critical antecedents of international strategic alliance performance. Instead of proposing a direct link between knowledge characteristics and alliance performance, however, this research suggests that organisational learning mechanism is critically mediating the relationship between the two. Without a proper receiving mechanism for absorbing and applying the transferred knowledge, the alliance performance cannot be enhanced, given the transparency of the knowledge transfer process between the partners. Organisational characteristics, which are concerned with the mechanisms of the organisational learning process itself, are thus identified to pose significantly positive effects on international strategic alliance performance in this research. In line with the organisational learning literature (e.g., Inkpen, 1998; Lyles and Salk, 1996; Zahra and George, 2002), this research defines organisational learning as a multi-faceted process involving knowledge acquisition, and potential and realised absorptive capacities of a firm through international cooperation.

Differentiating from most prior research linking a direct path between relational characteristics with knowledge transfer outcomes (e.g., Ko et al., 2005; Szulanski, 1996; van Wijk et al., 2008), this research argues that linkage between the two is mediated by the knowledge characteristics regarding both the transferor's and the recipient's behaviours and perceptions towards the transferring process. Indeed, transferring knowledge requires frequent and numerous interactions between a transferor and a recipient (Nonaka, 1994). A successful knowledge transfer depends both on the openness of the transferor towards the transferring process and on the conspicuous understanding of the recipient towards the transferred knowledge, which could be accomplished if there is a high level of relational capital accumulated from frequent interactions, and strong trust and commitment between the firms within international strategic alliances (Kale et al., 2000; Liu et al., 2010).

Despite the growing research on successful knowledge transfer or learning between firms, limited attention has paid by researchers to unpack the reasons why such transferring or learning processes would fail in the context of international strategic alliances. Therefore, this research argues that institutional distance is the major external antecedent of knowledge transfer negatively affects knowledge transfer processes by strengthening transferors' protectiveness behaviour and recipients' ambiguous perception towards knowledge transfer. Accordingly, both relational and contextual characteristics are proposed to be the important but distant antecedents of international strategic alliance performance in that they directly influence knowledge characteristics, which subsequently change the impacts of organisational characteristics on alliance performance.

Having unpacked the underlying mechanisms of alliance operations, this research is able to nurture the co-evolutionary view on international strategic alliance performance. This research characterises the simultaneous interactions among alliances, partner firms, and their domestic and international environments as the manifestation of the co-evolution of international strategic alliances. Accordingly, based on the developed research framework (Figure 4), this research first of all epitomises the interaction between partner firms as knowledge transfer and organisational learning processes through international strategic alliances and hypothesises knowledge characteristics (i.e., knowledge protectiveness and ambiguity) as essential antecedents of organisational characteristics (i.e., knowledge acquisition, potential and realised absorptive capacities). Secondly, this research unfolds the interaction between partner firms and their external environments by hypothesising institutional distance as the impediment of cross-border knowledge transfer processes; and the interaction between partner firms and their alliances by hypothesising relational capital as the facilitator of cross-border knowledge transfer processes. Finally, this research reflects the co-evolutionary view on international strategic alliance performance by proposing that all these individual interactions between partner firms, alliances, and their external contexts would simultaneously affect alliance performance, either directly or indirectly.

Figure 4: The Theoretical Framework and Hypotheses
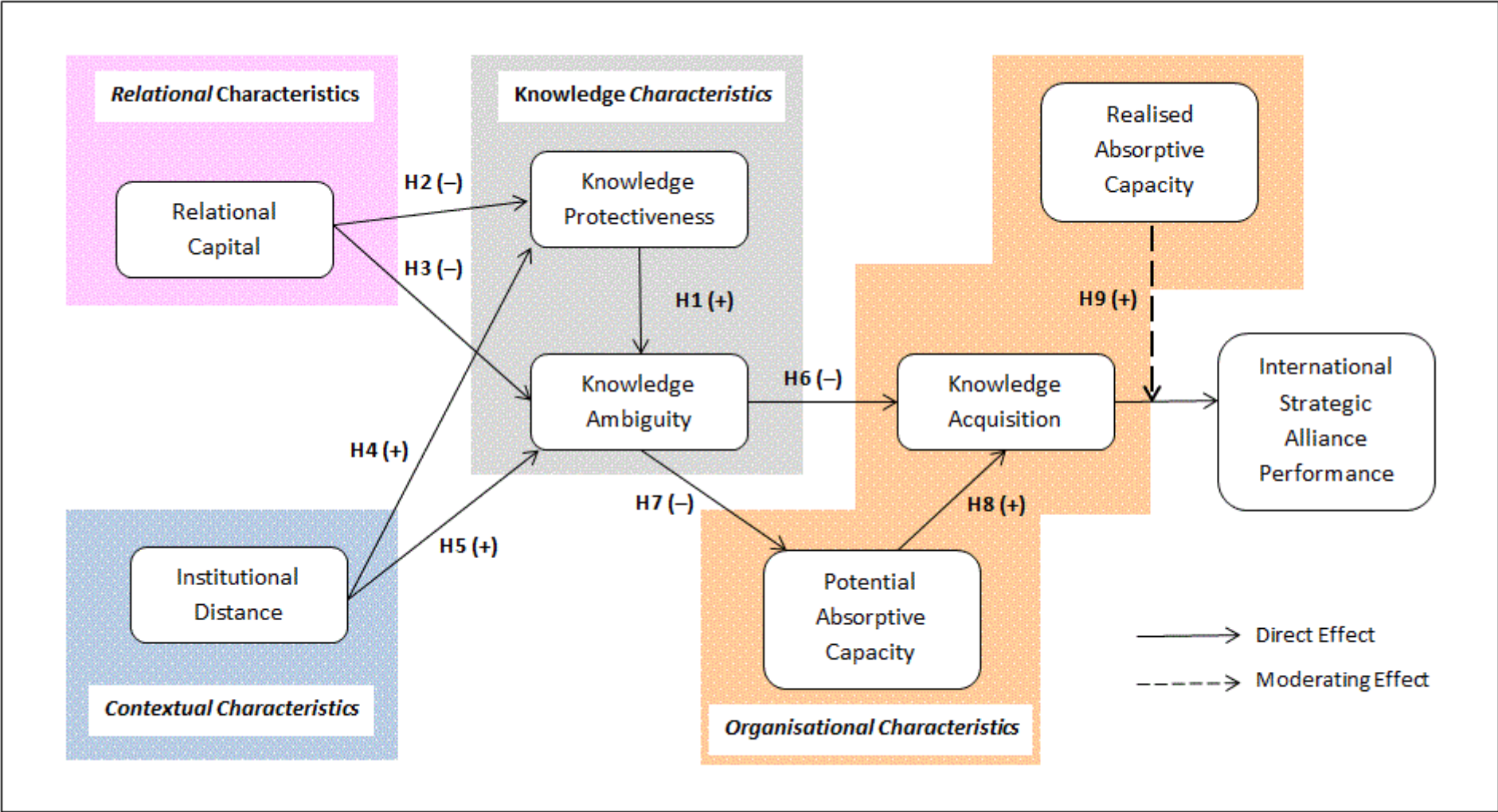
Chapter 4: Research Methodology

To better understand the inter-relationships among contextual and processual antecedents of international strategic alliance performance, an empirical examination on the developed hypotheses is necessary. Before presenting the empirical findings of this research, the design and methods of empirical research are introduced in this chapter.

4.1. Review of the Methodological Gaps

There has been a great deal of theorising work about knowledge transfer, organisational learning, and alliance research; however, relatively little has delved into these issues collectively for the purpose of empirical testing. Within the small numbers of empirical studies on knowledge transfer and learning between firms, most have been conducted by either case studies (e.g., Brewer, 2008; Hsiao, Tsai and Lee, 2006; Schotter and Bontis, 2009) or small-scale surveys (e.g., Ko et al., 2005; Simonin, 2004; Yang, Mudambi and Meyer, 2008), because the nature of cross-border knowledge transfer and learning is rather intricate and researchers often considered it as a process of stickiness in which a firm recreates and maintains a complex, causally ambiguous set of routines in a new setting (Szulanski, 2000; von Hippel, 1994).

Mowery et al. (1996) observed this methodological limitation and called for more reliable measures of knowledge transfer and learning; however, the authors solely placed emphasis on the advancement of evaluation measures of knowledge transfer outcomes from patent data to inter-firm cross-citation rate. Moreover, given the original method of large-scale survey research on vertical partnerships between the US and Japanese firms, Kotabe, Martin and Domoto (2003), unfortunately, failed to consider the intrinsic differences between technical exchanges and technology transfer, which were proposed by the authors as the major antecedents of knowledge transfer with idiosyncratic definitions but mutually inclusive measures. Such confusion posits improper operationalization of the variables, which has been a fundamental problem of many empirical studies on investigating knowledge transfer and organisational learning issues.

Additionally, researchers interested in exploring cross-border knowledge transfer and learning processes have been more partial to the recipients' rather than the transferors'

perspective. Evidence can be found in the past literature that most empirical studies were focused on the issues related to knowledge acquisition through international collaborations (e.g., Liu et al., 2010; Lyles and Salk, 1996; Yli-Renko et al., 2001). This limitation might have resulted from the restrictions of data sources to collect both actors' information in the process of knowledge transfer. It also explains the fact that more than 90% of the published articles concerning the issues of knowledge transfer in the Journal of International Business Studies are purely based on quantitative data, and most of it is derived from secondary sources. Yet it has been criticised that too many large sample cross-sectional empirical studies on strategic alliances were based on secondary data of dubious quality using superficial theories in a mechanistic way (Bell et al., 2006; Hennart, 2006).

Nevertheless, growing numbers of empirical researchers have applied surveys to collect the primary data to investigate the profound and complicated phenomena of intra- or inter-organisational knowledge transfer and learning. For instance, in a sample of 151 international strategic alliances, Simonin (1999a) examined the role of knowledge ambiguity and its antecedents – tacitness, asset specificity, complexity, experience, partner protectiveness, cultural and organisational distances – and suggested all these variables are related to knowledge transfer. Despite the fact that the findings suffered from insignificant evidence due to the biased questionnaire answers and the difficulties in detecting the alliance partners' protectiveness behaviours, the research opened up an empirical paradigm of cross-border knowledge transfer based on the primary data collection. Ten years later, Nielsen and Nielsen (2009) modified Simonin's (1999a) survey measures into mutual-dimensional ones in order to conduct an empirical study on knowledge transfer in a sample of 120 international strategic alliances and found supporting evidence for the hypotheses. This highlights the peculiar notion of knowledge transfer research that both transferors' and recipients' perceptions are symmetrically important in reflecting the various phenomena in knowledge transfer processes.

While survey research has been increasingly recognised as a suitable methodology for investigating knowledge transfer and learning through international strategic alliances, common method variance may become a critical concern when both the dependent and independent variables are perceptual measures derived from the same respondents in the questionnaire design (Podsakoff and Organ, 1986). Although the majority of empirical

research has applied Harman's single-factor test to assure that the research findings are exempt from the problem, Chang, van Witteloostuijn and Eden (2010) noted it as an insufficient ex post statistical approach, compared with a valid ex ante research design to collect data from different sources other than the questionnaire only. Consequently, a comprehensive research design concerning both data collection and analysis strategies gains importance and becomes the core of the current empirical study.

4.2. Research Design and Its Justifications

Research design as an overall plan for relating the conceptual understanding of research problems to empirical examination and analysis of collected data can be categorised into three types: exploratory research design aims at identifying the research problem that is unstructured or barely understood; descriptive research design involves a research being clear about the research problem(s) and seeking to describe it (them) systematically; and causal research design attempts to exploit the possible reasons for the observed outcomes (Ghauri and Gronhaug, 2010). This research employs causal research design to reconsider the antecedents of international strategic alliance performance and to empirically investigate the structural relationships among the causal variables and their effects in the proposed framework. Specifically, this research endeavours to diagnose the contextual and processual antecedents of international strategic alliance performance and to understand their functional relationships under scrutiny.

4.2.1. Positivism versus Social Constructionism

Two opposing philosophical positions are proposed to underlie the design of management research: positivism and social constructionism (Easterby-Smith, Thorpe and Lowe, 2002). Whilst positivism believes that the social world exists externally and objectively with ontological and epistemological assumptions, social constructionism supposes that the reality is determined by human actions and experience, individually and collectively. The choice of philosophical stance in empirical research design is important as it can help researchers to clarify what kind of evidence would be required and how it could be gathered and interpreted in response to the proposed question(s). This research stands for the positivistic position in doing empirical study because the nature of the research questions demonstrates causality between measurable factors: what are the contextual and processual antecedents of international strategic alliance performance and what are the underlying relationships between these antecedents? In line with the epistemological assumption, this research conducts empirical investigation

through independent observation on cross-border knowledge transfer and organisational learning and pinpoints international strategic alliances as the unit of analysis; hence, objective realities instead of human interests are the main driver of this research. With the premise of positivistic philosophy in causal research design, notably, this research manifests the causalities between contextual and processual factors and their effects on the performance of international strategic alliances by hypotheses development. In this regard, the operationalization of dependent, independent and control variables is critical to analyse and generalise the empirical findings through statistical probability in this research.

4.2.2. Deduction versus Induction

There are two differing approaches of establishing conclusions in empirical research: deduction draws conclusions through logical reasoning and induction draws conclusions from empirical observations (Ghauri and Gronhung, 2010). This research applies deductive approach to deduce a sequence of hypotheses based on the existing knowledge and to conceptualise a theoretical framework for the purpose of empirical testing. The main objective of the empirical research is therefore not concerned with theory building but rather with substantiation of the cause-and-effect relationships among the proposed theoretic constructs, and to present them in operational terms and to collect relevant information/ data for hypotheses testing. The conclusions of this research are thus derived from logical deduction from theory/ hypotheses development, empirical investigation to analytical findings.

4.2.3. Quantitative versus Qualitative Research

Although quantitative research is often related to positivism and deduction whereas qualitative research is associated with social constructivism and induction, the definitions of quantitative and qualitative research are essentially dependent on the methods of data collection and analysis. The fundamental distinction between quantitative and qualitative research is that quantitative researchers employ numerical measurements to examine the research questions whereas qualitative researchers use non-numerical interpretation 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' (Van Maanen, 1983: 9). Paralleling the causal research design with respect to understanding causalities between contextual and processual factors and their effects on international strategic alliance performance, this research

utilises quantitative research to collect the quantified data via survey methods and to analyse the collected information via statistical techniques. It is believed that being an independent researcher to investigate the research questions by distributing the scalable questionnaires to the representative sample and by statistical testing on the causal relationships between the variables and their measurements critically underpins the positivistic philosophy and deductive approach with respect to contributing to the findings and conclusions of this research.

4.3. Data Collection Strategy

4.3.1. Data Sources

Unlike much prior research using qualitative methods to study the issues of knowledge transfer and organisational learning (e.g, Brewer, 2008; Hsiao et al., 2006; Schotter and Bontis, 2009), this research employs quantitative methods to collect the primary data from large-scale and cross-sectional survey research on a sample of 671 international strategic alliances in Taiwanese information and communication technology industries as well as the secondary data from Global Information Technology Report 2010–2011 (Dutta and Mia, 2011) and Hofstede's (2011) cultural dimension indices.

For the purpose of hypotheses testing on the causal relationships between contextual and processual factors and their impacts on international strategic alliance performance, this research focusing on quantitative methods operationalizes the scalable measures to constitute the questionnaires in primary data collection via survey research. Given that it is commonly considered to be inherently positivistic to collect quantitative data in which it provides a numeric description of trends, attitudes, or opinions of a population by studying a sample of that population, it is not just a particular method of collecting information; that is, besides questionnaires, structured interviews, observations and other techniques also can be utilised in conducting survey research (Creswell, 2009; de Vaus, 2002). Management researchers have widely recognised survey research as an efficient and effective tool to learn about people's opinions and behaviours as well as for getting cause-and-effect relationships among the proposed variables within the relatively short period of time (Ghauri and Gronhaug, 2010).

Additionally, this research collects data from secondary sources (i.e., Global Information Technology Report 2010–2011 and Hofstede's cultural dimension indices) owing to the lack of reliable measures of institutional distance in the existing literature

via survey research. The Global Information Technology Report (Dutta and Mia, 2011) essentially contains large-scale and cross-sectional survey data across 138 countries on a number of issues related to the global information and communication technology industries, including market, political and regulatory, and infrastructure environments; individual, business, and government readiness; and individual, business, and government usages issues, with detailed analysis of sustainability in information and communication technology industries. The report has been published annually by Geneva-based World Economic Forum since 2000 and been acknowledged as a reliable data source by many international business scholars (e.g., Ionascu, Meyer and Erstin, 2004; Xu, Pan and Beamish, 2004). Moreover, as a well-grounded and on-going research project on differences of national cultural in 6 dimensions – power distance, individualism, uncertainty avoidance, long-term orientation, and indulgence versus restraint, and masculinity – between 110 countries since 1980, the cultural dimension indices developed by Hofstede have been extensively applied to support empirical studies on international business research (e.g., Makino and Tsang, 2010; Reus and Lamont, 2009). Accordingly, institutional distance construct can be measured by the comparison between alliance partners country-of-origins' rankings in both sets of indicators in the secondary data sources. The calculation of institutional distance between countries from where partner firms originate is further explicated in Section 4.3.6.

4.3.2. Population Definition

The target population of this research are information and communication technology industries in Taiwan. Over the past few decades, one of the greatest changes in the way business is being conducted has been the intensifying importance of relationships based on partnerships instead of on ownerships (Buckley and Ghauri, 2004). The phenomenon is especially evident in the information and communication technology industries where the business environments are fast moving and highly competitive with complexity and uncertainty. Due to knowledge-based competition, firms nowadays are not only forced to make the strategic decision of either creating proprietary knowledge by themselves or acquiring it through cooperation with external partners, but also exposed to the risk of knowledge loss or learning race (Hamel, 1991) when engaging in knowledge transfer. Such dilemmas are conspicuous in the information and communication technology industries because the knowledge-intensive nature and globalisation are inevitably transforming fundamental business configurations into alliance-based collaborations.

Based on Johnson, Korsgaard and Sapienza's (2002) research, an international strategic alliance is defined as a cooperative arrangement created by two or more firms, at least one of which is headquartered in another country. Partner firms are brought together because of their strategic complementarity, and they usually pool a portion of their resources, skills or knowledge into the alliances in order to create synergies and secure a competitive position in the global marketplace (Contractor and Lorange, 1988; Griffith, Zeybek and O'Brien, 2001; Kogut, 1988). However, like marriage, managing an alliance is not easy (Tsang, 1999) and often implicates the potential for management conflicts (Inkpen, 1995). Prior empirical research indicated that more than half of strategic alliances fail, and primary sources of alliance failure are the opportunistic hazards as each partner tries to maximise its own individual interest instead of collaborative benefits and the managerial complexity in coordinating two independent firms and in aligning operations at the alliance level with parent firms' long-term goals (Park and Ungson, 2001). In this research, the investigation into many challenges of implementing international strategic alliances arising from cross-border knowledge transfer and learning is focused on Taiwanese information and communication technology industries.

Taiwan as one of the advanced economies (International Monetary Fund, 2007) has transformed from a poor agricultural society into a technological powerhouse that ranks among the world's top producers of information and communication technology products in only half a century, accounting for 99% of the world's motherboards, 93% of the world's cable modems, 87% of the world's laptops, 77% of the world's liquid crystal display monitors, 75% of the world's personal computers, and 70% of the world's personal digital assistants, according to the world leading commercial news provider Business Wire (2010). Such remarkable performance is also evidential in the OECD Information Technology Outlook report (2008), which discovered a continuous trend of global information and communication technology industries − the number of Asian and other emerging economies' information and communication technology firms increased in the list of top 250 information and communication technology firms around the world, and notably Taiwan as the Asian leading economy ranks third in the list with 19 Taiwanese information and communication technology firms nominated, following 99 information and communication technology firms based in the US and 40 information and communication technology firms based in Japan.

The sophisticated development of the Taiwan information and communication technology industry resulted not only from the government's support for research and development in terms of creating a strong knowledge base and providing trained manpower for the industry, but also from the close cooperation between the local information and communication technology manufacturers and global brands, typically in the form of original equipment/ design manufacturers in the early stage. Recently, Taiwan has moved on from being solely traditional original equipment/ design manufacturers to developing its own local brands, such as Acer, Asus, BenQ and HTC, which have been successfully promoted to become globally recognisable brands tapping into innovative products and better value in addition to the same local manufacturing expertise. By the thriving growth of information and communication technology industries, Taiwan has played the crucial role in the global information and communication technology supply chain, involving frequent international collaborations with partners from other economies, in particular the special relationships with China, Japan and the US.

As such, it has become a necessity but rather a fad to establish international strategic alliances by Taiwanese information and communication technology firms, whose primary rationale is to enhance the global competitiveness and visibility by learning certain knowledge and skills from their foreign partners. Hence, knowledge transfer and organisational learning have become inevitable phenomena through international collaborations in information and communication technology industries in Taiwan. Owing to the exceptional performance, research on Taiwanese information and communication technology industries has been increasingly addressed. Most research has centred on economic perspectives, elucidating the linkages between the output of the information and communication technology industries and the economic development in Taiwan (e.g., Dahl and Lopez-Claros, 2006; Mai, 2001; Meng and Li, 2002); yet relatively little has been done into the investigation of knowledge-related issues (e.g., Liao, Fei and Chen, 2007), given the knowledge-intensive nature of the information and communication technology industries. In this void, it is imperative for this research to examine the issues of knowledge transfer and organisational learning through international strategic alliances in the information and communication technology industries in Taiwan.

4.3.3. Sampling Procedure

The representative sample in this research is the Taiwan-based information and communication technology manufacturers with international strategic alliance experience; hence, the non-probability technique is employed to implement the sampling procedure (Figure 5). It is fully aware of the drawback of a non-probability sample, which gives no basis for evaluating the size of the sampling variation and the error of estimation (Ghauri and Gronhaug, 2010); however, the non-probability sampling method is utilised to concentrate on the empirical investigation of the research questions of cross-border knowledge transfer and learning in a more advantageously way. The rationales and procedures of non-probability sampling in this research are explicated as follows.

Figure 5: Sampling Procedure
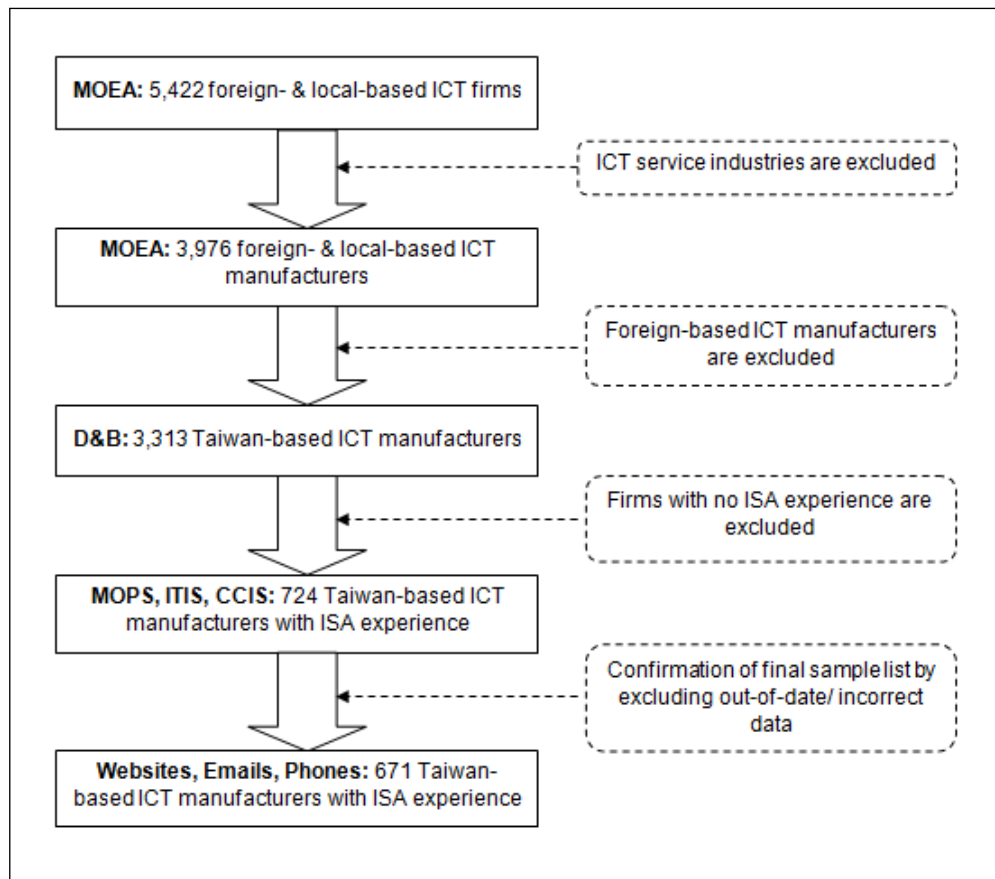
Note: MOEA = Ministry of Economic Affair; D&B = Dun and Bradstreet/D&B Foreign Enterprises database; MOPS = Market Observation Post System; ITIS = Industry and Technology Intelligence Service; CCIS = China Credit Information Service

Firstly, a total of 5,422 information and communication technology firms, including both foreign- and local-based information and communication technology firms, were

detected through the Ministry of Economic Affair (MOEA) online database in Taiwan. The definition of information and communication technology industries, based on the most recent Core Information and Communication Technology Indicators published by Geneva-based International Telecommunication Union (2010: 53), is those that 'use electronic processing to detect, measure and/ or record physical phenomena or to control a physical process', and the coverage of the industries is divided into manufacturing and service categories (Table 2).

Table 2: Classification of Information and Communication Technology Industries

Information and Communication Technology Manufacturing Sector	• Manufacture of electronic components and boards • Manufacturer of computers and peripheral equipment • Manufacturer of communication equipment • Manufacturing of consumer electronics • Manufacturer of magnetic and optical media
Information and Communication Technology Service Sector	• Wholesale of computers, computer peripheral equipment and software • Wholesale of electronic and telecommunications equipment and parts • Software publishing • Telecommunications • Computer programming, consultancy and related activities • Data processing, hosting and related activities; Web portals • Repair of computers and communication equipment

Source: OECD (2009)

Secondly, this research anchors information and communication technology manufactures as the representative sample because compared with the service providers, the manufacturers of information and communication technologies products are relatively R&D-intensive across all firms sizes (OECD, 2008). The issues of cross-border knowledge transfer and learning processes are thus suited to be empirically examined in the information and communication technology manufacturing sector in Taiwan. By definition, information and communication technology manufacturing products include laptops, personal computers, flat panel displays, modems, motherboards, and other electronic components and products (Dahl and Lopez-Claros, 2006). As such, 3,976 foreign and local-based information and communication technology manufacturers were screened and recognised via MOEA database, which provides a user-friendly interface containing industry classifications, company IDs, main products/ services, number of employees, addresses, websites, telephone and fax numbers.

Next, to examine how contextual factors (i.e., institutional distance) affect international strategic alliance performance and to avoid the ambiguous and invalid findings, it is necessary to frame the sample as purely local-based. By browsing the electronic resource of National Chengchi University Library (i.e., Dun and Bradstreet/D&B Foreign Enterprises in Taiwan), 3,313 Taiwan-based information and communication technology manufacturers were thus pulled out in the third phase.

Grounding on Tsang's (1999) definition, this research further specifies international strategic alliances as international cooperative arrangements involving at least one foreign and one domestic firm in the form of R&D coalition, coproduction agreement, franchising, licensing, or joint venture. By a combination of public/ private resources, including the official Market Observation Post System (MOPS) and the databases of Industry and Technology Intelligence Service (ITIS) and China Credit Information Service (CCIS) in Taiwan, an initial sample of 724 Taiwan-based information and communication technology manufacturers with international strategic alliance experience was identified in the fourth step.

To enhance the reliability of the sample list, a mixed checking approach comprising investigating companies' websites, emailing or phoning contact was applied, and an eligible sample set of 671 Taiwan-based information and communication technology manufacturers with international strategic alliance experience was finalised.

4.3.4. Questionnaire Design and Pre-testing

'A survey is only as good as the questions it asks (Neelankavil, 2007: 159).'

A questionnaire is defined as a set of questions following a predetermined order on a specific topic that a respondent answers (de Vaus, 2002; Neelankavil, 2007). It is a way of producing 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). In this research, a mixed-mode survey design is used to collect the primary data from both web-based and mail questionnaires. Given that the different layouts of questionnaire design are required for different interfaces of web-based and mail questionnaires, the structure, choice of

response categories and wordings in both types of questionnaires are consistently presented and carefully scrutinised.

The structure of the questionnaire design is divided into four sections. Firstly, a brief introduction of the current research is provided, including research aim, scope, and intended contribution. Secondly, the background profile of the sampling firms (i.e., Taiwanese information and communication technology manufacturer with international strategic alliance experience) is investigated through asking questions such as the firms' names, the origins of the alliance partner's countries, the duration of the collaborations, the equity structures, and the roles played by the firms in the knowledge transfer processes, either the transferor, recipient, or both. Thirdly, the major section of the questionnaire is categorised into the transferor's and the recipient's perspectives containing paralleling questions with multiple measures adapted from the prior literature. The primary rationale of operationalizing multiple measures underlying theoretical constructs is to offset the measurement error associated with the inferior questions. For the respondents' ease in filling in the questionnaires, a set of balanced and straightforward 5-point Likert Scales (e.g., Dawes, 2008; Minbaeva, Pedersen, Bjorkman, Fey and Park, 2003), ranging from '1= strongly disagree/ very low' to '5 = strongly agree/ very high', are used to constitute the response choice for all questions in the major section. Finally, the contact details of the respondents and the comments on the questionnaire are optionally requested. A sample questionnaire with specific measure codes is provided in Appendix 1.

Furthermore, the definition of an international strategic alliance − a cooperative arrangement, such as R&D coalition, franchising, licensing, coproduction agreements, distribution agreements, buyer-supplier partnerships, joint ventures and so forth, which involves at least one Taiwanese and one foreign partner engaging in business activities for mutual benefits − is shown and highlighted throughout the questionnaire pages in case some respondents may not be confidently knowledgeable about the terminology used in this research. Besides, since the issues of cross-border knowledge transfer and learning are perceived as sensitive topics by most information and communication technology firms in Taiwan, the confidential claim regarding all the information provided by the respondents in the empirical study is promised and emphasised in the first pages of the questionnaires in order to minimise the negative potential of nonresponse rate and evasive answer bias in my research.

Notably, the wordings of the questionnaire design have two versions: the English version of questionnaire is initially drafted for both supervisors' review; and the Mandarin version of the questionnaire is further translated based on the revised draft for the purpose of pre-testing and the formal distribution of the web-based and mail questionnaires in the Taiwanese context. It is fully recognised that not only the terminologies but also the customs should be adapted for the different presentations of languages in the questionnaire design. To ensure the equivalence and comparability of both versions of the questionnaire design, pre-testing thus becomes an important groundwork of survey research in terms of obtaining feedbacks from experts and making necessary corrections (Sinkovics, Penz and Ghauri, 2005). As a result, three stages of pre-testing questionnaire are organised in the following ways.

Firstly, two meetings with each supervisor (Professor Pervez Ghauri and Dr Matt Vidal) were set up for pre-testing the questionnaire in May 2010. Thanks to their comments, the structures and wordings of the English version of the questionnaire were greatly improved. After self-translating the English questionnaire into the Mandarin version in early June 2010, 3 individual meetings with Mr. James Chan, a former researcher at Industrial Technology Research Institute in Taiwan, Dr. Chao-Tung Wen and Dr. Feng-Shang Wu, both Professors in the Graduate Institute of Technology Management in National Chengchi University in Taiwan, were arranged to engage in the pre-testing of the Mandarin questionnaire in the second stage; and the sequence, response scale and layout design of both mail and web-based questionnaires were significantly altered to fit into Taiwanese customs suggested by the interviewees. In mid-June 2010, 2 experienced alliance managers in Taiwanese information and communication technology firms participated in the final stage of pre-testing questionnaire with each completing either web-based or paper survey. Both respondents found no difficulties in completing the questionnaire, and the average completion time was around 15 minutes. After scrutinising the questionnaire design by a systematic approach in pre-testing, the revised Mandarin version of questionnaires was then officially distributed out to the target respondents between mid-June and mid-September 2010.

4.3.5. Respondent Profile

Survey research has long been applied by researchers in various areas of inquiry in the past decades, and the constitution of it has been transformed from a comfortable face-to-face conversation to a highly impersonal experience with increasing frequency mediated

by an electronic device (Dillman et al., 2009). Thanks to the radical advancement in technology development, especially the invention of the Internet through personal computers, the mixed-mode approaches of survey research have become a necessity but rather a fad for researchers to follow. Dillman et al. (ibid) compiled four types of mixed-mode survey designs: use one mode to contact respondents and to encourage response by a different mode; use a second mode to collect responses from the same respondents for specific questions within a questionnaire; use alternative modes for different respondents in the same survey period; and use a different mode to survey the same respondents in a later data collection period. This research adopted the first type of mixed-mode survey research to contact the Taiwanese information and communication technology manufacturers with international strategic alliance experience by web-based questionnaires in the first place and to encourage response by mail questionnaires in the later phase (Figure 6).

Figure 6: Data Collection Procedure in Survey Research
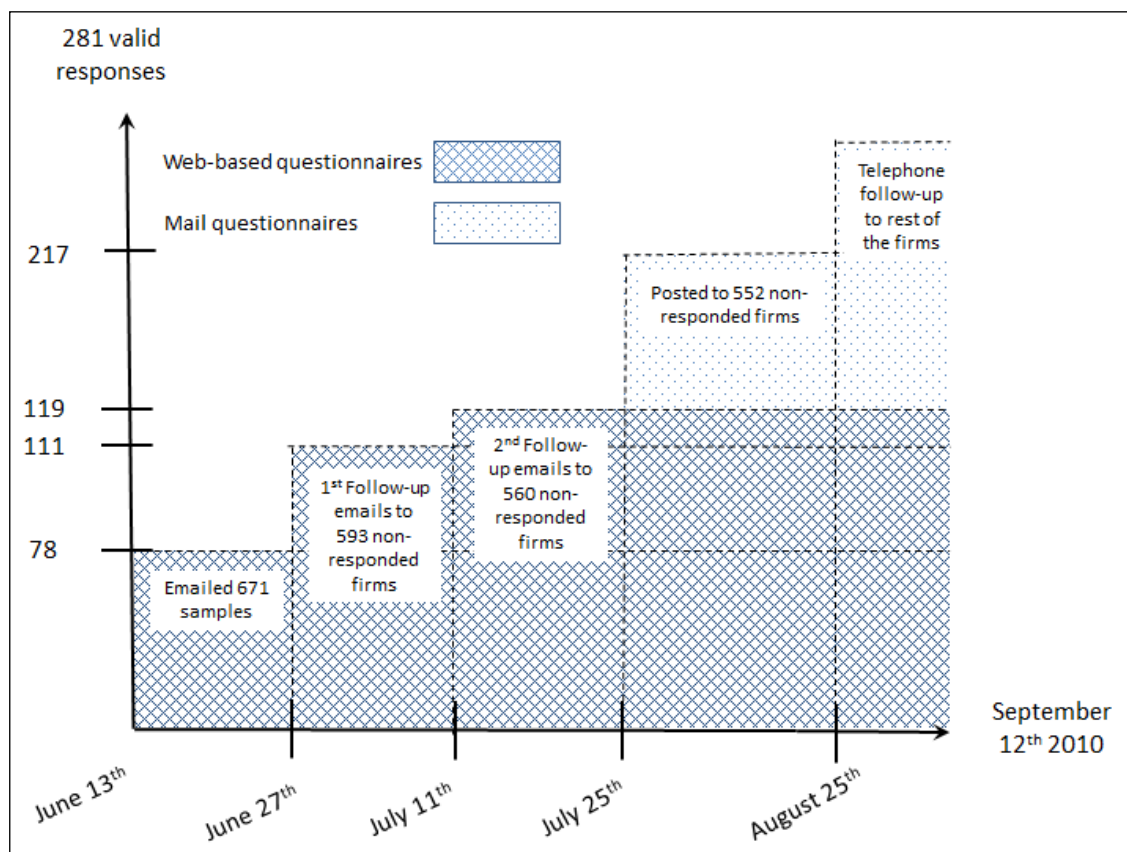
Specifically, this research applied web-based questionnaires via emailing to the sampling firms with follow-ups every couple weeks from mid-June to the end of July 2010. The email list was compiled from multiple sources, including the firms' websites,

Market Observation Post System (MOPS), the databases of Industry and Technology Intelligence Service (ITIS), and China Credit Information Service (CCIS), in order to ensure the accessibility of the contacts. By the end of two-month data collection (July 2010), a total of 162 responses were obtained but 43 were withdrawn due to incomplete answers. To boost the response rate, this research employed mail questionnaires via posting to 43 respondents with invalid answers and to the rest of 509 non-respondents with one telephone follow-up from early August to mid-September 2010 and received 174 returned mails, but 12 were withdrawn due to incomplete answers.

The valid response rate combining web-based and mail questionnaires is 41.9% (281/671), which is much higher than the general response rate of 15-25% presented in the prior research on Taiwanese information and communication technology industries (e.g., Jean, Sinkovics and Cavusgil, 2010; Liu et al., 2010). As discrete phases of data collection were involved in this research, nonresponse bias occurring when early and late respondents differ significantly (Armstrong and Overton, 1977; Dillman, Eltinge, Groves and Little, 2002) might become a concern. To assess the nonresponse bias, this research compared the subjective estimates of the respondent firms' product categories, number of employees and the respondents' positions at the firms between web-based (early) and mail (late) questionnaires and found no significant differences between the two groups via independent-sample t-test in SPSS (p>0.05). Besides, the issue of nonresponse bias between responding and non-responding firms in the selected sample set may also become a threat to challenge the research validity. To examine such issue, the same statistical technique (independent-sample t-test in SPSS) was executed to analyse the differences of the subjective estimates – the firms' product categories and number of employees – between responding and non-responding firms, and the result is indicative of no significant differences between the two groups (p>0.05). Consequently, nonresponse bias does not present a threat in this research.

4.3.6. Operational Variables and Measures

Dependent Variable

International Strategic Alliance Performance

Prior research has generally considered alliance performance as the adequate gauge for assessing the outcome of knowledge transfer; nonetheless, there are vast disagreements on the best ways to evaluate alliance performance and a wide range of indicators for alliance performance have been developed, including financial output, partners'

satisfaction, strategic goal achievement, capability enhancement, survival, and multidimensional measures (Table 3). The controversy is understandable because an alliance involves at least 2 firms and each firm has idiosyncratic criteria for assessing the collaborative outcomes, and most importantly, no consensus exists on measuring such results (Krishnan, Martin and Noorderhaven, 2006; Liu et al., 2010).

Early empirical research preferred to apply objective measures such as financial output indicators derived from secondary sources to measure alliance performance. For instance, Luo (1996) adopted a complete set of financial indicators from China Statistical Yearbook, ranging from profitability, efficiency, liquidity and financial risk, growth opportunities to business determinants, to evaluate the strategic alliance performance in China. Being aware of such fixed, external measures might not truly present the alliance partners' concern about the collaborative outcome, following researchers such as Glaister and Buckley (1998) and Griffith et al. (2001) placed emphasis on partners' satisfaction and developed a number of measures for survey research (Table 3). The authors believed that the subjective measures based on the firm's own assessment would produce more reliable findings; yet the argument has suffered from the critique of the potential sampling error, in which the satisfaction measures could be differently perceived by respondents and the results would thereby be affected by sampling differences (Ren, Gray and Kim, 2009).

To solve such a riddle in assessment of alliance performance, several researchers exerted strategic goal achievements as appropriate measures to explain the alliance performance (e.g., Draulans, deMan and Volberda, 2003; Sarkar et al., 2001). Contrary to the uni-dimensional measures developed in the aforementioned studies, strategic goal achievements are essentially mutual-dimensional measures that can be assessed separately by each firm in alliances. The underlying assumption of the measures is that the divergent strategic goals of the alliance partners are achieved to complement each other's needs. For example, Sarkar et al. (2001) measured strategic goal achievements as the representation of alliance performance based on both joint venture's and the parents' perspectives and found that compatibility instead of complementarity in partner resources has a significantly positive impact on alliance performance. Nevertheless, these measures have been under criticism as well because of the scepticism on the various weightings of the importance of strategic goals placed by alliance partners (Ren et al., 2009).

Recently, increasing research has employed capability enhancement as an important indicator for the alliance success (e.g., Kale and Singh, 2007; Liu, 2005). The common assumption of such measures is that an alliance is considered as a learning organisation, thus the capabilities enhanced by a firm to learn from its partner become the proper results of the alliance performance. In an unpublished doctoral thesis Liu (2005) developed 5 categories of capability enhancement measures (Table 3) to assess the alliance performance and found that both knowledge acquisition and application are positively related to capability enhancement by the alliance partners. Having similar research interest in alliance learning, Kale and Singh (2007) adopted composite measures for alliance performance but agreed that a firm's enhanced capabilities by learning critical skill(s) from its partner(s) reflect one of the aspects of alliance performance. As capability enhancement is derived from learning through alliance partners, however, such perceptual phenomenon has been criticised for the representativeness of the alliance performance as a stand-alone entity (Ren et al., 2009).

Besides, based on the assumption that an alliance is expected to be sustainable as long as it represents the most efficient organisation mode (Inkpen and Beamish, 1997), a small group of researchers have used survival as the indicator for alliance performance (e.g., Gaur and Lu, 2007; Steensma and Lyles, 2000). These researchers usually applied dummy measures, such as longevity and termination, to evaluate success and failure of the alliance, respectively. However, it is a problematic approach when some alliances are project-based collaborations in which most are terminated when the project is completed, which obviously contradicts the argument that a terminated alliance is unsuccessful cooperation by the prior research. To offset the problems resulting from utilising uni-dimensional measures as mentioned earlier, this research adopts a set of 10 Likert-type composite measures to define international strategic alliance performance captured from the prior research (e.g., Griffith et al., 2001; Lunnan and Haugland, 2008; Tsang et al., 2004). The measures concerning the enhancement in financial, technological, marketing, operational, and relational aspects of international strategic alliance performance are specified in Table 4.

Table 3: Review and Classifications of the Alliance Performance Measures in Prior Literature

Authors	Samples	Measures	Sources
		Financial output	
Luo (1996)	57 joint ventures in China	• **Profitability** – Return on assets before tax = earnings before taxes/ total assets – Return on assets after tax = net income/ total assets – Gross profit margin = gross profit/ sales – Operating profit margin = operating profit/ sales • **Efficiency** – Domestic accounts receivable turnover = sales/ domestic accounts receivable – Inventory turnover = costs of goods sold/ inventory – Total asset turnover = sales/ total assets • **Liquidity and financial risk** – Current ratio = current assets/ current liabilities – Liquidity = cash/ total assets – Debt ratio = total debt/ total assets – Interest coverage = earnings before interest and taxes/ interest • **Growth opportunities** – Domestic sales growth rate = compound growth rate of sales – Export growth rate = compound growth rate of export – Net profit growth rate = compound growth rate of new profit • **Business determinants** – Advertising intensity = advertising expenditures/ sales – R&D intensity = R&D expenditure/ sales – Sales force marketing intensity = sales force marketing expenditures/ sales – Credit intensity for domestic sales = forward domestic accounts receivable/ sales	China Statistical Yearbook
		Partners' Satisfaction	
Glaister and Buckley (1998)	75 UK parents of international strategic	• **Overall satisfaction** – Subjective measures of satisfaction of alliance performance made by UK partner – Assessment by UK parent of foreign partner's measure of satisfaction of alliance performance – Assessment by UK parent of alliance management's measure of satisfaction of alliance performance	Geringer and Hebert (1991)

	alliances	– UK parent's subjective measure of the extent to which the costs of the alliance outweigh the benefits of the alliance • **Individual dimensions** Sales level, Market share, profitability, cost control, management of alliance, technology development, product design, quality control, labour productivity, marketing, distribution, reputation, customer service, need for involvement, and overall performance	
Griffith et al. (2001)	87 Kazakhstan-based international joint ventures	• In general, you are pretty satisfied with your relationship with your joint venture partner • Overall, your joint venture partner is a good company to do business with • All in all, your joint venture partner has been fair with you • If you had to do over again, you would not do business with your joint venture partner	Dwyer and Oh (1987)

Strategic Goal Achievement			
Sarkar et al. (2001)	68 strategic alliances	• The collaboration provided a very effective medium of learning • Collaborating with this partner was a wise business decision • Our strategic objectives going into the venture were achieved • The owner's objectives (in terms of specifications, schedule, quality) were met • A quality job was done on the project • Overall, the project was efficiently carried out • The venture was profitable for our firm	Khanna (1998); Khanna et al. (1998)

Capability Enhancement			
Liu (2005)	160 electronics and IT strategic alliances in Taiwan	In your own assessment, to what extent has your firm enhanced your capabilities through alliance learning? • R&D capability in terms of product differentiation and functionality • Speed to introduce new products • Capability to perceive new technology development/ market trends • The ability to respond to the unique requirements of buyers, markets and services • Mass production under control of consistent quality and quality improvement	Subramaniam and Venkatraman (2001)
Kale and Singh (2007)	175 US-based strategic	• The alliance is characterized by a strong and harmonious relationship between the alliance partners • The company has achieved its primary objective(s) in forming this alliance • The company's competitive position has been greatly enhanced due to the alliance	Crossan and Inkpen (1995);

	alliances	• The company has been successful in learning some critical skill(s) or capabilities from its alliance partner(s) • An overall assessment of this alliance, based on all the above dimensions, check (a) satisfactory/ successful or (b) unsatisfactory/ failure	Khanna et al. (1998); Kale et al. (2000)
Survival			
Gaur and Lu (2007)	20177 Japan-based joint ventures	• IJV survival as a dummy variable	Kogut (1988)
Multidimensional Measures			
Tsang et al. (2004)	89 international joint ventures	Relative to your expectation, to what extent has your IJV achieved the following items? • Planned goals • Increase of business volume • Increase of market share • Market penetration of new products • Product quality • Reduction of product defects • Development of customer service • Customer satisfaction • Reduction of customer complaints • Reduction of operational cost • Increase of operational efficiency • Increase of employee productivity	Tsang (2002)
Lunnan and Haugland (2008)	100 contractual alliances	• The net contribution from this cooperation this year • This cooperative venture has resulted in firm growth • This cooperative venture has resulted in market growth • This cooperative venture has resulted in new products • This cooperative venture has resulted in new competencies • This cooperative venture has resulted in new market entrances	Glaister and Buckley (1998)

Table 4: International Strategic Alliance Performance Measures Developed in This
Research

Item Code	Measure
ISAP1	Overall, the collaborative results of the international strategic alliance have increased profitability.
ISAP2	Overall, the collaborative results of the international strategic alliance have resulted in sales growth.
ISAP3	Overall, the collaborative results of the international strategic alliance have accelerated the speed of new product development.
ISAP4	Overall, the collaborative results of the international strategic alliance have increased the number of patents.
ISAP5	Overall, the collaborative results of the international strategic alliance have increased manufacturing efficiency.
ISAP6	Overall, the collaborative results of the international strategic alliance have increased the production quality.
ISAP7	Overall, the collaborative results of the international strategic alliance have increased market penetration of new products.
ISAP8	Overall, the collaborative results of the international strategic alliance have increased customer satisfaction.
ISAP9	Overall, your firm has been satisfied with the cooperative outcomes.
ISAP10	Overall, your firm is willing to keep the cooperation with the foreign partner(s) / cooperate with the foreign partner(s) again.

Sources: Griffith et al. (2001); Lunnan and Haugland, 2008; Tsang et al. (2004)

Independent Variables

Knowledge Acquisition

As Harrigan (1985) noted that a receiving mechanism of the firm is crucial for the acquisition of external knowledge, growing empirical research has endeavoured to examine the antecedents of knowledge acquisition and originated various measures to represent the construct (Table 5). For example, in an empirical research on social capital, knowledge acquisition and exploration in young technology-based firms, Yli-Renko et al. (2001) developed 2 measures for knowledge acquisition, namely customer-based market knowledge and technical know-how, and the findings were indicative of the mediating role played by knowledge acquisition between social capital and knowledge exploitation. Drawing upon the similar research focus on knowledge acquisition in international joint ventures, Tsang (2002) generated 9 types of acquired knowledge as the measures for knowledge acquisition, including the specific skills and competences held by the partner, collaboration, overseeing and management skills, understanding about the local government and business environments, technology adaptation to local conditions, networking and building relationships with local firms. The findings showed

that firms usually improved their skills of knowledge acquisition through learning-by-doing, suggesting the existence of learning myopia.

Grounding on Tsang's (2002) research, Tsang et al. (2004) condensed the measures for knowledge acquisition into 7 kinds – new technological, marketing, product development, managerial, manufacturing process, and business operational expertise, and the knowledge about the foreign cultures and tastes – to investigate the relationship between knowledge acquisition and performance of Vietnam-based international joint ventures and found positive evidence to support their hypotheses. Focusing on the similar research topic on knowledge acquisition and performance of Korean international joint ventures, Park et al. (2008) succeeded Lane et al.'s (2001) and Lyles and Salk's (1996) research and further developed 6 measures for knowledge acquisition, encompassing corporate strategy, accounting finance, marketing, human resource management, information management, and overall know-how. Most recently, Liu et al. (2010) in an empirical research on examining the impact of relational capital and organisational learning on alliance outcomes operationalized knowledge acquisition into 3 types of measures, namely new R&D, product development, and managerial knowledge.

Generally, most prior research has considered cross-border knowledge acquisition as the extent of the knowledge acquired from the alliance partner and measured it by a specific set of knowledge pool related to the alliance operations. Knowledge acquisition would thus be adequately explained by the multi-dimensional measures in this research. As the target of current research is focused on Taiwan-based international strategic alliances in the information and communication technology industries, 5 types of acquired knowledge that are most relevant to the outcomes of knowledge transfer within these industries are developed, including new technological, marketing, product development, managerial, and manufacturing techniques/ expertise (e.g., Liu et al., 2010; Tsang, 2002; Tsang et al., 2004) as mentioned in Chapter 3. However, unlike the aforementioned research investigating solely the recipients' perception towards knowledge acquisition, this research explores both transferors' and recipients' perception towards the levels and types of the acquired knowledge within international strategic alliances in line with Nielsen and Nielsen's (2009) implication on knowledge transfer research. Accordingly, two sets of paralleling 5-item Likert-type scales considering both transferors' and

recipients' understanding of the levels and types of knowledge acquisition within international strategic alliances are displayed in Table 6.

Table 5: Review of Knowledge Acquisition Measures in Prior Literature

Authors	Samples	Measures	Sources
Yli-Renko et al. (2001)	180 young technology-based UK firms	• Because we supply to this customer we are able to obtain a tremendous amount of market knowledge • We get most of our valuable information on customer needs and trends from this customer • Because we supply this customer we are able to obtain a tremendous amount of technical know-how • We get most of our valuable technical know-how related to supplying our product. Service from this customer relationship	Huber (1991); Nooteboom, Berger and Noorderhaven (1997); von Hippel (1988)
Tsang (2002)	73 Singapore & 89 Hong Kong firms with joint ventures in China	The extent to which your company has learned from this joint venture experience in the following areas: • Specific skills and competencies held by your Chinese partner(s) • Collaborating with your Chinese partner(s) in running this joint venture • Setting up a management system in this joint venture • Overseeing this joint venture operation from Singapore/ Hong Kong • Knowing about the Chinese business environment, e.g., tax system, labour policy, etc. • Dealing with Chinese government bodies • Building up business connections (guanxi) in China • Adapting technology to the local Chinese condition • Establishing marketing and distribution networks in China	Tsang (1999)
Tsang et al. (2004)	89 Vietnam-based international joint ventures	Relative to your expectation, to what extent has your IJV acquired the following items from its foreign partner(s)? • New technological expertise • New marketing expertise • Product development • Knowledge about foreign cultures and tastes • Managerial techniques • Manufacturing processes • Business operational experience	Tsang (2002)
Park et al. (2008)	128 Korean-based international joint ventures	To what extent has your IJV acquired…from your foreign parent(s). • Corporate strategy • Accounting and finance • Marketing • Human resource management • Information management • Overall know-how	Lane et al. (2001); Lyles and Salk (1996)
Liu et al. (2010)	160 Taiwan-based alliances	• We learn new R&D expertise from out alliance partner. • We learn new product development from our alliance partner. • We learn new managerial practice from out alliance partner.	Lyles and Salk (1996)

Table 6: Knowledge Acquisition Measures Developed in This Research

Item Code	Measure
KAC1	To what extent has the foreign partner acquired the new technological technique/ expertise from your firm?
KAC2	To what extent has the foreign partner acquired the new marketing technique/ expertise from your firm?
KAC3	To what extent has the foreign partner acquired the new product development technique/ expertise from your firm?
KAC4	To what extent has the foreign partner acquired the new managerial technique/ expertise from your firm?
KAC5	To what extent has the foreign partner acquired the new manufacturing technique/ expertise from your firm?
KAC6	To what extent has your firm acquired the new technological technique/ expertise from the foreign partner?
KAC7	To what extent has your firm acquired the new marketing technique/ expertise from the foreign partner?
KAC8	To what extent has your firm acquired the new product development technique/ expertise from the foreign partner?
KAC9	To what extent has your firm acquired the new managerial technique/ expertise from the foreign partner?
KAC10	To what extent has your firm acquired the new manufacturing technique/ expertise from the foreign partner?

Sources: Liu et al. (2010); Tsang (2002); Tsang et al. (2004)

Potential and Realised Absorptive Capacities

Absorbing knowledge or learning from the alliance partners for capability enhancement has become a norm in the cooperation; yet not until two decades ago was the term 'absorptive capacity' coined by Cohen and Levinthal (1990) who defined it as a firm's ability to value, assimilate and commercially utilise new, external knowledge. Since then, substantial research has recognised it as critical variable to a firm's long-term survival and success because it can reinforce, complement or refocus the firm's knowledge base and endeavoured to explore and reconceptualise the construct (e.g., Lane et al., 2001, 2006; Zahra and George, 2002); however, far more limited research has delved into quantifying the construct for empirical investigation in the domains of cross-border knowledge transfer and learning research.

Cohen and Levinthal (1990) first proposed the R&D intensity as the measure of absorptive capacity. Although such single indicator of absorptive capacity has been largely applied by the subsequent research (e.g., Henderson and Clark, 1990; Youndt, Subramaniam and Snell, 2004; Tsai, 2001), it does not sufficiently capture the complex

nature of absorptive capacity in the context of international strategic alliances. Thus Lane et al. (2001) conceptualised relative absorptive capacity in an empirical research on international joint ventures and explained it by the multi-level measures, including relevant prior knowledge, cultural compatibility of the domestic and foreign parents, and the relatedness of the international joint venture's and foreign partner's business. However, the concept of relative absorptive capacity, which assumes the alliance partners are all keen on learning from each other, does not reflect a valid phenomenon in the collaboration.

Stemming from the seminal work of Zahra and George's (2002) reconceptualization of absorptive capacity, this research incorporates two types of absorptive capacities – potential and realised – with knowledge acquisition to explain the underlying mechanisms of organisational learning within international strategic alliances. In this regard, the review of the applicable measures of potential and realised absorptive capacities is problematic due to the narrow focus on the relatively new concepts in the existing literature. Nevertheless, two empirical studies focusing on the impacts of potential and realised absorptive capacities on firm performance have been spotted (Table 7): Jensen, van den Bosch and Volberda (2005) investigated organisational antecedents of potential and realised absorptive capacities in financial industries and developed multiple measures for each dimensional construct, namely acquisition, assimilation, transformation and exploitation; whereas Fosfuri and Tribo (2008) examined the antecedents of potential absorptive capacity and operationalized it as a firm's perceived importance on its innovation activity of information from 7 external sources, suggesting that potential absorptive capacity contributed to a firm's competitive advantages particularly in innovation performance.

Building upon the core propositions proposed by Zahra and Geoege (2002) and further adapting the measures derived from Jensen et al. (2005), this research assesses potential and realised absorptive capacities by the 3-item Likert type scale measures for each construct. Specifically, potential absorptive capacity is measured by the extents to which the firm is able to assimilate and acquire the transferred knowledge, and whether its cooperative structure in learning is open and flexible, and the knowledge infrastructure is effective. Realised absorptive capacity is measured by the extents to which the firm is able to transform and exploit the acquired knowledge into the alliance context, and also that the cooperative objective and responsibility are clearly known by

the firm. To observe both transferors' and recipients' perspectives on the extents of potential and realised absorptive capacities through organisational learning mechanisms within international strategic alliances, furthermore, this research follows Nielsen and Nielsen's (2009) two-fold measurements model to develop 2 sets of paralleling measures for both theoretical constructs as compiled in Table 8 and Table 9.

Table 7: Review of Potential and Realised Absorptive Capacities Measures in Prior Literature

Authors	Samples	Measures	Sources

Jensen et al. (2005)	769 organisational units in 220 branches of European financial services firms	**Potential Absorptive Capacity:**
		• **Acquisition**
		  – Our unit has frequent interactions with corporate headquarters to acquire new knowledge
		  – Employees of our unit regulatory visit other branches
		  – We collect industry information through informal means
		  – Other divisions of our company are hardly visited
		  – Our unit periodically organises special meetings with customers or third parties to acquire new knowledge
		  – Employees regularly approach third parties such as accountants, consultants, or tax consultants
		• **Assimilation**
		  – We are slow to recognise shifts in our market
		  – New opportunities to serve our clients are quickly understood
		  – We quickly analyse and interpret changing market demands
		
		Realised Absorptive Capacity:
		• **Transformation**
		  – Our unit regularly considers the consequences of changing market demands in terms of new products and services
		  – Employees record and store newly acquired knowledge for future reference
		  – Our unit quickly recognises the usefulness of new external knowledge to existing knowledge
		  – Employees hardly share practical experience
		  – We laboriously grasp the opportunities for our unit from new external knowledge
		  – Our unit periodically meets to discuss consequences of market trends and new product development
		• **Exploration**
		  – It is clearly known how activities within our unit should be performed
		  – Client complaints fall on deaf ears in our unit
		  – Our unit has a clear division of roles and responsibilities
		  – We constantly consider how to better exploit knowledge
		  – Our unit has difficulty implementing new products and services
		  – Employees have a common language regarding our products and services
			Zahra and George (2002); Szulanski (1996)

Fusfuri and Tribo (2008)	2464 firms with innovation activities in Spain	**Potential Absorptive Capacity:** Please indicate the importance for your innovation activity of the following external sources of information during the period 1998-2000: • Suppliers • Customers • Competitors • Universities • Public research institutions and technology parks • Conference, meetings and specialised journals • Exhibitions and showrooms	Zahra and George (2002)

Table 8: Potential Absorptive Capacity Measures Developed in This Research

Item Code	Measure
PAC1	To what extent has the foreign partner been able to assimilate and acquire the transferred knowledge from your firm?
PAC2	To what extent has the foreign partner's cooperative structure in learning been open and flexible?
PAC3	To what extent has the foreign partner's knowledge infrastructure been effective?
PAC4	To what extent has your firm been able to assimilate and acquire the transferred knowledge from the foreign partner?
PAC5	To what extent has your firm's cooperative structure in learning been open and flexible?
PAC6	To what extent has your firm's knowledge infrastructure been effective?

Sources: Jensen et al. (2005); Zahra and George (2002)

Table 9: Realised Absorptive Capacity Measures Developed in This Research

Item Code	Measure
RAC1	To what extent has the foreign partner been able to transform and exploit the acquired knowledge into the alliance context?
RAC2	To what extent has the foreign partner clearly known the cooperative objective(s)?
RAC3	To what extent has the foreign partner clearly known its responsibility in the cooperation?
RAC4	To what extent has your firm been able to transform and exploit the acquired knowledge into the alliance context?
RAC5	To what extent has your firm clearly known the cooperative objective(s)?
RAC6	To what extent has your firm clearly known your responsibility in the cooperation?

Sources: Jensen et al. (2005); Zahra and George (2002)

Knowledge Protectiveness and Ambiguity

Despite the practical recognition of the importance of knowledge protection and ambiguity, there has been limited empirical research drawing upon such issues. The primary reasons, suggested by Simonin (1999a, b), are the difficulties in assessing the protective behaviour and ambiguous perception by the firm. Examples can be seen from Simonin's research (1999a) in which the author pioneered the empirical research on knowledge protectiveness and ambiguity by developing two measures for each construct as shown in Table 10, and found a paucity of significance evidence on the proposed hypothesis, that is, knowledge ambiguity as a full mediator of knowledge protectiveness on knowledge transfer.

Focusing on the relevant research on knowledge transfer in alliances, Lee et al. (2007) succeeded Simonin's (1999a) concept and adapted knowledge ambiguity as a second-order construct resulting from 3 dimensions of knowledge properties – tacitness, complexity and specificity (Table 10). Contrary to Simonin's (1999a) finding of the negative relationship between knowledge ambiguity and the outcomes of knowledge transfer, however, the positive impact of knowledge ambiguity on alliance performance was found in Lee et al.'s (2007) research. The contrasting findings regarding knowledge protectiveness and ambiguity indicate the need for a better operationalization of the measures for both constructs.

To resolve the problem, Nielsen and Nielsen (2009) adapted Simonin's (1999a) measures into two-fold – one was the surveyed firm's own assessment on its extent of knowledge protectiveness and the other was the assessment on the alliance partner's extent of knowledge protectiveness (Table 10), and the findings finally supported a statistical significance on the proposed relationship. Such advancement of the measures into mutual-dimensional indicates that the empirical investigation into knowledge transfer issues requires to collect data from both of the actors in the transferring and absorbing processes, providing critical implication for this research to follow the logic in operationalization of the theoretical constructs.

However, instead of delving into the advancement of new measures, this research succeeds both the theoretical and empirical groundings of the relevant literature (e.g., Simonin, 1999a, b, 2004; Szulanski, 2000), complementing the mutual-dimensional operationalization proposed by Nielsen and Nielsen (2009), to formulate 2-item and 4-item Likert type scale measures for knowledge protectiveness and ambiguity, respectively. Particularly, knowledge protectiveness is measured as the extent to which the alliance partner/ your firm restrict your firm's/ alliance partner's access to the knowledge bases, and knowledge ambiguity is explained by the difficulty in transferring/ absorbing the knowledge from the alliance partner and the unclear association between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge (Table 11).

Table 10: Review of Knowledge Protectiveness and Ambiguity Measures in Prior Literature

Authors	Samples	Measures	Sources
Simonin (1999a)	147 US-based multinational enterprises with strategic alliance experience	**Knowledge Protectiveness** – Your partner has intentional procedures, routines, and policies to restrict the sharing of relevant information concerning its technology/ process know-how – Your partner is very protective of its technology/process know-how **Knowledge Ambiguity** – Marketing skills and know-how of the partner easily transferable back to the company. – Association between causes and effects, inputs and outputs, and actions and outcomes related to the marketing skills and know-how of the partner is clear.	Crossan and Inkpen, (1995); Lippman and Rumelt (1982); Lyles and Salk (1996); Szulanski (1996)
Lee et al. (2007)	95 Taiwanese-based strategic alliances	**Knowledge Ambiguity** • **Tacitness:** – Our technology and process know-how is difficult to codify – Our technology and process know-how is more tacit than explicit • **Complexity:** – Our technology and process know-how is the product of many interdependent techniques, routines, individuals, and resources – Our technology and process know-how is a complicated combination of many different capabilities and resources • **Specificity:** – To develop our technology and process know-how, we had to invest significantly in specialized equipment and facilities – To develop our technology and process know-how, we had to invest significantly in skilled human resources	Simonin (1999a,b, 2004)
Nielsen and Nielsen (2009)	120 Danish-based strategic alliances	**Knowledge Protectiveness** – To what extent has your partner restricted your access to: Knowledge/competences – To what extent has your company restricted your partner's access to: knowledge/ competences	Simonin (1999a,b)

Table 11: Knowledge Protectiveness and Ambiguity Measures Developed in This Research

Item Code	Measure
KP1	To what extent has your firm restricted the foreign partner's access to your knowledge base?
KP2	To what extent has the foreign partner restricted your firm's access to its knowledge base?
KAM1	To what extent has your firm experienced difficulty in transferring knowledge to the foreign partner?

KAM2	To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from your firm?
KAM3	To what extent has your firm experienced difficulty in absorbing the transferred knowledge from the foreign partner?
KAM4	To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from the foreign partner?

Sources: Nielsen and Nielsen (2009); Simonin (1999a, b, 2004); Szulanski (2000)

Relational Capital

Recently, the concept of relational capital has been increasingly discussed in the literature, and the phenomenon has been intensifying since Kostova and Roth (2002) called for greater clarity of social capital's potential to affect firm-level strategies. As one of the dimensions of social capital (De Clercq and Sapienza, 2006; Dekker and Uslaner, 2001), relational capital is primarily concerned with the dynamics of inter-firm relationships. Prior research has generally agreed upon the positive role played by the relational capital, yet the applications of the construct across disciplines correspond to the divergent dentitions and measurements as selectively shown in Table 12.

For instance, in an empirical study on learning and protection of proprietary assets in strategic alliances, Kale et al. (2000: 218) defined relational capital as 'the level of mutual trust, respect and friendship that reside at the individual level between alliance partners, and developed 5 measures – close personal interaction, mutual respect, mutual trust, personal friendship and high reciprocity. Succeeding Kale et al.'s (ibid) research, Cousins, Handfield, Lawson and Petersen (2006) operationalized the construct into 3 elements, namely mutual trust, respect and interaction between firms in order to investigate the socialisation processes of buyer-supplier relationships along with the manufacturing supply chain in the UK. In a most recent empirical study on alliance learning, Liu et al. (2010: 2) characterised relational capital as 'a relational rent generated in an exchange relationship that cannot be generated by either firm in isolation' and suggested trust, transparency and partner interaction as the 3 dimensions of the construct.

Despite the various measures developed in the prior research, the essence of the relational capital construct has been extensively perceived as multidimensional concerning a sequence of positive interactions between firms within cooperation. In line

with this premise, this research defines relational capital as the extent of partner interactions, mutual trust, and reciprocal commitments between alliance partners. Yet as Nielsen and Nielsen's (2009) research implied the important consideration of both transferors' and recipient's viewpoints to examine the inter-organisational knowledge transfer, this research develops a total of 12-item Likert type scale, mutual-dimensional measures as exhibited in Table 13 to present the underlying constructs based on the prior empirical research (e.g., Cousins et al., 2006; Kale et al., 2000; Liu et al., 2010).

Table 12: Review of Relational Capital Measures in Prior Literature

Authors	Samples	Measures	Sources
Kale et al. (2000)	592 US-based alliances with annual sales > $50 million in 1994	– There is close, personal interaction between the partners at multiple levels – The alliance is characterized by mutual respect between the partners at multiple levels – The alliance is characterized by mutual trust between the partners at multiple levels – The alliance is characterized by personal friendship between the partners at multiple levels – The alliance is characterized by high reciprocity among the partners	Dyer and Singh (1998)
Cousins et al. (2006)	111 manufacturers in the UK	• **Mutual trust:** – The relationship is characterised by mutual trust between the supply partners at multiple levels. • **Mutual Respect:** – The relationship is characterised by mutual respect between the supply partners at multiple levels. • **Interaction:** – There is close, personal interaction between the supply partners at multiple levels.	Kale et al. (2000)
Liu et al. (2010)	160 Taiwan-based alliances in electronics and IT industries	• **Trust:** – A good faith relationship has developed over time in my firm's dealings with the alliance partner – My firm and this alliance partner understand each other well – My firm has never had the feeling of being misled in its interactions with the alliance partner • **Transparency:** – The partner's willingness to discuss and solve technical problems – The partner's willingness to provide product technology data/ documentation – The partner's willingness to provide process technology • **Partner interaction:** – We interact with our alliance partner through on-site visits and face-to-face communication – Our company and our alliance partner will work together on technology sharing – Both companies will work together to solve the problems	Inkpen (2000); Robson (2001)

Table 13: Relational Capital Measures Developed in This Research

Item Code	Measure
PI1	Your firm has been very friendly and respectful to the foreign partner.
PI2	Your firm has made frequent communications and interactions with the foreign partner.
PI3	The foreign partner has been very friendly and respectful to your firm.
PI4	The foreign partner has made frequent communications and interactions with your firm.
MT1	Your firm has never cheated or misled the foreign partner.
MT2	Your firm has offered a fair deal to the foreign partner.
MT3	The foreign partner has never cheated or misled your firm.
MT4	The foreign partner has offered a fair deal to your firm.
REC1	Your firm has made all decision based on the mutual benefits.
REC2	Your firm has been highly committed to work with the foreign partner to solve problem(s).
REC3	The foreign partner has made all decision based on the mutual benefits.
REC4	The foreign partner has been highly committed to work with your firm to solve problem(s).

Sources: Cousins et al. (2006); Kale et al. (2000); Liu et al. (2010)

Institutional Distance

Since Kostova (1996) coined the institutional profile construct 'institutional distance' and defined it as the extent of similarity or dissimilarity between the regulatory, normative, and cognitive institutions of the two countries, relevant literature has enriched the theoretical groundings of institutional distance by recognising the importance of the variance between institutional environments and applying the concept of institutional distance to explain the various phenomena, such as entry mode choices (Yiu and Makino, 2002; Xu and Shenkar, 2002), partner selection for international strategic alliances (Li and Ferreira, 2008), conforming to organisational legitimacy in a host country (Kostova and Zaheer, 1999), diffusion of organisational practices within a multinational enterprise (Kostova and Roth, 2002; Nelson and Winter, 1982) and cross-border acquisition (Dikova et al., 2010); but limited research has contributed to empirical investigation due to underdeveloped measurements for institutional distance.

Not until recently have a number of researchers transformed the theoretical constructs of institutional distance into various pragmatic measures (Table 14). Xu et al. (2004) carried out the measures – institutions and management – from The Global Competitive Report, published annually by Geneva-based World Economic Forum, to examine the

impacts of regulatory and normative pillars of institutional distance on multinational enterprise ownership and expatriate strategies. Meanwhile, Ionascu et al. (2004) empirically investigated the association between institutional distance and entry mode choices and developed measures of regulatory, normative and cognitive distances in accordance with different sources of data collected, such as the Index of Economic Freedom, Hodstede's cultural dimension, World Development Indicators and so forth.

Most recently, Gaur and Lu (2007) synthesised the factors from the World Competitiveness Yearbook, published annually by International Institute for Management Development in Lausanne, and Country Risk Ratings, published annually through Euromoney website, to generate 7 and 5 measures for regulatory and normative distances respectively in terms of exploring the impact of institutional distance on ownership strategies and survival of foreign subsidiaries. Nooteboom, Van Haverbeke, Duysters, Gilsing and Van den Oord (2007) from an econometrics perspective calculated the cognitive distance based on the average of the correlations between the focal firm's technology profile and that of each of its alliance partners. Although the researchers generally agreed that the theoretical constitution of institutional distance can be classified into regulatory, normative, and cognitive aspects, they operationalized the measures of these constructs with distinctive elements.

For instance, while Xu et al. (2004) defined normative institutions from an organisational point of view, Ionascu et al. (2004) suggested national cultures as the essence of normative distance between two countries. Despite the statistical evidence, Gaur and Lu (2007) made unclear distinction between regulatory and normative measures in that all were related to governmental factors in a given country. Additionally, unlike Nooteboom et al. (2007) only concerning the technological profile of a country, Ionascu et al. (2004) applied a wider range of cognitive factors based on education, economic, and technological developments to formulate the measures. Given that the integrity of the institutional factors (regulatory, normative, and cognitive) has been widely noted in the prior literature (e.g., Ramsey, 2005; Scott, 1995; Williamson, 1991); except for Ionascu et al.'s (2004) research, others neglected the full aspects of the institutional distance construct coined by Kostova (1996), resulting in incomplete contribution to the empirical research.

Table 14: Review of Institutional Distance Measures in Prior Literature

Authors	Samples	Measures	Sources
Xu et al. (2004)	Secondary data based on over 2000 Japanese overseas sub-units	**Regulative:** – Anti-trust laws – Legal system – Impartiality of arbitration – Settlement of disputes – Institutional stability – Effectiveness of police force – Product liability **Normative:** – Product design – Customer orientation – Staff training – Willingness to delegate – Performance-related pay – Professional managers – Effectiveness of corporate boards	The Global Competitiveness Report
Ionascu et al. (2004)	Secondary data based on Estrin and Meyer's (2004) foreign direct investment survey in Egypt, India, South Africa and Vietnam	**Regulatory:** – Absolute distance on the level of regulations and restrictions to operate a business	Regulation Factor form the Index of Economic Freedom
		Normative: – Power distance – Individualism – Masculinity – Uncertainty Avoidance	Hofstede's cultural dimensions
		Cognitive: – Percentage of economically active population that has attained at least tertiary education. Year: 2000; Age: 25+ – Average schooling years in the total population. Year: 2000; Age: 25+ – Number of computers per 1000 persons – Number of internet hosts per 1000 persons	ILO Yearbook of Labour Statistics, OECD Statistics, Country Statistical Offices, World Development Indicators
Gaur and Lu (2007)	Secondary data based on 20, 177 Japanese foreign subsidiaries	**Regulatory:** – Fiscal policy (government debt & total foreign debt as percentage of GDP) – Antitrust regulation – Political transparency – Intellectual property protection – Judiciary system efficiency – Rarity of market dominance in key industries – Fiscal policy (inflation) **Normative:** – Adaptation of political system to today's economic challenges – Adaptation of government policies to new economic realities – Transparency of government toward its citizens – Political risk rating – Degree to which bureaucracy hinders economic development	The 10th item was taken from Country Risk Ratings. All other measures were from World Competitiveness Yearbook.
Nooteboom et al. (2007)	116 companies in the US chemicals, automotive and pharmaceutical industries	**Cognitive:** – The average of the correlations between the focal firm's technology profile and that of each of its alliance partners	Narin, Noma and Perry (1987)

Recognising the void in the prior empirical studies, this research thereby includes the complete theoretic pillars of institutional distance construct to constitute the appropriate measures. In light of institutional perspective, three types of institutional distance are proposed to affect the firm's behaviours and perceptions towards knowledge transfer in international strategic alliances: regulatory distance refers to the different political or legal environments from which alliance partners originate, such as laws, rules and regulations; normative distance defines the different legitimate means through which socially valued ends can be pursued by the alliance partners in their home countries, such as social values, culture, and norms; and cognitive distance concerns the different embedded beliefs and values that are imposed upon or internalised by the alliance partners in their own societies, such as the education schemas or industrial developments (Child and Tsai, 2005; Scott, 1995; Yiu and Makino, 2002).

Building on the similar institutional distance measures developed in the prior research (e.g., Chao and Kumar, 2010; Gaur and Lu, 2007; Xu et al., 2004), which were mainly taken from the secondary sources, this research initially adopted 7-item and 5-item scale measures from The Global Information Technology Report 2010–2011 (Dutta and Mia, 2011) to reflect the regulatory and cognitive distances, respectively; and 6-item scale measures from Hofstede's (2011) cultural dimension indicators to represent normative distance (Table 15). The selection of the appropriate measures is based on the relevance to the research scope of information and communication technology industries in Taiwan. Due to the composite scales of the collected data, the calculation of the values for institutional distance measures is adjusted by the variance explained of each measure and the formula is presented below:

$$ID_{tf} = \sum_{i=1}^{n}[(I_t - I_f)^2 / V_I] / n$$

where ID_{tf} refers to the institutional distance between Taiwan (t) and the foreign country (f); I_t refers to the institutional distance indicator for Taiwan; I_f refers to the institutional distance indicator for the foreign country; V_I is the variance of indicator I; and n is the number of indicators.

The formula design originates from Kogut and Singh's (1988) research on cultural distance, in which the authors corrected the variance to impose certain weights on the indicators in the composite index of Hofstede's cultural dimensions, and popularly

applied by the subsequent research on the examination of cultural or institutional differences in international contexts (e.g.,, Gaur and Lu, 2007; Morosini, Shane and Singh, 1998).

Table 15: Institutional Distance Measures Collected from Secondary Data

Item Code	Measure	Definition	Source
RD1	Laws relating to information and communication technology	The development of a country's laws relating to the use of information and communication technologies (e.g., electronic commerce, digital signatures, consumer protection).	The Global Information Technology Report (Dutta and Mia, 2011)
RD2	Intellectual property protection	The extent of the intellectual property protection, including anti-counterfeiting measures, in a country.	
RD3	Property rights	The extent of the protection of property rights, including financial assets, in a country.	
RD4	Effectiveness of law making bodies	The effectiveness of a country's parliament/ congress as a law-making institution.	
RD5	Judicial independence	The extent of the judiciary in a country independent from influences of members of government, citizens or firms.	
RD6	Efficiency of legal framework in setting disputes	The efficiency of the legal framework in a country for private businesses to settle disputes.	
RD7	Efficiency of legal framework in challenging regulations	The efficiency of the legal framework in a country for private businesses to challenge the legality of government actions and/or regulations.	
ND1	Power distance	The extent to which the less powerful members of organisations and institutions accept and expect that power is distributed unequally.	Hofstede's Cultural Dimension Indices (2011)
ND2	Individualism	The extent to which individuals are integrated into groups.	
ND3	Uncertainty avoidance	The extent of a society's tolerance for uncertainty and ambiguity.	
ND4	Long-term orientation	The extent to which a society fosters pragmatic virtues oriented towards future rewards, in particular saving, persistence, and adapting to changing circumstances.	
ND5	Indulgence versus constraint	The extent to which a society allows relatively free gratification of basic and natural human drives related to enjoying life and having fun versus suppresses gratification of needs and regulates them by means of strict social norms.	
ND6	Masculinity	The extent to which a society distributes emotional roles between the genders – masculinity versus femininity.	
CD1	Company spending on research and development	The extent to which companies spend on research and development.	The Global Information Technology Report (Dutta and
CD2	Firm-level technology	The extent to which businesses in a country absorb	

	absorption	new technology.	Mia, 2011)
CD3	Capacity for innovation	Companies obtain technology in a country either exclusively from licensing or imitating foreign companies or by conducting formal research and pioneering their own new products and processes.	
CD4	Impact of information and communication technology on new products and services	The extent of information and communication technologies creates new business models, services, and products in a country.	
CD5	Impact of information and communication technology on new organisational models	The extent of information and communication technologies creates new organizational models (virtual teams, remote working, telecommuting, etc.) within businesses in a country.	

Control Variables

This research anchors the roles played by the responding firms in the knowledge transfer processes (i.e., transferor, recipient or both) as the key control variables to better understand the different behaviours and perceptions of transferors and recipients towards cross-border knowledge transfer in a comparative sense. Hence, all items/ questions involved in the main section of the questionnaire are designed as dichotomous measures based on either transferors' or recipients' standpoint. Other dimensions of items/ questions in the questionnaire such as alliance duration (Simonin, 2004), country of origin of the alliance partner (Liu et al., 2010), equity structures (Das, 2005) have been acknowledged as the key variables influencing alliance performance in the prior studies. To examine if international strategic alliance performance is affected by these variables, this research ran a preliminary analysis of variance (ANOVA) via SPSS 18 (SPSS) and found no significant differences, thus withdrew the consideration of these as control variables.

4.4. Data Analysis Strategy

Having introduced what methods are employed for data collection, a systematic overview of the procedure and techniques used for data analysis in this research is essentially addressed. Also, the backbones of the empirical study such as research reliability and validity are further examined by the appropriate criteria.

4.4.1. Data Analysis Procedure and Techniques

The data collected from both primary and secondary sources of survey research are analysed by means of descriptive and inferential statistics encompassing a sequence of procedure and statistical techniques (Figure 7). Descriptive statistics provide important information about the collected data to be analysed, such as means, standard deviations, ranges, maximums and minimums; but the statistical methods essentially rely on a critical assumption that the data are normally distributed, and the data interpretation would be invalid if the assumption is violated (Park, 2008). However, a normality test via SPSS shows that all the collected data in the current research are non-normally distributed ($\rho < 0.05$), and a number of commonly applied statistical techniques, including exponential, logarithmic, inverse, square, and square root data transformations (DeCoster, 2001; Osborne and Costello, 2004), unfortunately fail to transform the data. In this regard, non-parametric methods, such as Wilcoxon-Mann-Whitney or Kruskal-Wallis test, are used to deal with the non-normalised data in this research because parametric methods, such as t-test or one-way analysis of variance, require the variables within each group to have an approximately normal distribution (Altman, 1991).

Figure 7: Data Analysis Procedure and Techniques
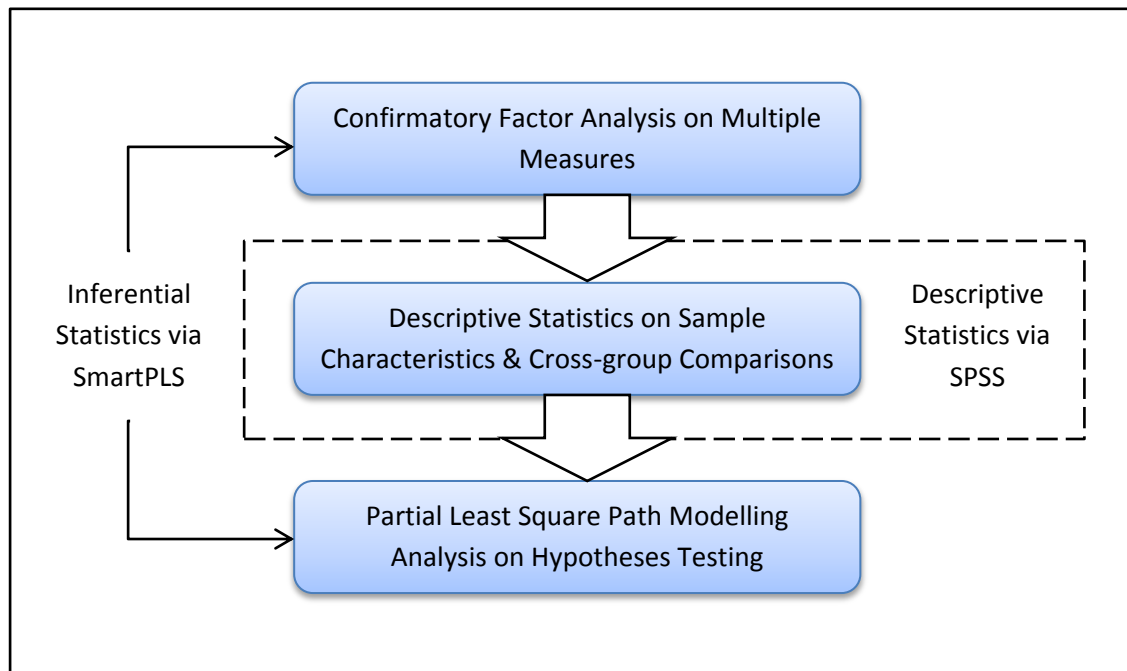
Within the context of descriptive statistics, several statistical approaches of univariate and bivariate analysis – frequency, chi-square, and cross-tabulation tests – are firstly applied to examine the sample characteristics in detail via SPSS, including the duration

and equity structure of the alliance, origin of the alliance partner's country, and role played by the responding firm in the knowledge transfer process. Since the design of the major section of the questionnaire is based on dichotomous questions, controlled by the roles played by the responding firms (i.e., transferor, recipient, and both), a number of statistical methods of multivariate analysis, including Spearman's Rank Correlation Coefficient, Related-Samples Wilcoxon Signed Rank, and Independent-Samples Kruskal-Wallis tests in SPSS, are subsequently employed to investigate and compare the developed measures across the 3 conditions. The aim of the cross-group comparison is to highlight the different behaviours of transferors and recipients in knowledge transfer processes and further provide practical implications for better management of knowledge transfer and organisational learning through international strategic alliances.

Distinguishing from descriptive statistics involving the organisation, summarisation, and presentation of the data, inferential statistics utilise probabilistic techniques to analyse and make inferences about population characteristics from information contained in the collected data drawn from the representative samples of the population. In the context of inferential statistics, the data analysis procedure and techniques are essentially used for decision-making (factor analysis) and hypotheses testing (PLS path modelling analysis).

Factor analysis as a collection of methods used to investigate how underlying theoretical constructs impact responses on a number of observed variables includes exploratory and confirmatory factor analysis. As the research framework developed in the present research is properly defined in line with the prior literature, exploratory factor analysis attempting to provide explanations for covariance on a potentially large number of observed variables in terms of reducing data to a smaller set of summarised variables for the generation of the constructs is not necessarily required; but confirmatory factor analysis focusing on the examination of whether the specific sets of observed variables reflect the underlying assumptions of the constructs is strongly demanded. Hence, confirmatory factor analysis as an important prerequisite for validating the theoretic model is adequately carried out in the first stage of data analysis.

Due to the theoretical considerations, however, both reflective and formative measures are defined to formulate the measurement models in the present research. Contrary to the reflective model, the formative model contains multidimensional and unrelated

measures reflecting the same underlying latent construct (Chin, 2010), which is, in fact, defined as a linear combination of the corresponding measures and each measure is perceived as an exogenous variable in the measurement model, thus changes in one measure do not imply changes in the others and internal consistency is no more an issue (Esposito Vinzi, Chin and Henseler, 2010).

Based on the comparison of both theoretical and empirical implications between formative and reflective models in the prior literature (Table 16), a couple of second-order latent constructs fundamentally formed and defined by their measures are characterised as formative measurement models, including institutional distance and relational capital; whereas other first-order latent constructs with measures manifesting themselves and requiring inter-correlation among their measures are typified as reflective measurement models, including regulatory, normative, and cognitive distances, partner interactions, mutual trust, reciprocal commitment, knowledge protectiveness, knowledge ambiguity, potential and realised absorptive capacities, knowledge acquisition, and international strategic alliance performance. In order to test the reliability and validity of both formative and reflective models, a series of assessment techniques of confirmatory factor analysis on both formative and reflective measurements models are performed via SmartPLS.

SmartPLS is a variance-based multivariate statistical programme that is particularly keen on 'soft modelling' (Wold, 1982) techniques and exhibits greater flexibility in dealing with various obstacles in situations where it is impossible to fit the hard assumptions of more conventional covariance-based statistical programmes (Esposito Vinzi et al., 2010), such as AMOS, EQS, and LISREL, as shown in Table 17. As an advantage, the PLS method 'involves no assumptions about the population or scale of measurement' (Fornell and Bookstein, 1982: 443) and therefore can work without distribution assumption and easily handle continuous, dummy, and categorical non-normal data collected in this research. Also, it is capable of assessing interaction effects of the hypothesised moderator (i.e., realised absorptive capacity) and higher-order models (i.e., institutional distance and relational capital) in this research because the assumption of interdependence/ exogeneity of the latent constructs is not required (Lohmoller, 1989). However, like any other statistical techniques the PLS path analysis demands implicit assumption to be fulfilled, that is, predictor specification (Chin and

Newsted, 1999), in which the systematic part of the linear regression must be equal to the conditional expectation of the dependent variable (Haenlein and Kaplan, 2004).

Table 16: Comparison between Formative and Reflective Models

	Formative Model	Reflective Model
Theoretical Considerations:		
• Nature of Construct	Latent construct is formed	Latent construct exists
• Direction of causality between items and latent construct	Causality from items to construct	Causality from construct to items
• Characteristics of items used to measure the construct	Items define the construct	Items are manifested by the construct
Empirical Considerations:		
• Item Inter-correlation	Items can have any pattern of inter-correlation but should possess the same directional relationship	Items should have high positive inter-correlations
• Item relationships with construct antecedents and consequences	Items may not have similar significance of relationships with the antecedents/consequences as the construct	Items have similar sign and significance of relationships with the antecedents/ consequences as the construct
• Measurement error and collinearity	Identifying the error term is not possible if the formative measurement model is estimated in isolation	Identifying the error term in items is possible

Source: Adapted from Coltman, Devinney, Midgley and Venaik (2008: 1252)

One of the peculiar assets of SmartPLS compared with LISREL is its ability to deal with formative as well as reflective models, in that the PLS path analysis adopts a component-based strategy to the measurement of multiple latent constructs by defining them as linear composites of the related observed measures, and provides maximised estimation of the predictive structural coefficients instead of the fit in a model (Chin, 1998; Chin and Newsted, 1999). The approach is therefore most suitable for exploratory research where the indicators/ measures are newly developed and the relationships between them and the latent construct have not yet been tested in the previous empirical studies (Ainuddin, Beamish, Hulland and Rouse, 2007). In this regard, measures of institutional distance that were newly developed in this research are adequately analysed by SmartPLS in a predictive sense, serving as significant contribution to the theory

development in the cross-border knowledge transfer and learning, as well as alliance research.

Table 17: Comparison between Covariance- and Variance-based Path Modelling Analysis

Criteria	Covariance-based	Variance-based
Statistical programmes	AMOS, EQS, LISREL	LVPLS, PLS-Graph, SmartPLS
Statistical assumptions	- Multivariate normality - Completely random missing data - Sufficiently large sample size (usually >200) - Correct model identification and specification - Exogeneity of predictor variables	- Distribution-free - Appropriate sample size (as small as 20) - Predictor specification
Algorithms of estimation	Common factor analysis, maximum likelihood approximation	Principle component analysis, PLS approximation
Relationships between observed measures and latent constructs	Reflective	Formative and reflective
Model evaluation	Statistical fit indices with full information about significance of path coefficients in the model	Heuristic methods but lack of information about significance of path coefficients in the model; yet can be supplemented by bootstrapping algorithm
Applications	Mathematical and statistical grounds, theory and interpretation-oriented research	Practical ground, prediction- and exploration-oriented research for early stage of theory development
Limitations	- Difficulty in handling interaction effects and higher-order model - Improper use for continuous, dummy or categorical non-normal data	Inclination to underestimate the correlations between latent constructs and overestimate the loadings

Sources: Brinckmann (2006); Chin (2010); Haenlein and Kaplan (2004)

Despite the superiorities of PLS over LISREL-type methods in the aforementioned aspects, it has certain limitations when the research is focused on precise estimation of the underlying population parameters, because the statistical results of the PLS method tend to underestimate the correlations between the latent constructs but overestimate the factor loadings (Dijkstra, 1983, 2010). Unless the number of samples and indicators/ measures per construct increase to infinity, the results of the estimation would

approximate to the true values and the problem disappear (Lohmoller, 1989). Hence, it is noted that compared with LISREL-type approaches, the PLS methods are more suited to prediction- and exploration-oriented research, especially in the early stage of theory development in the current study. To conclude, 3 stages of data analysis are involved in the present research, starting from confirmatory factor analysis on multiple measures for the purpose of research reliability and validity, descriptive statistics on sample characteristics and cross-group comparison, to PLS path modelling analysis on hypotheses testing.

4.4.2. Research Reliability and Validity

In order to ensure research reliability and validity, this research utilises several criteria of PLS path modelling analysis on both measurement and structural models. Due to the involvement of formative and reflective models in this research, different statistical methods and interpretations are thus needed to evaluate both types of models (Table 18).

Table 18: Research Reliability and Validity Criteria

Measurement Model Assessment		
	Reflective Measurement Model	*Formative Measurement Model*
Reliability Criteria	• Cronbach's alpha (α) • Dillon-Goldstein's rho (ρ_c)	
Validity Criteria	• Factor loading (λ) • Average Variance Extracted (AVE) • Latent Construct Correlations	• Factor Weight • Variance Inflation Factor (VIF) • Nomological Net • Cross-validated communality (H^2)
Structural Model Assessment		
Validity Criteria	• Construct Validity – face validity, convergent validity, divergent validity • Internal Validity – path coefficient (β), determination coefficient (R^2), cross-validated redundancy (Q^2) • Statistical Conclusion Validity – effect size (f^2), predictive relevance (q^2) • External Validity • Endogeneity • Common Method Variance	

Specifically, reflective models with measures manifesting themselves and requiring inter-correlations among their measures can be assessed by both reliability and validity criteria of PLS path modelling approach, such as Cronbach's alpha (α) and Dillon-Goldstein's rho (ρ_c) for measure reliability, factor loading (λ) and average variance

extracted (AVE) for convergent validity, and latent construct correlations for discriminant validity. In contrast to reflective models, formative models reverse the causal relationships between a latent construct and its measure; hence, no inter-correlation among the measures is required for the assessment. Since there is no empirical assessment of reliability, several criteria of research validity in both measure and construct levels are rendered pivotal for assessing the quality of the formative measurement models, including factor weights for measure validity, variance inflation factor (VIF) for multi-collinearity, nomological net and predictive relevance for construct validity. In terms of structural model assessment, four types of criteria proposed by Ghauri and Gronhaug (2010) are also examined, namely construct validity, internal validity, statistical conclusion validity, and external validity. The details of these criteria for reliability and validity assessments on both measurement and structural models are further discussed.

Reliability

Reliability refers to the degree of consistency with which different researchers come to the same answer or with which one researcher came to the same answer on different occasions (Chowdhury, 2009). In the paradigm of quantitative research, reliability is a precisely mathematical concept concerning the degree to which a measure remains the same when given repeatedly, stability of a measure over time, and similarity of measures within a given time period (Kirk and Miller, 1986), and can be assessed by a number of criteria: test-retest, parallel forms and split-halves methods, as well as internal consistency; all criteria measure reliability on a scale of 0 to 1, where higher values represent greater reliability (DeCoster, 2000).

Test-retest method demanding the respondents to engage in the research with the same measures at two different points in time underlies assumption that the participants are fundamentally the same during the test and retest periods. Similar to test-retest method, parallel forms method has the same logic in conducting empirical research twice but with the use of different versions of the measures during each time in order to reduce the likelihood that the first application of the measures influences responses to the second. Unlike the previous two methods requiring data to be collected at two different points in time, split-halves method only needs to collect data once but split the measures into two sections, calculate scores for each half, and determine the correlation between the two scores. Having the same advantage of requiring a single application of the

measures as split-halves method, internal consistency represents another way to evaluate reliability in the empirical research, and the most popular estimate is Cronbach's alpha (α).

Although a high value of Cronbach's alpha ($\alpha>0.70$) has been generally acknowledged as evidence that the measures jointly explain a latent construct, it has been criticised for providing severe underestimation of the internal consistency of a measurement model (Gotz, Liehr-Gobbers and Krafft, 2010; Werts, Linn and Joreskog, 1974). Dillon-Goldstein's rho (ρ_c) as a more appropriate gauge to assess the construct reliability by taking into account that measures within a latent construct essentially have composite factor loadings (Henseler, Ringle and Sinkovics, 2009) is therefore employed in this research. Analogous to the interpretation of Cronbach's alpha (α), the threshold value of 0.70 is also applicable to Dillon-Goldstein's rho (ρ_c). However, such criteria to measure reliability is only applicable for the reflective model but not for the formative one (Esposito Vinzi et al., 2010). Due to the error-free assumption, a formative model does not require inter-correlations among its measures (Albers, 2010; Coltman et al., 2008; Esposito Vinzi et al., 2010), and thus the statistical concept of measure of reliability is no longer relevant to the formative model assessment. In other words, there is no possible empirical assessment of reliability on a formative measurement model (Coltman et al., 2008).

<u>Validity</u>

Reliability is a necessary but not sufficient condition for validity (Pedhazur and Schmelkin, 1991: 81), because a researcher might have consistent but invalid measures (Bollen, 1989). Unlike reliability being considered as the precision of the construct/ measures, validity is often thought of as the accuracy (DeCoster, 2000), aiming at evaluating whether the methods used in the quantitative research accurately represent the phenomenon under investigation. Explicitly, validity is concerned about the demonstration that the theoretical interpretation of the responses to the scales/ questions is correct, and problem of validity occurs only when the researcher attempts to relate the scales/ questions to a particular theoretic construct (ibid). Ghauri and Gronhaug (2010) provide four types of criteria for assessing validity in quantitative research: construct validity, internal validity, statistical conclusion validity, and external validity. In conjunction with PLS modelling logic, the assessments on construct validity lie at the

core of measurement models; whereas internal, statistical conclusion and external validities are more concerned with the structural model assessments.

Construct validity as 'the extent to which an operationalization measures the concept which it purports to measure' (Zaltman, Pinson and Angelmar, 1977: 44) is essential for meaningful and interpretable research findings, and can be further categorised into face validity, convergent validity and divergent/ discriminant validity by various estimates. In this research, face validity, referring to the measures composing the questionnaire which are logically related to the underlying constructs, is assessed by asking for the expert opinions from both supervisors Professor Ghauri and Dr Vidal, who are most acquainted with the research topic.

Next, convergent validity as the extent to which multiple measures of and/or multiple methods for measuring the same construct yield similar/ comparable results (Ghauri and Gronhaug, 2010) is examined by the significance of factor loadings (λ) and average variance extracted (AVE>0.5) through SmartPLS in this research. The common threshold criterion of AVE is 0.5, indicating that 50% or more variance of the measures captured by the latent construct relative to the total amount of variance, , is due to the measurement error (Chin, 2010; Gotz et al., 2010).

Finally, the divergent/ discriminant validity as the extent to which a construct is distinguishable from another construct (Ghauri and Gronhaug, 2010) is assessed by the comparison between the latent construct correlations and the square root of AVE (Chin, 2010) with respect to observing whether measures exhibit more correlation to their own latent constructs than other construct columns. However, it is noteworthy that the aforementioned statistical methods are only suitable for the reflective model assessment.

It was noted earlier that the statistical concepts of measure/ construct reliability are no longer relevant to the formative model assessment; the validity criteria in both measure and construct levels thus become pivotal for assessing the quality of measurement models (Diamantopoulos, Riefler and Roth, 2008; Henseler et al., 2009). In this sense, the significance of factor weight other than factor loading of each measure in the formative model is applied to evaluate the validity by t-test statistics (t-value>1.96). Essentially, factor weights provide information about the composition and relative

importance of each measure in the formation of the respective construct (Barroso, Carrion and Roldan, 2010; Duarte and Raposo, 2010).

Not only the insignificant contribution of a formative measure to its latent constructs, but also the manifestation of multicollinearity concerning a set of measures' degree of linear dependency are indicative of invalidity in the measurement models. In order to assess the potential multicollinearity problems within the formative models, the constructs' scores calculated by PLS algorithm are exported into a SPSS dataset as the values of dependent/ independent variables and further examined by variance inflation factor (VIF<10) criterion in multiple regression analysis. If perfect multicollinearity is given, the regression analysis cannot be calculated at all (Gotz et al., 2010).

Besides measure validity, the emergent construct validity concerning whether the construct indeed carries the intended meaning (Henseler et al., 2009) holds equal importance for the formative model assessment. Contrary to reflective measurement models, formative models cannot be estimated without the introduction of additional information due to the under-identified specification (Diamantopoulos et al., 2008). In this regard, the structural relationships between the formative constructs and other reflective ones in the path model are estimated simultaneously to evaluate the formative constructs.

Succeeding Chin's (2010) validation roadmap (Appendix 2), nomological validity is therefore used as a supplement in formative model assessment with respect to examining the significance of the path coefficients within a nomological net of the theoretical model; yet the structural path linking a formative construct with another reflective one should follow the same pattern as that estimated in the prior research that has used the reflective measures. Consequently, a newly developed construct – institutional distances – that has not yet been tested in the prior cross-border knowledge transfer and learning research should be discarded from this assessment; rather, it is examined by the predictive relevance on the construct level (Chin, 2010; Fornell and Cha, 1994).

While assessing predictive relevance through SmartPLS, the programme discloses two criteria: the cross-validated communality (H^2) and cross-validated redundancy (Q^2); and both reflect the goodness of reconstruction by models and parameter estimations

and can be assessed by the threshold value of 0 (Andreev, Heart, Maoz and Pliskin, 2009; Chin, 2010). Unlike cross-validated redundancy (Q^2) serving as a gauge for structural model assessment, cross-validated communality (H^2) as a sign of the quality of a measurement model evaluating the capacity of the path model to predict the measures from their own latent construct scores (Tenenhaus, Esposito Vinza, Chatelin and Lauro, 2005) is used to inspect the construct validity of institutional distance.

Internal validity as the extent to which a researcher can infer that there is causal relationship between two or more variables (Ghauri and Gronhaug, 2010) is evaluated by path coefficient (β), determination coefficient (R^2), and cross-validated redundancy (Q^2) in the structural model. Determination coefficient (R^2) reflects the level or share of the latent construct's explained variance and thus measures the regression function's 'goodness of fit' against the empirically obtained measures (Gotz et al., 2010). Although Gotz et al. (ibid) proposed no generalizable statement about the threshold values of determination coefficient (R^2), Duarte and Raposo (2010) recently proposed 0.1 as an acceptable level in the marketing research. While eliciting Cohen, Cohen, West and Aiken's (2003) rule of thumb on the effect sizes (f^2), the values of 0.19, 0.33, and 0.67 thereby refer to the estimates of small, medium, and large determination coefficients (R^2) of the endogenous construct. Notwithstanding, the determination coefficient (R^2) as a normalised value between 0 and 1 presents the larger the value the larger percentage of variance explained by the endogenous construct in the structural model.

Unlike determinant coefficient (R^2) focusing on the explanatory power of the latent constructs in the structural model, cross-validated redundancy (Q^2) as a criterion to measure the capacity of a structural model in prediction of each endogenous construct by taking into account the measurement model (Tenenhaus et al., 2005) is also applied to assess internal validity in this research, and can be assessed by the same threshold value of cross-validated communality (H^2) as mentioned earlier. Specifically, a positive cross-validated redundancy ($Q^2 > 0$) of a latent construct is indicative of its predictive relevance with others in the structural model; whilst a negative cross-validated redundancy ($Q^2 < 0$) of a latent construct demonstrates a contrasting result.

Statistical conclusion validity as the prerequisite for making inferences about causal relationships (Ghauri and Gronhaug, 2010) is assessed by the effect size (f^2) and predictive relevance (q^2) in the structural model. These criteria are particularly useful when the complex design of the structural models combines both mediating and moderating effects that demand to be investigated in this research. They are numerical ways of expressing the strength of a causal relationship by calculating the changes of an endogenous construct's determination coefficient (R^2) and cross-validated redundancy (Q^2) in the structural model when adding and subtracting a particular exogenous construct.

$$f^2, q^2 = \frac{R^2_{included}, Q^2_{included} - R^2_{excluded}, Q^2_{excluded}}{1 - R^2_{included}, Q^2_{included}}$$

where $R^2_{included}$, $Q^2_{included}$ and $R^2_{excluded}$, $Q^2_{excluded}$ are the determination coefficients (R^2), cross-validated redundancy (Q^2) provided on the endogenous construct when estimating a specific exogenous construct is added in and deleted from the causal relationship respectively.

Generally, a positive criterion ($f^2, q^2 > 0$) refers to the fact that the variance explained/ predictive relevance of an endogenous construct with the linkage to a specific exogenous construct performs better than the one without such linkage does; whereas a negative criterion ($f^2, q^2 < 0$) reveals the contrary explanations. Unlike the traditional partial F-test, the effect size (f^2) coined by Cohen (1988) and predictive relevance (q^2) suggested by Henseler et al. (2009) do not refer to the sample but the basic population of the analysis, thus no degrees of freedom require to be considered; but they do have a general rule of thumb for statistical interpretations in which the calculation values of 0.02, 0.15, and 0.35 signify that the specific exogenous construct has weak, moderate, and substantial capacity to explain and predict the endogenous construct at the structural level.

External validity as the extent to which the findings can be generalised to particular persons, settings and times, as well as across types of persons, settings and times (Ghauri and Gronhaug, 2010) is attempted to be achieve by the well-designed sampling model in the survey research. The sampling procedure is nonprobability-based but the scrutinised representative samples of Taiwanese information and communication

technology manufacturers were based on the various, justified data sources, such as the Geneva-based International Telecommunication Union, Ministry of Economic Affair (MOEA), Dun and Bradstreet/D&B Foreign Enterprises database, Market Observation Post System (MOPS), Industry and Technology Intelligence Service (ITIS), and China Credit Information Service (CCIS) in Taiwan.

Moreover, endogeneity as the condition when observable explanatory variables are correlated with unobservable error terms (Blundell and Powell, 2003) is examined by Durbin–Wu–Hausman test (augmented regression test, which is referred to as DWH) via Stata in the structural model. The DWH test can be easily conducted by including the residuals of each endogenous variable as a function of all exogenous variables in a regression of the original model (Davidson and MacKinnon, 1993; Li and Liu, 2005). Although it can be caused by various sources, such as mismeasured regressors, sample selection, heterogeneous treatment effects, and correlated random effects in panel data (Blundell and Powell, 2003), endogeneity is more concerned with the simultaneity issue in this research due to the cross-sectional research design. It is therefore crucial for this research to assess this potential problem in the proposed research framework. Through the two-step analytical procedure proposed in DWH test, this research discovers that the simultaneity bias is insignificant across all regression models ($t<1.96$).

The other potential problem arising from the cross-sectional research design is common method variance, which occurs when both the dependent and independent variables are perceptual measures derived from the same respondents in the questionnaire design (Podsakoff and Organ, 1986). Despite different sources of data are collected in this research – the primary data from the questionnaire and the secondary data from the Global Information Technology Report 2010-2011 (Dutta and Mia, 2011) and Hofstede's (2011) cultural dimension indices, the common method bias could still be a potential threat for the research validity. This research therefore examines this problem on the variables that are constructed by the data collected from the same primary source (questionnaire). Following a new statistical approach proposed by Liang, Saraf, Hu and Xue (2007) in controlling and assessing common method bias in PLS path modelling, this research recommends that common method bias is unlikely to be serious concern, because the statistics demonstrate that the average substantively explained of the indicators (0.61) is significantly larger than the average method-based variance (0.03) and the ratio of substantive variance to method variance is about 20: 1.

Chapter 5: Empirical Research Findings

This chapter presents empirical findings obtained from a succession of statistical examinations on both measurement and structural models via SPSS and SmartPLS programmes. As the nature of the second-order latent constructs – institutional distance and relational capital – is fundamentally formed by their measures, which do not need to be inter-correlated due to theoretical explanations (Coltman et al., 2008), two formative measurement models with the reverse arrows between the constructs and the assigned measures are thus highlighted in the analytical framework (Table 19). Other first-order latent constructs – regulatory, normative, and cognitive distances, partner interactions, mutual trust, reciprocal commitment, knowledge protectiveness, ambiguity, and acquisition, potential and realised absorptive capacities, and international strategic alliance performance – proposed in this research are defined as the reflective measurement models because the characteristics of the assigned measures are manifested by their own constructs and thus require high correlation among them (ibid). Consequently, a mixed analytical framework with both formative and reflective measures is developed in this research for the purpose of empirical testing.

Table 19: The Analytical Framework in Empirical Research

Item Code	Measure
CD	Cognitive distance
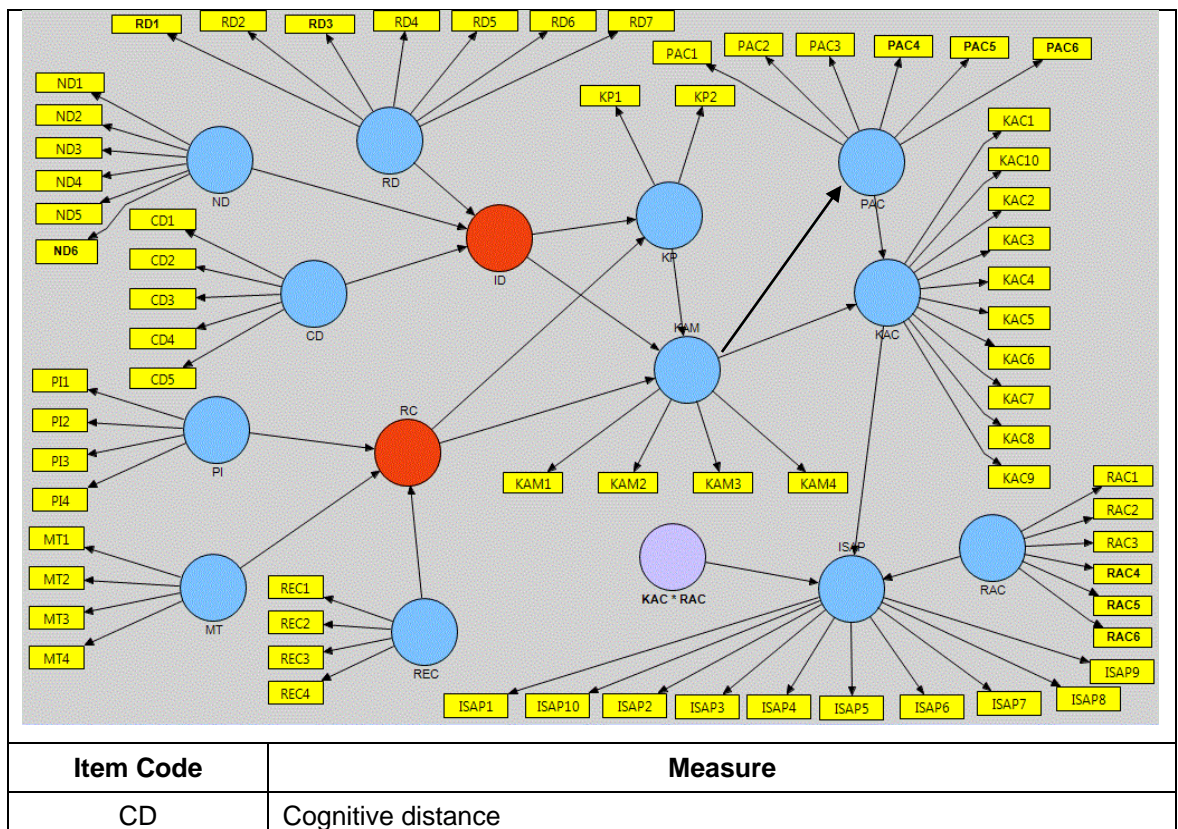
ISAP	International strategic alliance performance	
ID	Institutional distance	
KAC	Knowledge acquisition	
KAM	Knowledge ambiguity	
KP	Knowledge protectiveness	
MT	Mutual trust	
ND	Normative distance	
PAC	Potential absorptive capacity	
PI	Partner interactions	
RAC	Realised absorptive capacity	
RC	Relational capital	
RD	Regulatory distance	
REC	Reciprocal commitment	

Note: red circle = second-order construct; blue circle = first-order construct; yellow rectangle = measure; the direction of an arrow = the relationship between constructs or between a construct and its assigned measure; * = moderating effect.

5.1. Confirmatory Factor Analysis on Measurement Models

Unlike exploratory factor analysis as a data-driven statistical technique, confirmatory factor analysis as the hypothesis-driven approach is run by SmartPLS to determine the reliability and validity of the predefined factor models based on the prior theoretical and empirical grounds. As an advantage, SmartPLS is capable of dealing with both formative and reflective models, demanding fewer requirements compared with those of LISREL-type programmes, but produces compatible estimation results. Consequently, confirmatory factor analysis distinguishing from exploratory factor analysis can be performed on the mixed models, the inclusion of formative and reflective measures, via SamrtPLS simultaneously in this section.

While the premise of confirmatory factor analysis is to assess the variance of observed variables with others within the context of a latent construct, it makes sense to evaluate the construct with paired-measures (i.e., knowledge protectiveness) due to the dichotomous questions designed for the sake of comparative study in the later phase. As a result, other constructs with multiple measures – regulatory, normative and cognitive distances, partner interactions, mutual trust, reciprocal commitment, knowledge ambiguity and acquisition, potential and realised absorptive capacities, and international strategic alliance performance – are qualified to undertake confirmatory factor analysis.

In line with Coltman et al.'s (2008) theoretical and empirical considerations on formative and reflective models, a couple of second-order constructs fundamentally

formed and defined by their measures are characterised as formative measurement models, namely institutional distance and relational capital; whereas others with measures manifesting themselves and requiring inter-correlation among their measures are typified as reflective measurement models, including regulatory, normative and cognitive distances, partner interactions, mutual trust, reciprocal commitment, knowledge protectiveness, ambiguity, and acquisition, potential and realised absorptive capacities, and international strategic alliance performance as mentioned earlier.

To produce the coherent statistical assessment on both measurement and structural models, this research adopts Path Weighting Scheme rather than Centroid and Factorial Schemes to run PLS algorithm. In spite of the common practices, path weighting scheme was argued to be the only estimation method that explicitly considers the directional relationships in the predictive path model (Esposito Vinzi et al., 2010), which in turn, most adequately can be applied to execute the parallel analytical processes of confirmatory factor analysis on the mixed models in the current research. However, due to the involvement of second-order formative constructs (i.e., institutional distance and relational capital), the evaluation of measure validity under these two domains (i.e., regulatory, normative, and cognitive distances, partner interaction, mutual trust, and reciprocal commitment) poses complexity and challenges.

Distinguishing from the popularly applied Hierarchical Component Model/ Repeated Indicators Approach (Lohmoller, 1989; Chin, Marcolin and Newsted, 2003) and newly developed Hybrid Approach (Wilson and Henseler, 2007), the Two-step Approach (Diamantopoulos and Winklhofer, 2001; Reinartz, Kraff and Hoyer, 2004) is more suited to assess higher-order constructs containing both reflective and formative measures by eliminating the possible bias results derived from calculating the same types of measure through PLS iteration. While different statistical criteria are required to examine the reliability and validity of reflective and formative measurement models, a more detailed utilisation of the Two-step Approach is given along with the analytical processes in the following sections.

5.1.1. Reflective Measurement Model Assessment

Several criteria of reliability and validity assessments on reflective measurement models are examined through confirmatory factor analysis in this section, namely measure reliability, measure validity, construct validity, and discriminant validity. Due to the

flexibility of SmartPLS, all these criteria can be simultaneously assessed via PLS algorithm estimation. Succeeding the analytical logic of the Two-step Approach (Diamantopoulos and Winklhofer, 2001; Reinartz et al., 2004), a complete path model without second-order constructs (i.e., institutional distance and relational capital) is initially estimated in order to obtain the scores of the first-order constructs (i.e., regulatory, normative and cognitive distances, partner interaction, mutual trust, and reciprocal commitment) for the use of the formative measures of the second-order constructs in the later phase.

Meanwhile, the factor loadings (λ), Cronbach's alpha (α), Dillon-Goldstein's rho (ρ_c), and average variance extracted (AVE) of each measure and construct are recoded. Subsequently, 2 sets of new path models with only the key variables for the purpose of confirmatory factor analysis on the variables involved in the mixed models, the inclusion of both reflective and formative measures, are formulated by adding the latent construct scores obtained earlier as the measures for the second-order constructs (i.e., institutional distance and relational capital). As a result, a more focused and accurate estimation of the aforementioned criteria of reliability and validity assessments on the reflective measures of the first-order constructs within the mixed models are provided. An illustration of the Two-step Approach (Diamantopoulos and Winklhofer, 2001; Reinartz et al., 2004) on reflective measurement model assessment is in Table 20, and the statistical results derived from the approach are compiled in Table 21.

Ideally, factor loadings should be greater than 0.7; however, weak loadings have been frequently observed in the empirical research, especially when newly developed scales are used (Gotz et al., 2010). Hulland (1999) thereby proposed 0.4 as a common threshold of factor loadings in the assessment of measure validity, and suggested that the measure should be disregarded from the measurement model if its factor loading cannot reach the acceptable level. In this regard, 4 measures with low factor loadings ($\lambda < 0.4$) are eliminated from the factor models, including the effectiveness of law-making bodies (RD4), judicial independence (RD5), power distance (ND1), and masculinity (ND6). The analysis results yield robust composite reliability and convergent validity for the rest of the measures as all possess significant factor loadings (λ) related to their underlying constructs (t-values>1.96), Dillon-Goldstein's rho values range from 0.79 to 0.94 (ρ_c>0.7), and AVE values are higher than the threshold value of 0.5 after the elimination of the disregarded measures.

Table 20: The Two-step Approach on Reflective Measurement Model Assessment
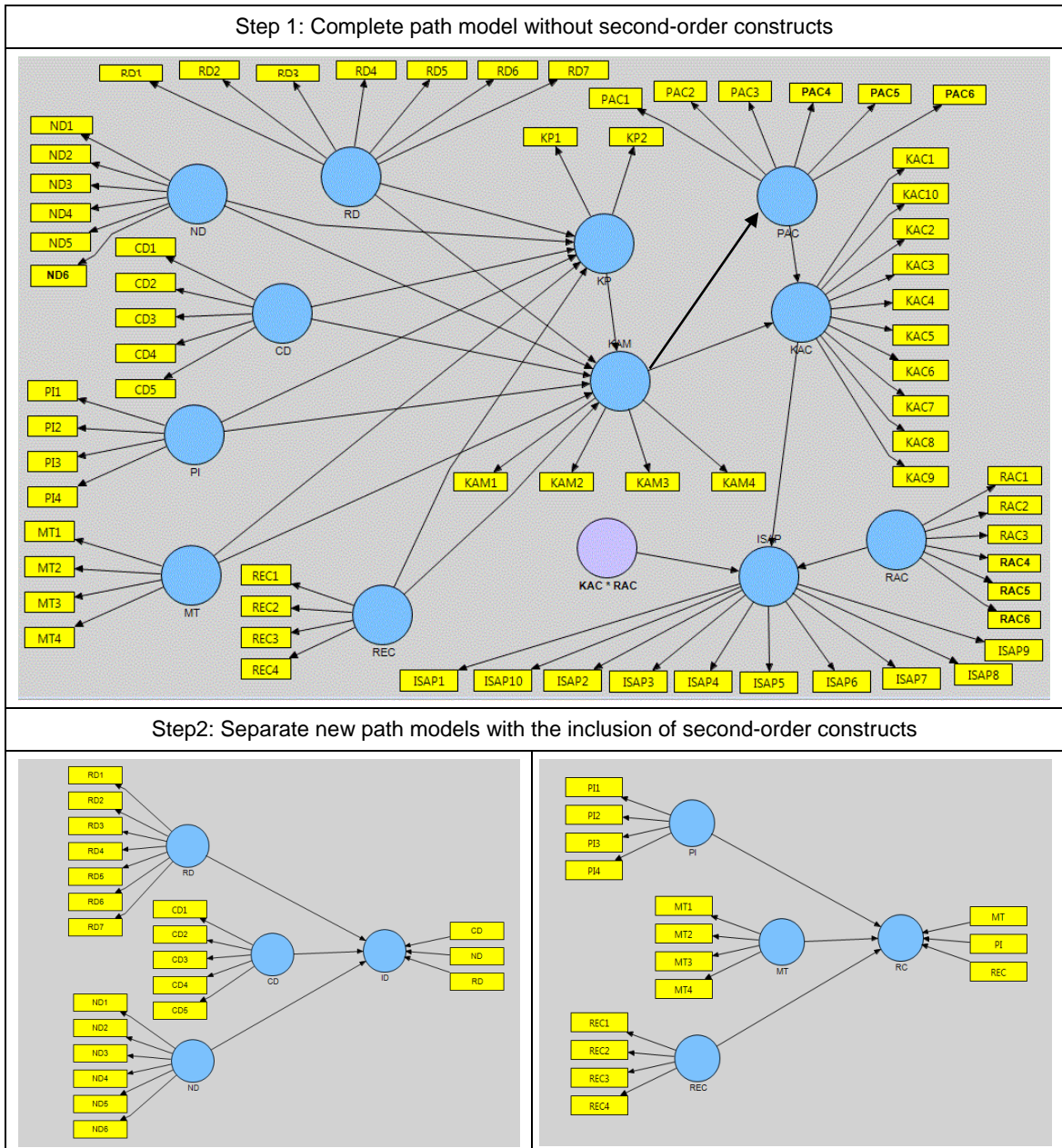
Note: the item codes are in line with those shown in Table 19; * = moderating effect.

However, not only should each latent construct be strongly reflected by the assigned measures, but it should not have a stronger correlation with any other constructs in the theoretic model; otherwise, it would imply that the construct might not be conceptually distinctive from others by sharing the same types of measures. To evaluate such discriminant validity of each latent construct, an advocated approach of comparison between the square root of AVE and construct correlations is applied (Chin, 2010). A common criterion for assessing discriminant validity is that the shared variance between the latent constructs and the assigned measures should be greater than the variance shared with other constructs (Fornell and Larcker, 1981; Hulland, 1999; Gotz et al.,

2010). The statistical results compiled in Table 22 suggest that all constructs possess discriminant validity because their correlations with others do not present greater values than the square root of their own AVEs.

It is noteworthy that besides factor loadings, other criteria of reflective measurement model assessment can be obtained simultaneously from PLS algorithm of SmartPLS. To assess the significance of factor loadings, nonetheless, the bootstrap algorithm should be applied in this research. Fundamentally, bootstrapping is a nonparametric resampling technique for estimating the precision of the individual sign changes of PLS estimates when the population distribution is unknown and the sample size is relatively small (Hayes, 2009; Tenehaus et al., 2005). Based on Henseler et al.'s (2009) recommendation, a new dataset containing 5,000 random samples as the replacement for the original sample in the analytical model is arranged to run the bootstrap algorithm in SmartPLS in this research.

Construct/ Measures	λ	T-value	α	ρ_c	AVE
Regulatory Distance (RD) – adapted from Chao and Kumar (2010); Gaur and Lu (2007); Xu et al. (2004)			0.75	0.83	0.67
RD1: Laws relating to information and communication technology	0.86	4.84			
RD2: Intellectual property protection	0.70	3.99			
RD3: Property rights	0.73	4.25			
RD6: Efficiency of legal framework in setting disputes	0.58	2.90			
RD7: Efficiency of legal framework in challenging regulations	0.66	3.59			
Normative Distance (ND) – adapted from Tihanyi et al. (2005); Manev and Stevenson (2001)			0.66	0.79	0.58
ND2: Individualism	0.69	3.62			
ND3: Uncertainty avoidance	0.83	12.08			
ND4: Long-term orientation	0.41	2.84			
ND5: Indulgence versus restraint	0.43	2.21			
Cognitive Distance (CD) – adapted from Nooteboom et al. (2007)			0.84	0.88	0.71
CD1: Company spending on research and development	0.52	3.94			
CD2: Firm-level technology absorption	0.90	11.05			
CD3: Capacity for innovation	0.93	28.54			
CD4: Impact of information and communication technology on new products and services	0.58	5.20			
CD5: Impact of information and communication technology on new organisational models	0.89	8.96			
Partner Interactions (PI) – adapted from Cousins et al. (2006); Liu et al. (2010)			0.75	0.84	0.57
PI1: Your firm has been very friendly and respectful to the foreign partner.	0.79	20.65			
PI2: Your firm has made frequent communications and interactions with the foreign partner.	0.80	13.85			
PI3: The foreign partner has been very friendly and respectful to your firm.	0.70	25.79			
PI4: The foreign partner has made frequent communications and interactions with your firm.	0.73	15.85			
Mutual Trust (MT) – adapted from Cousins et al. (2006); Kale et al. (2000)			0.85	0.90	0.69
MT1: Your firm has never cheated or misled the foreign partner.	0.81	32.96			
MT2: Your firm has offered a fair deal to the foreign partner.	0.85	31.55			

MT3: The foreign partner has never cheated or misled your firm.	0.83	33.11			
MT4: The foreign partner has offered a fair deal to your firm.	0.84	44.86			
Reciprocal Commitment (REC) – adapted from Kale et al. (2000)			0.84	0.89	0.67
REC1: Your firm has made all decisions based on the mutual benefits.	0.82	42.11			
REC2: Your firm has been highly committed to work with the foreign partner to solve problem(s).	0.84	19.85			
REC3: The foreign partner has made all decisions based on the mutual benefits.	0.76	33.71			
REC4: The foreign partner has been highly committed to work with your firm to solve problem(s).	0.87	45.40			
Knowledge Ambiguity (KAM) – adapted from Simonin (1999); Szulanski (2000)			0.78	0.85	0.60
KAM1: To what extent has your firm experienced difficulty in transferring knowledge to the foreign partner?	0.65	8.83			
KAM2: To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from your firm?	0.89	28.11			
KAM3: To what extent has your firm experienced difficulty in absorbing the transferred knowledge form the foreign partner?	0.66	9.25			
KAM4: To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from the foreign partner?	0.87	27.36			
Potential Absorptive Capacity (PAC) – adapted from Jensen et al. (2005); Zahra and George (2002)			0.70	0.80	0.54
PAC1: To what extent has the foreign partner been able to assimilate and acquire the transferred knowledge from your firm?	0.78	20.79			
PAC2: To what extent has the foreign partner's cooperative structure in learning been open and flexible?	0.77	19.22			
PAC3: To what extent has the foreign partner's knowledge infrastructure been effective?	0.67	8.83			
PAC4: To what extent has your firm been able to assimilate and acquire the transferred knowledge from the foreign partner?	0.81	23.91			
PAC5: To what extent has your firm's cooperative structure in learning been open and flexible?	0.82	24.48			
PAC6: To what extent has your firm's knowledge infrastructure been effective?	0.66	7.16			
Realised Absorptive Capacity (RAC) – adapted from Jensen et al. (2005); Zahra and George (2002)			0.72	0.81	0.53
RAC1: To what extent has the foreign partner been able to transform and exploit the acquired knowledge into the alliance context?	0.72	15.05			
RAC2: To what extent has the foreign partner clearly known the cooperative objective(s)?	0.69	13.78			
RAC3: To what extent has the foreign partner clearly known its responsibility in the cooperation?	0.58	6.62			
RAC4: To what extent has your firm been able to transform and exploit the acquired knowledge into the alliance context?	0.80	21.98			
RAC5: To what extent has your firm clearly known the cooperative objective(s)?	0.82	24.72			
RAC6: To what extent has your firm clearly known your responsibility in the cooperation?	0.66	7.03			
Knowledge Acquisition (KAC) – adapted from Liu et al. (2010); Tsang (2002); Tsang et al. (2004)			0.88	0.90	0.67
KAC1: To what extent has the foreign partner acquired the new technological technique/ expertise from your firm?	0.65	11.81			

	λ	α	ρ_c	AVE
KAC2: To what extent has the foreign partner acquired the new marketing technique/ expertise from your firm?	0.63	11.13		
KAC3: To what extent has the foreign partner acquired the new product development technique/ expertise from your firm?	0.69	12.87		
KAC4: To what extent has the foreign partner acquired the new managerial technique/ expertise from your firm?	0.67	12.09		
KAC5: To what extent has the foreign partner acquired the new manufacturing technique/ expertise from your firm?	0.66	14.79		
KAC6: To what extent has your firm acquired the new technological technique/ expertise from the foreign partner?	0.60	11.94		
KAC7: To what extent has your firm acquired the new marketing technique/ expertise from the foreign partner?	0.68	17.75		
KAC8: To what extent has your firm acquired the new product development technique/ expertise from the foreign partner?	0.79	29.49		
KAC9: To what extent has your firm acquired the new managerial technique/ expertise from the foreign partner?	0.71	17.65		
KAC10: To what extent has your firm acquired the new manufacturing technique/ expertise from the foreign partner?	0.72	19.30		
International Strategic Alliance Performance (ISAP) – adapted from Griffith et al. (2001) ; Lunnan and Haugland, 2008 ; Tsang et al. (2004)			0.92	0.94	0.59
ISAP1: Overall, the collaborative results of the international strategic alliance have increased profitability.	0.73	15.50		
ISAP2: Overall, the collaborative results of the international strategic alliance have resulted in sales growth.	0.76	23.30		
ISAP3: Overall, the collaborative results of the international strategic alliance have accelerated the speed of new product development.	0.57	12.70		
ISAP4: Overall, the collaborative results of the international strategic alliance have increased the number of patents.	0.72	20.61		
ISAP5: Overall, the collaborative results of the international strategic alliance have increased manufacturing efficiency.	0.77	25.75		
ISAP6: Overall, the collaborative results of the international strategic alliance have increased the production quality.	0.80	35.54		
ISAP7: Overall, the collaborative results of the international strategic alliance have increased market penetration of new products.	0.82	30.91		
ISAP8: Overall, the collaborative results of the international strategic alliance have increased customer satisfaction.	0.83	33.80		
ISAP9: Overall, your firm has been satisfied with the cooperative outcomes.	0.88	38.04		
ISAP10: Overall, your firm is willing to keep the cooperation with the foreign partner(s) / cooperate with the foreign partner(s) again.	0.82	41.02		

Note: λ = factor loading; α = Cronbach's alpha; ρ_c = Dillon-Goldstein's rho; AVE = average variance extracted

Table 22: Latent Construct Correlations and Discriminant Validity

Construct	RD§	ND§	CD§	PI	MT	REC	KP	KAM	PAC	RAC	KAC	ISAP
Regulatory Distance (RD) §	**0.82**											
Normative Distance (ND) §	0.24	**0.76**										
Cognitive Distance (CD) §	0.40	0.10	**0.84**									
Partner Interactions (PI)	-0.02	-0.13	-0.17	**0.75**								
Mutual Trust (MT)	-0.04	-0.13	-0.07	0.41	**0.83**							
Reciprocal Commitment (REC)	-0.06	-0.14	-0.11	0.43	0.44	**0.82**						
Knowledge Protectiveness (KP)	0.18	0.25	0.16	-0.09	-0.13	-0.15	**0.79**					
Knowledge Ambiguity (KAM)	0.10	0.15	0.13	-0.36	-0.42	-0.41	0.34	**0.77**				
Potential Absorptive Capacity (PAC)	-0.03	-0.21	-0.02	0.29	0.20	0.24	-0.17	-0.48	**0.73**			
Realised Absorptive Capacity (RAC)	-0.02	-0.10	-0.01	0.18	0.13	0.14	-0.16	-0.24	0.49	**0.73**		
Knowledge Acquisition (KAC)	-0.05	-0.15	-0.01	0.24	0.26	0.28	-0.17	-0.45	0.53	0.44	**0.82**	
International Strategic Alliance Performance (ISAP)	-0.01	-0.13	-0.01	0.11	0.12	0.14	-0.06	-0.26	0.27	0.59	0.60	**0.77**

Note: § = different scales are used from survey items; Diagonal terms (in bold) are square root of the average variance extracted. Off-diagonal terms are the correlation of latent constructs.

5.1.2. Formative Measurement Model Assessment

Contrary to the reflective measurement models, formative models reverse the directional relationships between a latent construct and its measures; hence, different criteria and interpretations are demanded for confirmatory factor analysis. Instead of the reliability assessment, validity criteria on both measure and construct levels are more relevant to formative measurement model assessment owing to the error-free assumption (Diamantopoulos et al., 2008; Henseler et al., 2009). As a result, the significance of factor weights, which provide information about the composition and relative importance of each measure in the formation of the respective construct (Barroso et al., 2010; Duart and Raposo, 2010), other than factor loadings within the formative measurement models are employed to assess the measure validity via SmartPLS. Due to the involvement of both formative and reflective measures in the analytical framework, the Two-step Approach proposed by Diamantopoulos and Winklhofer (2001) is employed in this section.

However, distinguishing from the tasks undertaken to perform confirmatory factor analysis on the reflective measurement models, slightly different statistical techniques suggested by Reinartz et al. (2004) are utilised to evaluate the formative measurement models. Firstly, akin to the task done in the reflective model assessment, a complete path model without the second-order constructs (i.e., institutional distance and relational capital) is estimated via PLS algorithm to get the scores of the first-order constructs (i.e., regulatory, normative, cognitive distances; partner interaction, mutual trust, and reciprocal commitment) for the use of the formative measures of the second-order constructs in the next stage. Yet succeeding the assessment results of the reflective models in the previous section, 4 neglected measures – the effectiveness of law-making bodies (RD4), judicial independence (RD5), power distance (ND1), and masculinity (ND6) – are not included in the path model.

Subsequently, the path model is modified by omitting the first-order constructs and replacing their latent construct scores as the indicants of the second-order constructs; and thus the assessment results of the significance of factor weights derived from remodelling techniques provide a valid foundation for evaluating the measure validity within the formative measurement models. The illustration of the Two-Step Approach (Diamantopoulos and Winklhofer, 2001; Reinartz et al., 2004) of confirmatory factor analysis on the formative measurement models is exhibited in Table 23. The statistical

results are indicative of the valid operationalization of the second-order constructs (i.e., institutional distance and relational capital) as formative in nature in this research because all measures in the formative models possess significant factor weights (t-value>1.96) contributing to the theoretical domains of the respective constructs (Table 24).

Table 23: The Two-step Approach on Formative Measurement Model Assessment
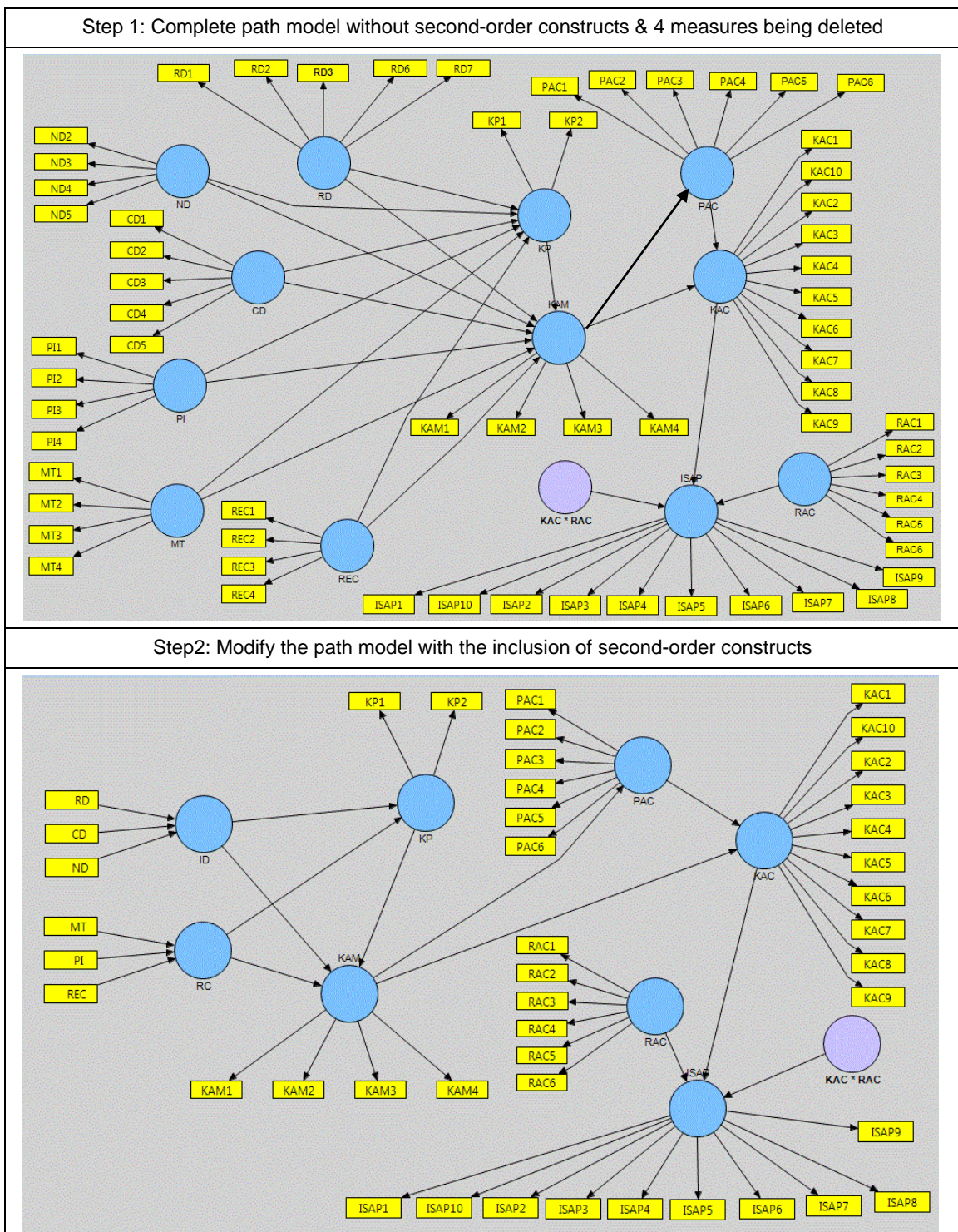
Note: the item codes are in line with those shown in Table 19; * = moderating effect.

Following the two-step analytical logic of evaluation of factor weights of formative, higher-order measurement models, the scores for both levels of the latent constructs engaging in the models are calculated by PLS algorithm of SamrtPLS and exported into SPSS dataset as the values of dependent (i.e., institutional distance and relational capital) and independent variables (i.e., regulatory, normative and cognitive distances, partner interaction, mutual trust, and reciprocal commitment) for the assessment of the potential multicollinearity problem via VIF criterion in multiple regression analysis. The statistical results displayed in Table 24 are indicative of the absence of multicollinearity in the formative measurement models because all measures have VIF values far less than the threshold value of 10 (Andreev et al., 2009; Bruhn, Georgi and Hadwich, 2008; Henseler et al., 2009).

Table 24: Factor Weight and Variance Inflation Factor

Construct/ Measure	Factor Weight	T-statistic	VIF
Institutional Distance			
Regulatory Distance	0.66	2.36	1.35
Normative Distance	0.59	2.27	1.02
Cognitive Distance	0.52	2.05	1.37
Relational Capital			
Partner Interaction	0.63	2.92	2.25
Mutual Trust	0.57	2.77	2.82
Reciprocal Commitment	0.66	1.99	2.80

Furthermore, the criterion of external validity, which associates the formative construct with external phantom variables (Rindskopf, 1984) and the construct's reflective operationalization, is advocated as an adequate approach to evaluate the formative measurement model (Diamantopoulos et al., 2008; Gotz et al., 2010; Henseler et al., 2009); however, it is not applicable in this research owing to the lack of reflective items developed for the formative constructs (i.e., institutional distance and relational capital). Based on Chin's (2010) recommendation, nomological validity is thus applied as a supplementary method for the formative measurement model assessment in terms of examining the significance of the path coefficients within a nomological net of the proposed framework; yet the structural path linking the formative construct with the reflective one should follow the same patterns as those which were estimated in the prior research. Hence, the newly developed construct – institutional distance – that has not been examined in the arenas of cross-border knowledge transfer and learning

research is not included in the nomological validity assessment; instead, it is assessed by its predictive relevance in the later phase.

In line with Diamontopoulos et al.'s (2008) suggestion that a justifiable nomological network should associate a formative construct with at least two reflective ones based on the theoretical considerations, a net of path model comprising the key latent constructs that are conceptually hypothesised to have direct linkages with relational capital is developed to evaluate the nomological validity. Grounding on Simonin (1999a, b, 2004), Kale et al. (2000), and Liu et al.'s (2010) research, relational capital is hypothesised to impose positive impacts on knowledge transfer processes; thus direct relationships from relational capital to knowledge protectiveness and ambiguity are formulated to examine the nomological validity of the formative construct. The statistical results demonstrate that all structural paths linking from relational capital to other reflective constructs are significant at 0.95 level (t-value>1.96), providing strong evidence of the construct validity of relational capital in this research.

Finally, to investigate if institutional distance is a valid construct proposed in the analytical framework, the Stone-Geisser's Q^2 Test (Geisser, 1975; Stone, 1974) via the blindfolding algorithm of SmartPLS with omission distance setting into 30 blocks (Duarte and Raposo, 2010; Wold, 1982) is employed. Essentially, the blindfolding algorithm is a sequence of procedures of calculation involving omitting or blindfolding one case at a time and re-estimating the model parameters according to the remaining cases, as well as predicting the omitted case values on the basis of the remaining parameters (Durate and Raposo, 2010; Selin, 1989). The calculation result discloses the presence of construct validity as the value of cross-validated communality (H^2) of institutional distance is 0.48, which is much higher than the threshold value of 0 (Andreev et al., 2009).

5.1.3. Overview of the Measurement Model Fit Indices

A list of the applied criteria for measurement model assessment is compiled in Table 25 in order to provide a holistic view on the results of confirmatory factor analysis on both formative and reflective measurements models in this research. In the case of reflective measurement model assessment, measure validity is firstly examined by factor loadings (λ) and 4 measures with low factor loadings (λ<0.40) are withdrawn, namely the

effectiveness of law-making bodies (RD4), judicial independence (RD5), power distance (ND1), and masculinity (ND6).

Table 25: Fit Statistics for Measurement Models

Type of Measurement Model	Fit Statistic	Interpretation	Statistical Results
Reflective Measurement Model	Factor Loading (λ)	Measure validity; Hulland (1999) suggested that the value should be greater than 0.40	0.41 – 0.93
	Dillon-Goldstein's rho (ρ_c)	Composite reliability; akin to Cronbach's alpha (α), the threshold value is 0.70 (Werts et al., 1974)	0.79 – 0.94
	Average Variance Extracted (AVE)	Construct/ convergent validity; 0.50 is acceptable level (Chin, 2010)	0.53 – 0.71
	Latent Construct Correlation	Discriminant/ divergent validity; √AVE > Latent construct correlations (Fornell and Larcker, 1981)	
Formative Measurement Model	Factor Weight	Measure Validity; the bootstrap result should be significant (Barroso et al., 2010)	1.99 – 2.92
	Variance Inflation Factor (VIF)	Multicollinearity; VIF < 10 indicates the absence of multicollinearity among the measures (Henseler et al., 2009)	1.02 – 2.82
	Nomological Net	Nomological Validity; the bootstrap results of path coefficients (β) of the links between a formative construct and at least other 2 reflective ones should be significant (Chin, 2010)	2.18 – 7.03
	Cross-validated communality (H^2)	Predictive Relevance of a construct; Andreev et al. (2009) suggested the threshold value is 0	0.48

After the elimination of the omitted measures, Dillon-Goldstein's rho (ρ_c) as the criterion of composite reliability among the measures representing a latent construct is assessed. Akin to the statistical interpretation of Cronbach's alpha (α), the threshold value of 0.70 is also applicable to examine the results of Dillon-Goldstein's rho (ρ_c), which range from 0.79 to 0.94 across all constructs in the reflective measurement models, indicating robust reliability among the reflective measures developed in this research.

Next, the construct validity is evaluated by two criteria: average variance extracted (AVE) is used to examine the convergent validity; and latent construct correlation is applied in conjunction with the square root of AVE to assess the discriminant/ divergent validity. The statistical results show strong validity in the construct-level as all

reflective constructs present AVEs values higher than 0.50 and their correlations with others do not exceed the values of the square root of their own AVEs.

Contrary to the reflective measurement models, formative models essentially reverse the directional relationships between the formative measures and their respective constructs; hence, no reliability assessment is required. Yet there are fit statistics for validity assessment on the formative measurement models as exhibited in Table 25. The significance of factor weight of each formative indicant is firstly examined for measure validity and the statistical results show that all measures comprising the second-order constructs in this research possess strong validity as the T-statistics of their factor weights range from 1.99 to 2.92. Subsequently, the potential multicollinearity problem is assessed by the criterion of variance inflation factor (VIF) of each formative measure, and the statistical results are indicative of the absence of the concern because all measures manifest VIF values far less than 10.

To examine the construct validity, two criteria depending upon the empirical consideration, that is, whether the association between a formative construct and other reflective ones has been tested in the prior research, are used. Firstly, the significance of the path coefficients among the nomological net containing the tested formative construct – relational capital – and other reflective ones (i.e., knowledge protectiveness and knowledge ambiguity) in the analytical model are examined, and the statistical results yield nomological validity of relational capital because all structural paths present significance at 0.95 level. Ultimately, the cross-validated community (H^2) as the criterion for predictive relevance of a latent construct in the analytical model is assessed, and the result provides supporting evidence of the construct validity of institutional distance as the calculation value of cross-validated community (H^2) is larger than the threshold value of 0.

In short, the results of confirmatory factor analysis on both formative and reflective measurement models are indicative of construct/ measure reliability and validity in the analytical framework in this research, consolidating the empirical stance for the subsequent assessments and modifications on the structural model and hypotheses testing.

5.2.   Sample Characteristics and Cross-group Comparison

Sample characteristics concerning the basic information about the responding firms through international collaborations are comprised of the first section in the questionnaire, including the alliance duration, equity structure, foreign partner's country of origin, and the role played by the firm in the knowledge transfer process as presented in Table 26. Among the 281 valid questionnaires received from Taiwanese information and communication technology manufacturers, most responding firms have collaborative experience with their foreign partners within 2 to 5 years, which accounts for more than 42% of the total responses. To be consistent with Ernst and Bamford's (2005) research finding that the standard lifespan of alliances is 5 to 7 years, this research finds the average duration of international strategic alliances between Taiwanese information and communication technology manufacturers and their foreign partners is around 6 years.

Table 26: Descriptive Statistics on Sample Characteristics (N=281)

Sample Characteristics	n	%
Alliance Duration (Mean = 6.34; SD = 5.37)		
Less than 2 years	38	13.52
2 to 5 years	120	42.71
6 to 10 years	82	29.18
11 to 20 years	39	13.88
More than 20 years	2	0.71
Equity Structure		
Non-equity Alliance	202	71.89
Equity Alliance	79	28.11
Foreign Partner's Country of Origin		
US	70	24.91
Japan	57	20.28
China (PRC)	33	11.74
Others	121	43.07
The Role Played by the Responding Firm in the Knowledge Transfer Process		
Transferor	74	26.33
Recipient	95	33.81
Both	112	39.86

In terms of the alliance structures, over 71% of the responding firms report their cooperative types are non-equity, indicating that most Taiwanese information and communication technology manufacturers prefer not to share ownerships with their foreign partners when engaging in cross-border knowledge transfer. While cross-examining the alliance duration and equity structure statistics via Chi-square test in

SPSS, the statistical results show that two categorical variables are interdependent at a significant level of 0.95 ($X^2 = 53.491, df = 31, p < 0.05$), signifying the equity investment as a conceivable leverage in ISAs constrains Taiwanese information and communication technology manufacturers to make continuous efforts with respect to maintaining the collaborative relationships with their foreign partners.

Due to the special bonds between US, Japan, China (PRC) and Taiwan, it is not surprising that over 50% of the respondents' foreign partners come from these countries. The relationships among the USA, China (PRC), and Taiwan have been a tricky and sensitive political issue since 1971 when China (PRC) replaced Taiwan as the only legitimate country representing 'China' in the United Nations and later in 1978 the US announced diplomatic relations with it. The dramatic shattering of the politic status of Taiwan implies that not only the political failure of it as a nation in the world but also the shaky relationship with the US, which had been robust since 1954 when the Sino-American Mutual Defence Treaty was signed between the US and Taiwan in order to defend against China (PRC) in the Korean War.

Despite the political instability, the US and Taiwan have kept economic interdependence for decades, particularly in the information and communication technology sectors. Taiwan as the second largest semiconductor supplier of the US has built a strong industrial relationship with the US since the 1960s, when the Taiwanese government encouraged the brightest young Taiwanese to pursue advanced studies in the US. Such brain drain is usually regarded as a disadvantage for developing countries, but Taiwan as one of them has told a different story as the government later offered large incentives for the people abroad to return back as entrepreneurs to establish start-ups in the planned science parks or as leaders to engage in academic research and management positions in public sectors.

The strategy worked very successfully because it allowed Taiwan to build a large pool of experienced and qualified talents before the economy was ready to take off in 1985; and those returning people as the pioneers of Taiwanese information and communication technology industries brought back not only the Silicon Valley experience but also the industrial networks with major global information and communication technology players, significantly contributing to the development of Taiwanese information and communication technology industries by offering necessary

conditions for Taiwan to stay near the forefront of innovation and creating business opportunities. Such interdependence between the US and Taiwan corresponds to the survey results in the present research, in which among 29 countries of the origins of the foreign partners, those from US ranks as the top one that most responding Taiwanese information and communication technology manufacturers cooperate with (24.91%).

It is well-known that the cross-strait relation between China (PRC) and Taiwan has long been a sensitive issue in Chinese history. Not until recently has there been an improved economic relationship between the two because the pro-China political party (Kuomingtang) came into power in the latest Presidential election in 2008. Since then, China (PRC) has replaced the US as the largest exporting country for Taiwan and over 80% of foreign investment of Taiwanese information and communication technology industries has been clustered in China (PRC), according to the most recent economic indicator of MOEA database. Such an economic trend is consistent with the survey results in that China (PRC) represents the third leading country of the origins of the foreign partners that the responding firms of Taiwanese information and communication technology manufacturers most prefer to cooperate with (11.74%).

Besides, Taiwanese information and communication technology manufacturers favour to partner with Japanese firms, the second popular alliance partners of the respondents (20.28%) in the survey research. Unlike the teacher-student relationship between the US and Taiwan as mentioned earlier, the relationship between Japan and Taiwan is more like a partner-child bond because Taiwan had been under Japanese rule for more than half a century (1985–1945). Thanks to much effort made by the Japanese government, the economic, education, infrastructure, and public work developments in Taiwan had been substantially improved during the colonial period; thus the Taiwanese have been highly willing to cooperate with Japanese firms across industries owing to such trustworthy relationship between the two countries.

With respect to the key control variable – the knowledge transfer roles – in the survey study, most responding firms conceive themselves as both transferors and recipients in the knowledge transfer processes in cooperation with the foreign partners, accounting for almost 40% of the valid responses, followed by nearly 34% of the respondents as recipients and 26% of the respondents as transferors. The findings are indicative of a transforming role of Taiwanese firms in the global information and communication

technology industries in that they have evolved from the passive to more active actors in knowledge transfer processes with frequent transmitting to and learning from their foreign partners.

When associating the knowledge transfer roles played by Taiwanese information and communication technology manufacturers with the origins of the foreign partners, classified by the economic developments, the statistical result of Chi-square supports the evidence of significant relationship between the two ($X^2 = 77.591, df = 4, p < 0.05$) and suggests that those Taiwanese information and communication technology manufacturers with foreign partners from advanced economies[1] are more likely to be recipients; from other emerging markets and developing countries[2] are more likely to be transferors; and from newly industrialised Asian economies[3] are more like to be both transferors and recipients in the knowledge transfer processes through international strategic alliances.

Such intriguing findings map out learning chains/ knowledge flows in the global information and communication technology industries as illustrated in Figure 8 where Taiwan as one of the newly industrialised Asian economies (International Monetary Fund, 2007) positioning in the midway, one the one hand, relies highly on acquiring knowledge from advanced economies to develop or enhance its global competeness; whereas on the other hand, is in intensive demand by other emerging economies and developing countries to transfer its proprietary knowledge to sustain the collaborations. Furthermore, parallel partnerships between Taiwan and other newly industrialised Asian economies are also discovered from the survey results in which the international strategic alliances often involve two-way knowledge transfer between Taiwanese information and communication technology manufacturers and the foreign partners from these economies.

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[1] Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Sweden, Switzerland, UK, and US (International Monetary Fund, 2007)
[2] Argentina, Brazil, Chile, China, India, Indonesia, Malaysia, Poland, Thailand, and Vietnam (International Monetary Fund, 2007)
[3] Hong Kong, Korea, and Singapore (International Monetary Fund, 2007)

Figure 8: Knowledge Flows in the Global Information and Communication Technology Industries

Note: ———► = knowledge flow; ⬭ = country
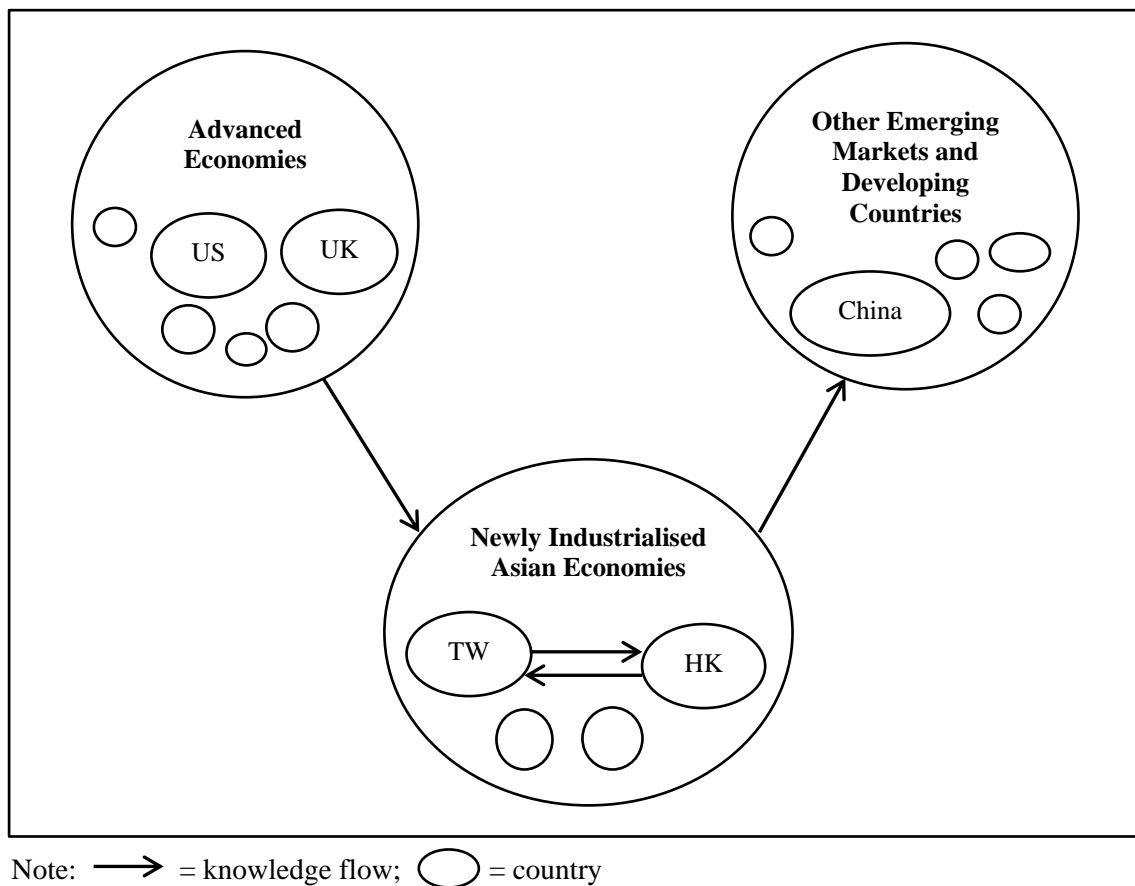
This research aims to unpack the paradoxical issues engaging in knowledge transfer and learning processes through international strategic alliances, thus the control variable – the knowledge transfer roles played by the responding firms – is critical to provide comparative explanations of the survey findings. For the purpose of comparative study, the sample of 281 valid responses collected from survey research is divided into 3 sub-groups, namely the responding firms as transferors (n=74), recipients (n=95), and both transferors and recipients (n=112) in the knowledge transfer processes. Disregarding the neglected measures assessed via confirmatory factor analysis in the previous section, the descriptive statistic results of the latent constructs constituted by the reliable and valid measures are compiled in Table 27. As the non-normalised data collected from survey research, Kruskal-Wallis test as a nonparametric statistical method in SPSS is employed to conduct comparative study across 3 independent sub-samples and the statistical results are presented in Table 28.

The comparative findings suggest that by common consent all responding firms in the survey research reflect strong extents of relational capital (mean=3.89, SD=0.67),

potential absorptive capacity (mean=3.77, SD=0.75), and alliance performance (mean=3.75, SD=0.56); but relatively weak realised absorptive capacity (mean=2.26, SD=0.66) during the cooperation with the foreign partners, because the statistical results of Kruskal-Wallis test do not present significantly different distributions of the collected data across 3 sub-groups (p>0.05), that is, the firms as transferors, recipients, and both transferors and recipients in the knowledge transfer processes in international strategic alliances. Particularly, this research finds that Taiwanese information and communication technology manufacturers and their alliance partners make symmetrical efforts to improve the relationship quality by frequent partner interactions (mean=3.86, SD=0.71) and high levels of mutual trust (mean=3.98, SD=0.73) and reciprocal commitment (mean=3.85, SD=0.75) within international collaborations.

Table 27: Descriptive Statistics on Cross-group Comparison

Construct	All (N=281)		Transferors (n=74)		Recipients (n=95)		Both (n=112)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Institutional Distance §	1.51	1.08	1.86	1.40	1.35	0.87	1.42	0.95
Regulatory Distance §	1.32	1.52	1.81	1.59	1.16	1.88	1.13	0.99
Normative Distance §	2.22	0.99	1.63	0.99	2.51	0.93	2.37	0.87
Cognitive Distance §	1.13	2.31	2.08	3.15	0.60	0.78	0.94	2.34
Relational Capital	3.89	0.67	3.85	0.78	3.90	0.67	3.92	0.57
Partner Interactions	3.86	0.71	3.73	0.83	3.85	0.76	3.94	0.56
Mutual Trust	3.98	0.73	3.94	0.83	4.02	0.73	3.98	0.65
Reciprocal Commitment	3.85	0.75	3.88	0.84	3.83	0.77	3.84	0.68
Knowledge Protectiveness	3.83	0.69	3.53	1.15	3.96	1.05	3.89	0.81
Knowledge Ambiguity	2.25	0.72	2.03	0.98	2.47	1.12	2.26	0.82
Potential Absorptive Capacity	3.77	0.75	3.86	0.80	3.80	1.07	3.73	0.75
Realised Absorptive Capacity	2.27	0.66	3.76	0.94	3.72	1.12	3.71	0.78
Knowledge Acquisition	3.72	0.60	3.71	0.73	3.43	0.83	3.54	0.74
Alliance Performance	3.75	0.56	3.85	0.65	3.68	0.73	3.75	0.64

Note: § = different scales are used from survey items; Items in **bold Italics** are second-order constructs

However, the comparative findings show that not all responding firms cooperate with the alliance partners having similar institutional distance (mean=1.51, SD=1.08), and agree that the cooperation involves great extents of knowledge protection (mean=3.83, SD=0.69) and acquisition (mean=3.72, SD=0.60) but relatively low level of ambiguous perception towards knowledge transfer (mean=2.25, SD=0.72). Specifically, the results of Kruskal-Wallis test suggest that on the one hand the responding firms as transferors are more likely to cooperate with the foreign partners having similar normative (mean=1.63, SD=0.99) but entirely diverse regulatory (mean=1.81, SD=1.59) and

cognitive (mean=2.08, SD=3.15) institutional frameworks; whilst on the other hand, the responding firms as recipients are more likely to cooperate with the foreign partners having similar regulatory (mean=1.16, SD=1.88) and cognitive (mean=0.60, SD=0.78) but distinctive normative (mean=2.51, SD=0.93) institutional backgrounds.

Also, it is interesting to find supporting evidence for information asymmetry during knowledge transfer processes in this research, in which the comparative findings demonstrate that the responding firms as transferors are less likely to consider themselves as being protective towards knowledge transfer (mean=3.53, SD=1.15), and thus fewer difficulties and ambiguous perceptions are experienced (mean=2.03, SD=0.98) and greater knowledge is acquired by their alliance partners (mean=3.71, SD=0.73); whereas the responding firms as recipients are more likely to regard their alliance partners as being protective towards knowledge transfer (mean=3.96, SD=1.05), and thus more difficulties and ambiguous perceptions are experienced (mean=2.47, SD=1.12) and less knowledge is acquired by themselves (mean=3.42, SD=0.83).

Table 28: Kruskal-Wallis Test on Cross-group Comparison

Construct	Knowledge Transfer Role	Mean Rank	Test Statistic	Significance
Institutional Distance §	Transferor	168.45	11.98	0.002*
	Recipient	128.25		
	Both	133.68		
Regulatory Distance §	Transferor	167.09	10.68	0.005*
	Recipient	130.24		
	Both	132.88		
Normative Distance §	Transferor	97.28	31.11	0.000*
	Recipient	163.56		
	Both	150.75		
Cognitive Distance §	Transferor	189.92	37.82	0.000*
	Recipient	119.22		
	Both	127.16		
Relational Capital	Transferor	139.38	0.04	0.980
	Recipient	141.59		
	Both	141.57		
Partner Interactions	Transferor	131.49	1.86	0.395
	Recipient	140.31		
	Both	147.88		
Mutual Trust	Transferor	138.87	0.55	0.758
	Recipient	145.97		
	Both	138.19		
Reciprocal Commitment	Transferor	147.80	0.72	0.698
	Recipient	138.83		

	Both	138.35		
Knowledge Protectiveness	Transferor	120.88	7.61	0.022*
	Recipient	154.15		
	Both	143.14		
Knowledge Ambiguity	Transferor	120.49	7.71	0.021*
	Recipient	154.57		
	Both	143.04		
Potential Absorptive Capacity	Transferor	145.78	1.93	0.381
	Recipient	146.52		
	Both	133.16		
Realised Absorptive Capacity	Transferor	142.88	0.76	0.684
	Recipient	145.21		
	Both	136.19		
Knowledge Acquisition	Transferor	158.38	6.03	0.049*
	Recipient	127.56		
	Both	140.92		
Alliance Performance	Transferor	154.21	3.06	0.216
	Recipient	132.41		
	Both	139.56		

Note: § = different scales are used from survey items; Items in ***bold Italics*** are second-order constructs; The test statistics are adjusted for ties, df = 2, N = 281; * = Reject the null hypothesis–the distribution of the data is the same across the 3 categories of knowledge transfer roles–at the significance level of 0.95.

5.3. Structural Model Assessment

A structural model defines the causal relationships between the latent constructs, thus the assessment of the structural model is based on the meaningfulness and prediction of the proposed relationships. Due to the distribution-free assumption, the PLS modelling analysis does not allow a statistical test to examine the calibrated model's overall goodness of fit (Gotz et al., 2010); but it applies non-parametrical tests to evaluate the explanatory and predictive power of a structural model and provides compatible estimation results. As complex structural paths are hypothesised in the analytical model, the significance of direct, mediating, and moderating effects among the latent constructs is estimated by a series of PLS path modelling techniques in this research.

To consolidate the findings, first of all, the bootstrapping other than the Sobel (Sobel, 1982) or empirical M (Holbert and Stephenson, 2003) test is used to assess the significance of mediating and moderating effects in the structural model. Bootstrapping has been applied with increasing popularity in the simulation research (e.g., MacKinnon, Lockwood and Williams, 2004; Williams and MacKinnon, 2008) and compared with

other inferential approaches it has been proved to produce more powerful statistical results in detecting intervening variable effects.

In addition to the criterion of path coefficient (β) via bootstrap algorithm in SamrtPLS, the effect size (f^2) concerning the changes of determination coefficients (R^2) and the predictive relevance (q^2) regarding the changes of cross-validated redundancy (Q^2) on an endogenous construct are also employed via PLS and blindfolding algorithms, respectively, to estimate the statistical validity of a specific mediator or moderator being added in or deleted from the structural model. At this stage, the model with better explanatory and predictive power when adding/ disregarding a mediator/ moderator is justified and succeeded for modification purposes in this research. Before jumping into the hypotheses testing in the next section, a non-parametric PLS goodness-of-fit (GoF) index proposed by Tenenhaus et al. (2005) is employed to provide a well-rounded assessment on both measurement and structural models.

5.3.1. Mediation Analysis

Mediation refers to a succession of causal relations by which an exogenous variable exerts its effect on an endogenous variable by influencing intervening variables (Hayes, 2009). Traditionally, Baron and Kenny's (1986) Causal Steps Approach[4] had long been used to detect mediation in a structural relationship, but it has been criticised for inferior statistical power and lack of capability in assessing multilevel mediation (MacKinnon, Fairchild and Fritz, 2007; MacKinnon, Lockwood, Hoffman, West and Sheets, 2002). Shrout and Bolger (2002) advanced the approach by classifying mediation into proximal, distal, and suppressed effects in the structural model and suggesting that the first-step of testing an association between initial and outcome variables without mediator need not be a requirement when there is a prior belief that the effect size of the mediator is small or the suppression is a possibility.

Due to the involvement of the multilevel mediation in the analytical framework, Shrout and Bolger's (ibid) approach is incorporated with bootstrapping method based on the resampling number of 5,000 (Hayes, 2009; Henseler et al., 2009) to examine the significance of mediating effects in this research. Excluding the moderator (i.e., realised

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[4] Step 1: Test correlation between initial and outcome variables; Step 2: Test correlation between initial variable and mediator; Step 3: Test both initial variable and mediator affect the outcome variable; Step 4: Test mediator completely mediates the initial-outcome relationship in that path coefficient for such relationship should be 0.

absorptive capacity) in the analytical framework, a baseline model containing the original order of the proposed relationships among the constructs is initially bootstrapped to examine the significance of the path coefficients (β). As Shrout and Bolger (2002) suggested that distal mediation in which more than 2 mediators are involved in a structural relationship is theoretically unnecessary, a sequence of alternative models by withdrawing one parameter at a time, starting from knowledge protectiveness (Model 1), knowledge ambiguity (Model 2), potential absorptive capacity (Model 3) to knowledge acquisition (Model 4), are subsequently developed and bootstrapped for the purpose of mediation analysis.

Unlike the full mediation requiring the insignificant path coefficient between initial and outcome variables when constraining the indirect paths linked between the mediator and initial and outcome variables, partial mediation refers to that the path coefficient of the direct effect from initial to outcome variables is significant but in the same direction as the indirect relationships between the mediator and initial and outcome variables (Baron and Kenny, 1986; Shrout and Bolger, 2002). The statistical results compiled in Table 29 indicate that, first of all, there is no suppressed effect in the analytical framework because the signs of the path coefficients in the adjusted models with a series of elimination of the mediators present consistent results with the baseline model (MacKinnon et al., 2002; Shrout and Bolger, 2002). Accordingly, partial mediation in which path coefficients of the direct effects are different from zero but in the same direction as indirect effects (Baron and Kenny, 1986) is exhibited in the structural models, implying that the causal mechanisms among the constructs are more, rather than less, complicated in this research. Nonetheless, such complications offered the potential of enriching theories and practices in cross-border knowledge transfer and learning research, which are further explored by hypotheses testing in the later section.

To quantify the strength of mediation, Shrout and Bolger (2002) introduced effect ratio, the ratio of the indirect effect relative to the total effect, to assess the proportion of the total effect that is mediated; however, the approach was criticised by Hayes (2009) for the limited statistical power when suppression occurs and lack of specifications on either upper or lower bounds of the computation results. Hence, better criteria for mediation assessment on statistical conclusion validity of a structural model derived from PLS modelling analysis – effect size (f^2) and predictive relevance (q^2) – are employed. The calculation of both criteria is explained in Chapter 4. Generally, a

positive effect size/ predictive relevance refers to the fact that the explanatory/ predictive power of a endogenous construct with the linkage to a specific mediator performs better than the one without such linkage, and the larger the effect size/ predictive relevance the more effective the strength or magnitude of the proposed relationship; whereas a negative effect size/ predictive relevance reveals the contrary explanations.

While comparing the statistical results between the baseline model and Model 1, secondly, this research finds that knowledge protectiveness is a partial mediator of institutional distance and relational capital with small to medium explanatory and predictive power on knowledge ambiguity ($f^2 = 0.10$, $q^2 = 0.06$) owing to the significant impacts of institutional distance and relational capital on knowledge ambiguity (t-values > 1.96) when constraining all paths linked among the constructs in the baseline model.

When comparing the statistical results between the baseline model and Model 2, however, this research confirms the full mediating role played by knowledge ambiguity in the proposed analytical framework in that the direct impacts of institutional distance, relational capital, and knowledge protectiveness on potential absorptive capacity and knowledge acquisition are insignificantly (t-values < 1.96) exhibited in the Model 2. Specifically, this research discovers that knowledge ambiguity is a full mediator of institutional distance, relational capital, and knowledge protectiveness with small to medium explanatory and predictive power on potential absorptive capacity ($f^2 = 0.12$, $q^2 = 0.04$); whereas it is a full mediator of those antecedents with moderate explanatory and predictive power on knowledge acquisition ($f^2 = 0.13$, $q^2 = 0.10$) in the analytical framework.

Next, potential absorptive capacity as a partial mediator of knowledge ambiguity with strong explanatory and predictive power ($f^2 = 0.52$, $q^2 = 0.16$) on knowledge acquisition is found when comparing the statistical results between the baseline model and Model 3. The significant path coefficients among knowledge ambiguity, potential absorptive capacity, and knowledge acquisition as displayed in the baseline model are indicative of the complex mechanisms of the causal relationships among the constructs, which are further examined and discussed in the hypotheses testing section.

Table 29: Mediation Analysis on the Structural Model

Structural Path	Baseline Model		Model 1		Model 2		Model 3		Model 4	
	β	t-value	β	t-value	β	t-value	β	t-value	β	t-value
Institutional Distance → Knowledge Protectiveness	0.16	2.39	–	–	0.16	2.36	0.16	2.29	0.16	2.29
Relational Capital → Knowledge Protectiveness	-0.13	2.18	–	–	-0.13	2.03	-0.13	2.06	-0.13	2.06
Knowledge Protectiveness → Knowledge Ambiguity	0.27	4.74	–	–	–	–	0.27	4.73	0.27	4.67
Institutional Distance → Knowledge Ambiguity	0.11	2.04	0.14	2.49	–	–	0.11	2.30	0.11	2.28
Relational Capital → Knowledge Ambiguity	-0.40	7.13	-0.42	7.39	–	–	-0.40	6.92	-0.40	6.90
Knowledge Ambiguity → Potential Absorptive Capacity	-0.49	9.40	-0.49	9.40	–	–	–	–	-0.50	9.38
Knowledge Ambiguity → Knowledge Acquisition	-0.16	2.67	-0.16	2.68	–	–	-0.45	8.98	–	–
Potential Absorptive Capacity → Knowledge Acquisition	0.60	10.66	0.60	11.07	0.55	10.26	–	–	–	–
Knowledge Acquisition → International Strategic Alliance Performance	0.45	9.39	0.45	9.44	0.44	9.50	0.44	9.47	–	–
Institutional Distance → Potential Absorptive Capacity	–	–	–	–	-0.09	1.86	–	–	–	–
Relational Capital → Potential Absorptive Capacity	–	–	–	–	0.07	1.24	–	–	–	–
Knowledge Protectiveness → Potential Absorptive Capacity	–	–	–	–	-0.09	1.57	–	–	–	–
Institutional Distance → Knowledge Acquisition	–	–	–	–	-0.01	0.31	–	–	–	–
Relational Capital → Knowledge Acquisition	–	–	–	–	0.05	1.31	–	–	–	–
Knowledge Protectiveness → Knowledge Acquisition	–	–	–	–	-0.04	1.15	–	–	–	–
Knowledge Ambiguity → International Strategic Alliance Performance	–	–	–	–	–	–	–	–	-0.06	1.12
Potential Absorptive Capacity → International Strategic Alliance Performance	–	–	–	–	–	–	–	–	0.07	1.45

Endogenous Construct	R^2	Q^2	R^2	Q^2	R^2	Q^2	R^2	Q^2	R^2	Q^2
Knowledge Protectiveness	0.05	0.03	–	–	0.02	0.02	0.04	0.03	0.04	0.03
Knowledge Ambiguity	0.28	0.17	0.21	0.12	–	–	0.28	0.17	0.28	0.17
Potential Absorptive Capacity	0.24	0.11	0.24	0.11	0.15	0.08	–	–	0.25	0.11
Knowledge Acquisition	0.48	0.21	0.48	0.21	0.41	0.13	0.21	0.08	–	–
International Strategic Alliance Performance	0.59	0.35	0.59	0.35	0.59	0.35	0.59	0.35	0.38	0.24

Note: β = path coefficient; R^2 = determinant coefficient; Q^2 = cross-validated redundancy.

Finally, when comparing the statistical results between the baseline model and Model 4, this research notes that knowledge acquisition is a full mediator of potential absorptive capacity and knowledge ambiguity with substantial explanatory but relatively moderate predictive power ($f^2 = 0.51$, $q^2 = 0.17$) on international strategic alliance performance because there are insignificant direct impacts of potential absorptive capacity and knowledge ambiguity on international strategic alliance performance (t-values < 1.96).

These comparative findings of mediation analysis reveal the robust statistical conclusion validity of the analytical framework in this research because both explanatory and predictive power of the endogenous constructs in the baseline/ proposed structural model is greater than those in the alternative models. Hence, no alteration of the structural paths in the analytical framework is required to be done.

5.3.2. Moderation Analysis

Moderation describing a situation in which an exogenous variable's effect on an endogenous variable varies in strength or direction as a constrained function by a moderator (Hayes, 2009) posits an important premise to explain organisational learning mechanism in this research. Adapting from Zahra and George's (2002) research, specifically, this research hypothesises realised absorptive capacity as the key moderator affecting the causal relationship between knowledge acquisition and international strategic alliance performance. Compared with the intense popularity of investigation on moderating effects in the information systems research (e.g., Chin et al., 2003; Goodhue, Lewis, and Thompson, 2007), little empirical contribution has been made to examine the presence and strength of such effects in the domains of knowledge transfer and organisational learning studies, albeit the similarity of process-driven theories and practices among these research areas.

Information systems' researchers have long applied multiple regression with a product of the sums approach[5] to detect the existence of moderation (e.g., King and Sethi, 1997; Wade and Hulland, 2004), not until Chin et al. (2003) in an extended Monte Carlo simulation analysis discovered that PLS path modelling with product indicator approach results in statistical examination and interpretation of moderating effects which are

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[5] Moderator score = the sum of the items of the exogenous construct x the sum of the items of the endogenous construct

superior to the conventional method, because the average path coefficient of moderation is larger and closer to the true parameter value. Goodhue et al. (2007) further rectified Chin et al.'s (2003) approach and suggested that PLS path modelling with product of the sums approach is adequately used if sample size or statistical significance is the major concern for the empirical research. Due to the distinctive underlying assumptions between formative and reflective models, Henseler and Fassott (2010) recently pointed out the need to differentiate the techniques in conducting moderation analysis on both models.

The importance of including moderators in empirical research for better understanding and mimicking the complex phenomenon in the real world has been emphasised repeatedly (e.g., Henseler and Fassott, 2010; Homburg and Giering, 2001); however, most researchers using structural equation modelling approach have not taken into account the possible moderation in their studies due to the methodological concerns[6]. To avoid the technical restrictions of covariance-type statistical programmes (i.e., AMOS, LISREL) on moderation analysis, this research adopts variance-based method (i.e., SmartPLS) to evaluate the significance of moderating effect in the analytical framework. As the design of analytical framework involves both formative and reflective measures, moreover, the Two-stage Approach proposed by Henseler and Fassott (2010) is employed in conjunction with PLS path modelling techniques to assess moderating effects in this research.

In the first stage, a structural model without the moderating effect is run by PLS algorithm of SmartPLS to obtain the precise estimation of the latent constructs' scores. Based on Henseler and Fassott's (ibid) suggestion, the estimation results of moderation analysis are feasible only if all constructs are constrained by single measures in the structural model. In the second stage, therefore, the moderator building up by the product of the constructs' scores in the previous stage is incorporated into the model for the purpose of moderation analysis. Meanwhile, the significance of path coefficients (β) in both models is examined by bootstrapping with 5,000 replacements in SmartPLS.

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[6] Most researchers applying covariance-based statistical programmes (i.e., LISREL) to conduct structural equation modelling analysis; yet as mentioned earlier in Table 17 such LISREL-type methods have difficulty in handling interaction effects and higher-order model.

Although Baron and Kenny (1986) argued that the moderation is supported if its path coefficient is significant regardless of the significance of the main effects in the causal relationship, Carte and Russell (2003) later criticised the argumentation for limited specifications as one of the nine common errors in pursuit of moderation. Hence, apart from the estimation on the significance of path coefficients via bootstrap algorithm, other criteria such as effect size (f^2) and predictive relevance (q^2) concerning how much a unit change in a moderator influences the causal relationship between the initial and outcome variables (Chin et al., 2003) via PLS and blindfolding algorithms, respectively, are also employed to assess the explanatory and predictive power of the moderator affecting the proposed relationship.

The statistical results displayed in Table 30 disclose the significant moderating effect of realised absorptive capacity (t-value > 1.96) with moderate explanatory and predictive power ($f^2 = 0.25$, $q^2 = 0.11$) on the causal relationship between knowledge acquisition and international strategic alliance performance. Specifically, the findings reveal that one standard deviation increase in realised absorptive capacity not only affects alliance performance by 0.39 but also boosts the impact of knowledge acquisition on alliance performance from 0.43 to 0.53, providing the empirical evidence of the presence of a moderating effect in the proposed analytical framework.

Table 30: Moderation Analysis on the Structural Model

Structural Path	Model without Moderating Effect		Model with Moderating Effect	
	β	t-value	β	t-value
Institutional Distance → Knowledge Protectiveness	0.16	2.21	0.16	2.39
Relational Capital → Knowledge Protectiveness	-0.13	2.03	-0.13	2.18
Knowledge Protectiveness → Knowledge Ambiguity	0.27	4.77	0.27	4.72
Institutional Distance → Knowledge Ambiguity	0.11	2.28	0.11	2.38
Relational Capital → Knowledge Ambiguity	-0.40	7.08	-0.40	7.03
Knowledge Ambiguity → Potential Absorptive Capacity	-0.49	9.28	-0.49	9.29
Knowledge Ambiguity → Knowledge Acquisition	-0.16	2.68	-0.16	2.73
Potential Absorptive Capacity → Knowledge Acquisition	0.60	10.83	0.60	10.72
Knowledge Acquisition → International Strategic Alliance Performance	0.71	25.92	0.43	9.30
Realised Absorptive Capacity → International Strategic Alliance Performance	–	–	0.39	6.29
Knowledge Acquisition*Realised Absorptive Capacity → International Strategic Alliance Performance	–	–	0.10	2.40
Endogenous Construct	R^2	Q^2	R^2	Q^2
Knowledge Protectiveness	0.04	0.03	0.04	0.03
Knowledge Ambiguity	0.28	0.17	0.28	0.17
Potential Absorptive Capacity	0.24	0.11	0.24	0.11
Knowledge Acquisition	0.48	0.21	0.48	0.22
Alliance Performance	0.50	0.28	0.60	0.35

Note: β = path coefficient; R^2 = determinant coefficient; Q^2= cross-validated redundancy; * = moderating effect.

5.3.3. Overview of the Model Fit Indices

Through a series of PLS path modelling techniques on model assessment, both measure- and construct-level validity and reliability are systematically examined; yet the research findings are not consolidated until an overall fit of both measurement and structural models is optimised. In this regard, a global criterion of PLS goodness-of-fit (GoF) proposed by Tenenhaus et al. (2005) is adopted to provide statistical evidence for model validation. As an operational solution for the methodological gap in the PLS path modelling literature, the criterion of PLS goodness-of-fit (GoF) has been increasingly applied by researchers to evaluate the overall model robustness at both measurement and structural levels (e.g., Duarte and Raposo, 2010; Esposito Vinzi et al., 2010; Tenenhaus and Hanafi, 2010), and is calculated as the geometric mean of the average community of the measures and the average variance explained (R^2) by the endogenous constructs.

The normed values of PLS goodness-of-fit (GoF) after computation range between 0 and 1, whilst no threshold value has been advocated for interpretation in the prior research. When considering the cut-point value of average variance extracted as 0.50 (Fornell and Larcker, 1981) and the small, medium and large levels of determinant coefficient (R^2) as 0.19, 0.33, and 0.67, however, the values of PLS goodness-of-fit as 0.13, 0.23, and 0.47 become the appropriate representations of the hierarchical levels of the overall model fit indices.

Despite the restriction to reflective measurement models (Henseler et al., 2009), the criterion of PLS goodness-of-fit can still be used for model assessment in the case that the calculation results for a formative measurement model with lower communality but higher determinant coefficient (R^2) is expected by the researcher (Esposito Vinzi et al., 2010). The calculation result of PLS goodness-of-fit criterion displayed in Table 31 demonstrates that the analytical framework possesses strong validation of the overall model fit at both measurement and structural levels (GoF > 0.47), which justifies the empirical stance on the proposed causal relationships among the theoretical constructs in this research.

Table 31: PLS Goodness-of-fit Index

Construct	Number of Measures	Communality	Determinant Coefficient
Regulatory Distance	5	0.67	–
Normative Distance	4	0.58	–
Cognitive Distance	5	0.71	–
Partner Interactions	4	0.57	–
Mutual Trust	4	0.69	–
Reciprocal Commitment	4	0.67	–
Realised Absorptive Capacity	6	0.53	–
Institutional Distance	3	0.41	0.94
Relational Capital	3	0.82	0.92
Knowledge Protectiveness	2	0.61	0.04
Knowledge Ambiguity	4	0.60	0.28
Potential Absorptive Capacity	6	0.54	0.24
Knowledge Acquisition	10	0.67	0.48
International Strategic Alliance Performance	10	0.59	0.60
Average community of the measures/ variance explained		0.62	0.50
PLS Goodness-of-fit (GoF)			**0.56**

5.4. Hypotheses Testing

Having analysed the mediating and moderating effects in the structural model, the direct effects of the hypothesised relationships are examined in this section. The statistical results shown in Table 32 reveal that, first of all, knowledge protectiveness is strongly correlated to knowledge ambiguity (H1), which in turn, significantly decreases the potential absorptive capacity (H7) and the amount and types of knowledge acquired by the firm (H6). It also further weakens the international strategic alliance performance if its realised absorptive capacity is insufficient to moderate the application of the acquired knowledge into the alliance context (H9). Other than the negative effect of knowledge ambiguity, this research finds a significantly positive impact of potential absorptive capacity on knowledge acquisition (H8), indicating that a firm's ability to integrate the transferred knowledge can essentially mitigate the difficulties in absorbing the ambiguous knowledge.

In terms of the exogenous variables, this research confirms that both relational capital and institutional distance significantly influence knowledge transfer processes through international collaborations (t-values > 1.96). On the one hand, this research detects that institutional distance is positively correlated with transferors' protectiveness behaviour towards knowledge transfer (H4) and recipients' ambiguous perception towards the

transferred knowledge (H5), resulting in the negative impacts on knowledge transfer outcomes through declining potential absorptive capacity in acquiring and assimilating the transferred knowledge (H7). On the other hand, however, this research finds that knowledge transfer processes can be facilitated by relational capital accumulated between alliance partners in that relational capital is negatively related to knowledge protectiveness (H2) and knowledge ambiguity (H3). With greater extent of relational capital between alliance partners, transferors would be more likely to weaken their protectiveness behaviour towards knowledge transfer and recipients would then experience less causal ambiguous perception towards the transferred knowledge, which in turn, would increase the amount and types of knowledge acquired (H6) through enhancement of recipients' potential absorptive capacity (H7).

In short, the statistical results of both measurement and structural model assessment via PLS path modelling techniques verify the reliability and validity of the analytical framework at both measure- and construct-levels proposed in this research. A detailed analysis on hypotheses testing is discussed in the next Chapter with respect to providing a holistic view on the theoretical and empirical implications and contribution to the existing literature.

Table 32: Hypotheses Testing

Hypothesis (Expected Sign): Structural Path	β	t-value
H1(+): Knowledge Protectiveness → Knowledge Ambiguity	0.27	4.72
H2(−): Relational Capital → Knowledge Protectiveness	-0.13	2.18
H3(−): Relational Capital → Knowledge Ambiguity	-0.40	7.03
H4(+): Institutional Distance → Knowledge Protectiveness	0.16	2.39
H5(+): Institutional Distance → Knowledge Ambiguity	0.11	2.38
H6(−): Knowledge Ambiguity → Knowledge Acquisition	-0.16	2.73
H7(−): Knowledge Ambiguity → Potential Absorptive Capacity	-0.49	9.29
H8(+): Potential Absorptive Capacity → Knowledge Acquisition	0.60	10.72
H9(+): Knowledge Acquisition*Realised Absorptive Capacity → International Strategic Alliance Performance	0.10	2.40

Note: β = path coefficient; * = moderating effect.

Chapter 6: Discussion and Conclusion

Although much prior research has suggested that knowledge sharing is a key contributor to international business success (e.g., Grant, 2002; Hitt et al., 2000), it often involves many challenges for a firm to retain or enhance its competitive advantage in a cooperative setting with other firms. The major obstacle is inter-firm asymmetry of knowledge demand and supply; hence, it is generally assumed that partner protectiveness and accessibility to its knowledge base would be correspondingly asymmetrical within alliances (Nielsen, 2005). This research thus aims to unpack the paradoxes in cross-border knowledge transfer and learning processes and their impacts on the performance of international strategic alliances.

Particularly, this research argues that the performance of an international strategic alliance is determined not only by the processual factors embedded within and across organisational boundaries (i.e., inter-partner relationships and cross-border knowledge transfer and learning processes) but also by the contextual factors derived from the external environments from where the partner firms originate (i.e., institutional distance). In this regard, the concept of co-evolution of international strategic alliances is initially proposed in Chapter 2 to advance the conceptual knowledge about the dynamics of interaction between external environments and internal operations of the alliance in the prior literature. Based on Das and Teng's (2002) and Lewin and Volberda's (1999) propositions, this research reconceptualises the co-evolution of international strategic alliances as the simultaneous interaction among partner firms (micro-level environment), alliances (meso-level environment), and their contexts (macro-level environment), domestically and internationally.

Drawing upon this co-evolutionary view, this research further adapts Lewin et al.'s (2004) and Volberda and Lewin's (2003) adaption-selection research to consolidate the theoretic foundations of the co-evolution of international strategic alliances by applying the micro-level theories – organisational learning (Zahra and George, 2002) and knowledge-based view (Grant, 1996a,b) – to explain the heterogeneities of alliance partners' behaviours and perceptions towards knowledge transfer and learning processes at micro-level environments. Additionally, this research employs meso-level theory – the relational view (Dyer and Singh, 1998) to examine the inter-firm relationships and

their impacts on the knowledge transfer and learning processes through international strategic alliances. Lastly, this research utilises the institution-based view (Peng et al., 2008) to analyse the interactions between exogenous discontinuities originating from the diverse institutional contexts from where alliance partners originate at macro-level environments and their impacts on the partner firms' behaviours and perceptions towards knowledge transfer and learning processes.

6.1. Overview of the Research Framework

By the synthesis of the organisational learning, knowledge- and institution-based, and relational theories, this research develops a theoretical framework comprising a sequence of hypotheses concerning the inter-relationships between contextual and processual antecedents of international strategic alliance performance in Chapter 3. Grounding on the co-evolutionary view rejuvenated in Chapter 2, this research further classifies processual and contextual antecedents of international strategic alliance performance into knowledge, organisational, relational, and contextual characteristics with respect to mapping out the underlying relationships among these antecedents and their impacts on the alliance performance (Figure 9).

Figure 9: Overview of the Research Framework
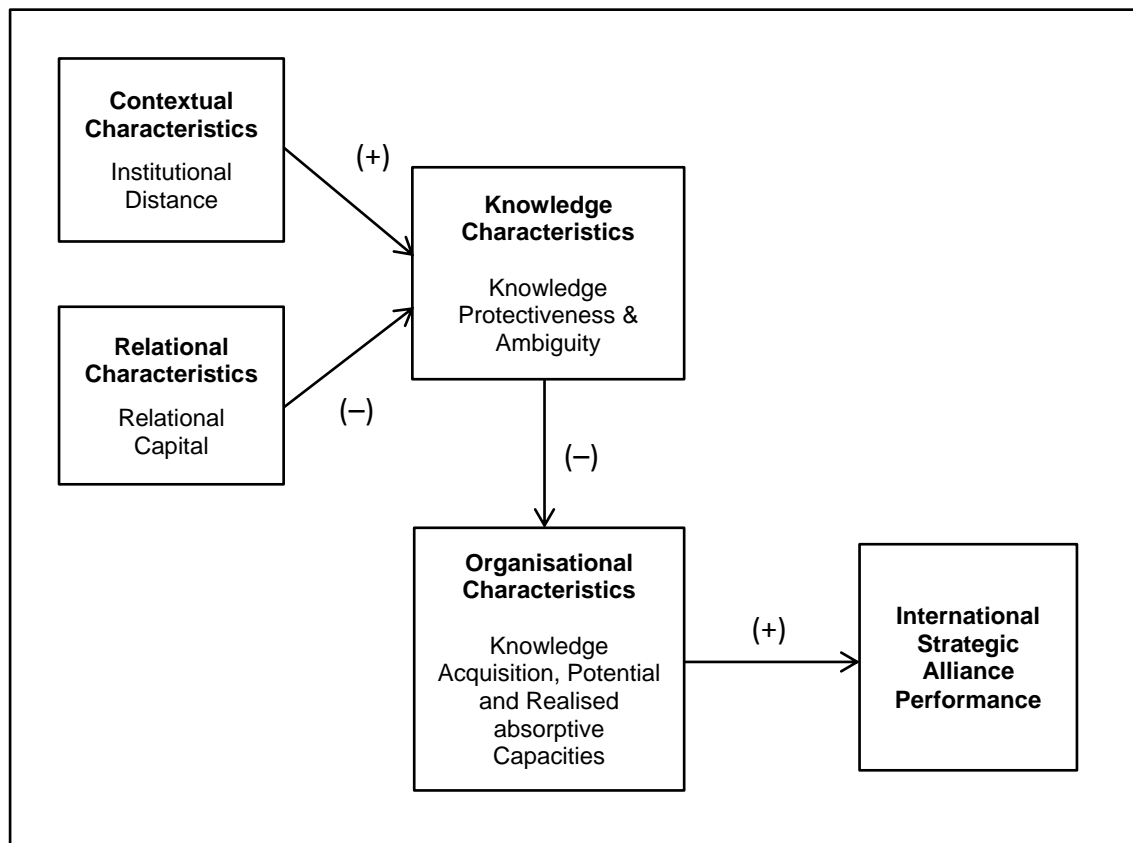
6.1.1. Knowledge Characteristics

Building upon the knowledge-based theory (Kogut and Zander, 1992) and the 'transferor-recipient' view on knowledge transfer (Cantu et al., 2009), this research defines knowledge characteristics – knowledge protectiveness and ambiguity – as the different behaviours and perceptions of the transferor and the recipient towards the knowledge transfer process and identifies them as critical antecedents of international strategic alliance performance. Specifically, knowledge protectiveness is proposed as the transferor's defensive behaviour towards knowledge transfer in terms of securing its proprietary knowledge from the potential opportunism of the alliance partner, whilst knowledge ambiguity is defined as the difficulties to absorb the transferred knowledge by the recipient in the knowledge transfer process (Simonin, 1999a, b, 2004; Szulanski, 1996). Building upon the transferor-recipient generic model (e.g., Albino et al., 2004; Cantu et al., 2009; Ko et al., 2005), furthermore, this research hypothesises a positive relationship between knowledge protectiveness and ambiguity (H1): the higher/ lower level of knowledge protection by the transferor, the greater/ lesser extent the recipient would experience the difficulties in knowledge internalisation.

6.1.2. Organisational Characteristics

Instead of proposing a direct link between knowledge characteristics with alliance performance, however, this research suggests that organisational learning mechanism is critically mediating the relationship between the two (Figure 8). Without a proper receiving mechanism to absorbing and applying the transferred knowledge, the alliance performance cannot be enhanced, given the transparency of the knowledge transfer process between the partners. Organisational characteristics, which are concerned with the mechanisms of the organisational learning process itself, are thus identified to pose significantly positive effects on international strategic alliance performance in this research (Figure 8). Whereas knowledge ambiguity is hypothesised to impede organisational learning processes by reducing the recipient's potential absorptive capacity (H7) as well as the amounts of the knowledge acquired (H6) (Cantu et al., 2009; Cohen and Levinthal, 1990; Lenox and King, 2004), this research considers a positive relationship between potential absorptive capacity and knowledge acquisition (H8) in line with organisational learning literature (e.g., Lane et al., 2001; Zahra and George, 2002). Notably, this research also adapts Larsson et al.'s (1998) proposition and hypothesises realised absorptive capacity as a crucial moderator in the relation between knowledge acquisition and international strategic alliance performance. Hence, the

conceptual distinction between potential and realised absorptive capacities is advanced in the present research.

6.1.3. Relational Characteristics

Despite the various dimensions of inter-organisational factors, previous research has generally agreed upon the positive role played by them in terms of facilitating resource and knowledge exchange between firms (e.g., Johnson, 1999; Liu et al., 2010; Kale et al., 2000). However, even if there are harmonious relationships between firms, successful performance of international strategic alliances cannot be necessarily guaranteed in that the partner firms might experience the difficulties in knowledge transfer and learning processes along with collaborations. Differentiating from much prior research linking a direct path between relational factors with alliance performance (e.g., Liu et al., 2010; Kale et al., 2000), this research argues that linkage between the two is essentially mediated by the knowledge and organisational characteristics as exhibited in Figure 8. Based on the relational view (Dyer and Singh, 1998), relational capital as a distant antecedent of international strategic alliance performance is thus indicated in this research. Paralleling much prior literature (e.g., Inkpen, 1998; Kachra and White, 2008; Lyles and Salk, 1996; Norman, 2001, 2002), this research hypothesises that relational capital positively influences cross-border knowledge transfer processes by decreasing both transferors' protectiveness behaviour towards knowledge transfer (H2) and recipients' ambiguous perception towards the transferred knowledge (H3).

6.1.4. Contextual Characteristics

Apart from the on-going dynamics of relational interactions, this research proposes that the uncertainty derived from the diverse institutional frameworks between the countries from where alliance partners originate also serve as the crucial antecedents of international strategic alliance performance. Building upon the emergent institution-based view (Peng et al., 2008) and Kostova's (1996) proposition, this research enriches the existing literature by incorporating institutional distance with cross-border knowledge transfer and learning processes in terms of developing a co-evolutionary view on international strategic alliance performance. Yet unlike the positive role played by relational capital, institutional distance as the major external determinant of knowledge transfer negatively affecting knowledge transfer processes by strengthening transferors' protectiveness behaviour towards knowledge transfer (H4) as well as

recipients' ambiguous perception towards the transferred knowledge (H5) is proposed in this research. Accordingly, institutional distance as the representation of contextual characteristics is hypothesised to be the important but distant antecedent of international strategic alliance performance in this research in that it directly influences knowledge characteristics, which subsequently change the impacts of organisational characteristics on alliance performance (Figure 8).

6.2. Discussion of Research Findings

Through the large-scale and cross-sectional survey research on a sample of 671 Taiwan-based international strategic alliances, this research analyses the non-normalised data and higher-order measurement models with formative nature via non-parametric methods in SPSS and PLS path modelling techniques in SmartPLS statistical programmes. To achieve research reliability and validity, first of all, the confirmatory factor analysis is conducted on both formative and reflective measurement models and four measures (i.e., effectiveness of law-making bodies (RD4), judicial independence (RD5), power distance (ND1), and masculinity (ND6)) with low factor loadings ($\lambda < 0.4$) are eliminated at this stage.

Secondly, descriptive statistics are used to examine the sample characteristics, including the duration and equity structure of the international strategic alliances, origin of the alliance partner's country, and knowledge transfer roles played by the responding firms. The analytical results reveal that most responding firms have collaborative experience with their foreign partners for 2 to 5 years (42%) and prefer to cooperate with foreign partners from US (25%), Japan (20%), and China (12%) among a total of 29 countries. Also, most international strategic alliances between Taiwanese information and communication technology manufacturers and foreign firms are non-equity-type collaborations (71%).

While cross-examining the knowledge transfer roles and foreign partners' origins via Chi-square test ($X^2 = 77.591, df = 4, p < 0.05$), this research finds that the responding firms with foreign partners from advanced economies (e.g., US, Germany) tend to be recipients; from emerging markets and developing countries (e.g., China, Brazil) tend to be transferors; and from newly industrialised Asian economies (e.g., Hong Kong, Korea) tend to be both transferors and recipients in the knowledge transfer processes. Hence, a global map of knowledge flows/ learning chains is manifested in

this research. Taiwan as one of the newly industrialised Asian economies located at the midway of the global knowledge flows/ learning chains depends greatly on absorbing knowledge from advanced economies to enhance its global competitiveness and meanwhile, being strongly relied on by other emerging economies and developing countries to transfer its competitive knowledge to sustain the collaborations.

Due to the dichotomous questions designed in the questionnaire based on the roles played by the responding firms in knowledge transfer processes (i.e., transferors, recipients, both), descriptive statistics are also employed to conduct cross-group comparison on the developed measures. The comparative findings indicate that, firstly, there are significantly different knowledge transfer patterns across the Taiwanese information and communication technology manufacturers as transferors, recipients, and both transferors and recipients in knowledge transfer processes. It is found that the recipient firms are more likely than the transferor firms to consider experiencing restrictions and difficulties in accessing the partners' knowledge bases during collaborations, which essentially supports the empirical evidence of asymmetrical knowledge demand and supply within international strategic alliances in the prior research (Nielsen, 2005).

Next, the comparative findings of knowledge transfer determinants are examined. Unlike symmetrical efforts made by all responding firms and their foreign partners across the 3 sub-groups to build up relational capital within alliances, this research finds that diverse institutional backgrounds in the aspects of regulatory, normative, and cognitive institutions between alliance partners distinguish the Taiwanese information and communication technology manufacturers as transferors, recipients, and both transferors and recipients in the knowledge transfer processes. The comparative findings demonstrate that the transferor firms prefer to cooperate with the foreign partners with larger regulatory and cognitive distances but similar normative institutional framework; whereas the recipient firms demonstrate contrary findings.

The findings correspond to the statistical results of Chi-square test mentioned earlier: the Taiwanese information and communication technology manufacturers as transferors are more likely to form alliances with foreign partners from emerging markets and developing countries, which have weaker regulatory systems and technology developments in information and communication technology industries but much more

similar cultural backgrounds compared with Taiwan. However, Taiwanese information and communication technology manufacturers as recipients are more likely to form alliances with foreign partners from advanced economies, which usually have compatible regulatory systems and technology developments in information and communication technology industries but distinctive cultures compared with Taiwan.

Apart from knowledge acquisition, subsequently, the comparative findings concerning the knowledge transfer outcomes state that there are consistent extents of potential and realised absorptive capacities in acquiring, assimilating, transforming, and exploiting the knowledge within organisational learning mechanisms as well as alliance performance across the 3 sub-subgroups. Specifically, the Taiwanese information and communication technology manufacturers as transferors perceive their foreign partners acquire more knowledge than they themselves as recipients do. The finding is understandable as explained earlier that compared with the recipient firms, the transferor firms are less likely to regard themselves as being protective towards knowledge transfer, and thus their alliance partners experience less ambiguous perception towards the transferred knowledge and acquire greater knowledge within the collaborations afterwards.

Through the systematic analysis on mediating and moderating effects in the structural model via PLS path modelling techniques (Henseler and Fassott, 2010; Shrout and Bolger, 2002), the empirical stance on the proposed causal relationships among the theoretical constructs hypothesised in this research is validated as having strong PLS goodness-of-fit (GoF > 0.47). A complete research framework with empirical findings of the structural paths is elucidated in Figure 10.

Primarily, this research unpacks the underlying mechanisms of knowledge transfer processes by applying the transferor-recipient view (e.g., Albino et al., 2004; Cantu et al., 2009; Ko et al., 2005) to define the nature of knowledge transfer as involving different behaviours and perceptions of transferors and recipients towards knowledge transfer processes. Aligning with Simonin's (1999a, b, 2004) research, this research hypothesises knowledge protectiveness as a critical antecedent of knowledge ambiguity in that the degree of transferors' protectiveness behaviour towards knowledge transfer is positively associated with the extent of recipients' causal ambiguous perception towards the transferred knowledge (H1). The empirical finding as shown in Figure 10 not only

justifies the positive relationship between knowledge protectiveness and knowledge ambiguity (H1: 0.27**) but also enhances Simonin's (ibid) proposition by incorporating the process-oriented view on knowledge transfer (e.g., Liyanage et al., 2009; Szulanski, 2000). In the light of the knowledge-based theory (Kogut and Zander, 1992), most importantly, the finding also discloses the paradoxes in cross-border knowledge transfer processes as the results of the intrinsic competition over knowledge-based resources between firms in the context of international strategic alliances.

Prior research has generally agreed upon the positive role played by relational capital in inter-organisational relationships, particularly in facilitating the efficiency and effectiveness of knowledge transfer and learning between firms (e.g., Adler and Kwon, 2002; Gupta and Govindarajan, 2000; Perez-Nordtvedt et al., 2008). Except for a few empirical studies (e.g., Johnson, 1999; Liu et al., 2010), nonetheless, limited research has provided a practical insight into which peculiar factor along with knowledge transfer or learning processes is influenced by the varied levels of relational capital between alliance partners. This is because the majority of prior studies have simply positioned knowledge transfer and alliance learning as the main dependent variables to explain the exogenous impact derived from relational capital, which in turn, lacks detailed investigation into the possible outcomes while engaging in knowledge transfer.

In line with the aforementioned studies, this research characterised relational capital as a key facilitator of knowledge transfer within international strategic alliances. Yet by delving into the underlying mechanisms of knowledge transfer and synthesising the relational and knowledge-based views (Dyer and Singh, 1998; Kogut and Zander, 1992), this research further hypothesises relational capital as the mirco-level determinant of knowledge transfer, because it would negatively affect knowledge protectiveness and ambiguity in knowledge transfer processes (H2 & H3). The empirical findings exhibited in Figure 10 validate the positive impact of relational capital on knowledge transfer processes within international strategic alliances. With more frequent partner interactions and higher levels of mutual trust and reciprocal commitment between partner firms, the less transferors would need to take defensive, protective actions towards knowledge transfer (H2: –0.13*) and thus recipients would be less likely to experience the causal ambiguous perception and difficulties in absorbing the transferred knowledge (H3: –0.40**).

Figure 10: Research Framework and Findings
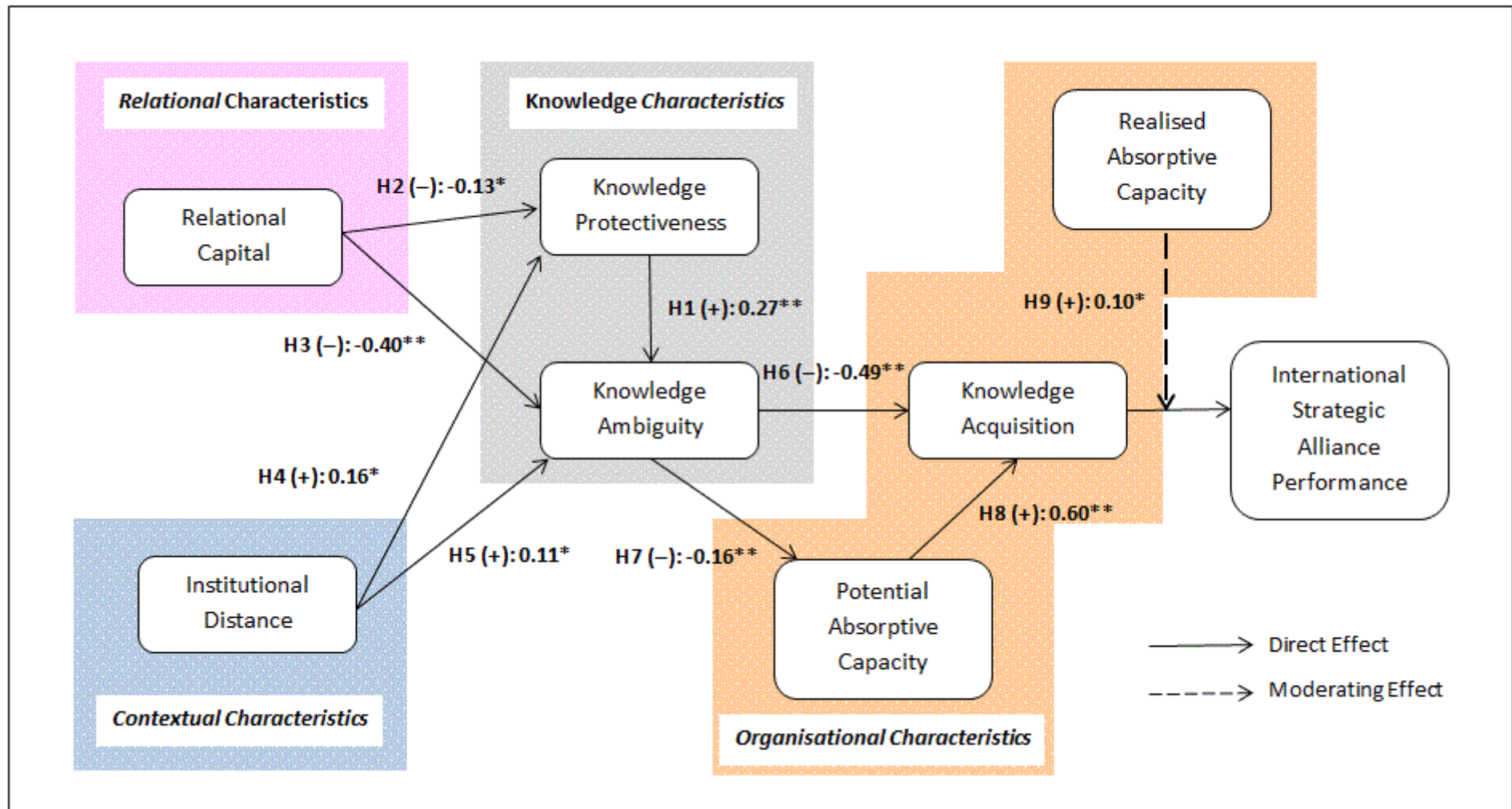
Apart from the dynamics of relational factors embedded within the development of partnerships between firms, the discontinuities of contextual factors derived from the heterogeneities of institutional environments between countries where partner firms originate from are also proposed to serve as crucial determinants of knowledge transfer in this research. In contrast to the positive role played by relational factors, this research characterised contextual factors, particularly the macro/ country-level institutional distance between partner firms, as the major impediments of knowledge transfer processes within international strategic alliances. Although the concept of institutional distance has not been discussed in the arenas of cross-border knowledge transfer and learning research, the noxious effects of institutional distance on ownership strategies and survival of foreign subsidiaries have been widely documented in the international business studies (e.g., Gaur and Lu, 2007; Ingram and Silverman, 2002; Yiu and Makino, 2002).

Incorporating the emergent institution-based (Peng et al., 2008) with knowledge-based (Kogut and Zander, 1992) theories, this research proposes the pessimistic role played by institutional distance on knowledge transfer processes, in which it is positively associated with knowledge protectiveness and ambiguity (H4 & H5). The empirical findings displayed in Figure 10 on the one hand advance the existing literature by supporting the negative impacts of institutional distance on knowledge transfer and, on the other hand, nurture both theoretical and empirical stances on cross-border knowledge transfer research by unpacking the reasons why partner firms would possess certain levels of protection and causal ambiguity towards knowledge transfer processes. Particularly, the findings suggest that with more diverse institutional frameworks between alliance partners with respect to regulatory, normative, and cognitive distances, the more likely transferors would raise their protectiveness behaviour towards knowledge transfer (H4: 0.16*), which would subsequently even more harden recipients' causal ambiguous perception towards the transferred knowledge, in addition to the direct effect from institutional distance (H5: 0.11*). The findings essentially echo Wang et al.'s (2009) research that the country-of-origin effects significantly lead to different behaviours and perceptions of foreign and domestic firms within international collaborations.

Next, this research succeeds the process-oriented view (e.g., Kumar and Nti, 1998; Ring and Van de Ven, 1994) on internal developments of international strategic alliances and

argues that organisational learning as a critical receiving mechanism to the transferred knowledge mediates the relationship between knowledge transfer and alliance performance. Indeed, it is suggested that knowledge transfer is completed when learning takes place and when recipients understand the intricacies and implications associated with that knowledge so as to apply it (Ko et al., 2005). Adapting from Easterby-Smith et al.'s (2008) proposition, this research defines the extents of knowledge acquired by recipients as the manifestation of consequences of knowledge transfer between partner firms within international strategic alliances. Accordingly, this research hypothesises that the amounts and types of knowledge acquired by a firm are negatively determined by its perception towards the transferred knowledge. Aligning with much prior research proposing causal ambiguity as an important antecedent of knowledge transfer outcomes (e.g., Cantu et al., 2009; Simonin, 1999a, b, 2004, Szulanski, 1996), this research empirically sustains the significantly negative impact of knowledge ambiguity on knowledge acquisition (H6: -0.49^{**}) as presented in Figure 10.

However, even if the knowledge is transferred from one firm to the other, regardless of the negative effect of causal ambiguity, it cannot guarantee that the knowledge is fully acquired as expected. This is because some firms may lack the capacity to learn (Inkpen, 2000). Drawing upon Zahra and George's (2002) research, this research thereby integrates the concept of absorptive capacity with organisational learning mechanism within international strategic alliances, and further distinguishes potential absorptive capacity, a firm's ability to assimilate and acquire the transferred knowledge, from realised absorptive capacity, a firm's ability to transform and exploit the acquired knowledge into the alliance context. Essentially, organisational learning is guided by pre-existing knowledge (Andersen, 2008) and thus it is both a function of access to new knowledge and the capabilities for using and building on such knowledge (Inkpen, 1998). Also, recognising the research gaps in the prior literature that recognise that the actions and interactions of organisational and inter-organisational antecedents of absorptive capacity remains unclear (Volberda et al., 2010), this research hypothesises that recipients' potential absorptive capacity is negatively influenced by their causal ambiguous perception towards the transferred knowledge. Knowledge must be distributed throughout the alliance to have the largest possible effect on the development of absorptive capacity (Lenox and King, 2004). The empirical finding shown in Figure 10 maintains that there is a substantially negative linkage between knowledge ambiguity and potential absorptive capacity (H7: -0.16^{**}). With more

ambiguous perception towards the transferred knowledge, the less likely the potential absorptive capacity of recipients would be effectively utilised to acquire and assimilate the knowledge from their partners within international strategic alliances.

Despite the negative impact of knowledge ambiguity on knowledge acquisition, this research suggests that knowledge acquisition can be enhanced if recipients possess strong potential absorptive capacity to assimilate and acquire the transferred knowledge. Indeed, prior organisational learning research on the development of absorptive capacity constructs has largely acknowledged them as critical contributors to a firm's long-term survival and success because it can reinforce, complement, and refocus the firm's knowledge base (e.g., Kale and Singh, 2007; Lane, et al., 2006; Lyles and Salk, 1996). The positive impacts of learning on alliance performance have been widely documented; nonetheless, there has been limited in-depth understanding of how absorptive capacity contributes to the alliance performance or more fundamentally, where absorptive capacity has an effect on the organisational learning process with respect to enhancing/ lessening the capability development of the alliance. To fill the research gaps, as a result, this research indicates that organisational learning mechanisms as multi-faceted developmental processes within international strategic alliances involve a series of positive relationships among knowledge acquisition, potential and realised absorptive capacities (Dodgson, 1993; Kale and Singh, 2007), which subsequently contribute to the successful alliance performance.

In line with Lane et al.'s (2001) proposition, on the one hand, this research hypothesises a positive relationship between potential absorptive capacity and knowledge acquisition, as the more capacity of a firm in absorbing the knowledge, seemingly, more transferred knowledge from its alliance partner would be effectively and efficiently acquired by the firm. On the other hand, this research advocates that the recipient firm's feedback with respect to applying the acquired knowledge into the alliance context is the key to elucidating the underlying association between organisational learning and alliance performance. Without the partner firm's capacity in transforming and exploiting the acquired knowledge into the alliance context, the performance of such alliance cannot be guaranteed to be successful because the firm might possess opportunistic learning strategies to undercut the collective knowledge development in the alliance (Larsson et al., 1998). Consequently, realised absorptive capacity as a crucial moderator in the

relation between knowledge acquisition and alliance performance is hypothesised in this research.

The empirical findings exhibited in Figure 10 validate the significantly positive association between potential absorptive capacity and knowledge acquisition (H8: 0.60**), reflecting that potential absorptive capacity on behalf of recipient firms is a crucial facilitator of cross-border knowledge acquisition. The findings also justify the positive moderating role played by realised absorptive capacity in the linkage between knowledge acquisition and international strategic alliance performance (H9: 0.10*), revealing that realised absorptive capacity not only affects alliance performance but also boosts the impact of knowledge acquisition on alliance performance. Corresponding to the organisational learning literature (e.g., Cohen and Levinthal, 1990; Zahra and George, 2002), the findings of this research unpack the underlying mechanisms of organisational learning by positing potential absorptive capacity as one of the antecedents of knowledge acquisition as well as by reconceptualising realised absorptive capacity as a key moderator in the relation between knowledge acquisition and international strategic alliance performance. The importance of absorptive capacities in organisational learning mechanisms through international collaborations between firms with respect to contributing to the alliance success is therefore empirically fortified in this research. Without absorptive capacities, assuredly, a recipient firm would not be able to commit resources and take actions to appropriate the transferred knowledge, and the alliance performance would be less likely to be satisfactory for partners in order to sustain the long-term cooperation.

6.3.   Significance of the Research

Unlike most knowledge transfer and organisational learning research focusing on the contexts of international joint ventures and international acquisitions (e.g., Dhanaraj et al., 2004; Griffith et al., 2001), this research aims to unpack the paradoxes in cross-border knowledge transfer and learning processes by developing a co-evolutionary view on international strategic alliance performance and by empirically examining the inter-relationships between contextual and processual antecedents of alliance performance. The findings of this research thus contribute to advancing the alliance literature by reconceptualising a co-evolutionary perspective on international strategic alliance performance and by explicating both contextual and processual factors as focal antecedents of alliance performance based on the integration of the organisational

learning, institution- and knowledge-based, and relational theories. It also broadens the knowledge transfer and organisational learning research by identifying the underlying mechanisms of international strategic alliance operations as cross-border knowledge transfer and learning processes between foreign and domestic partners and by unpacking the paradoxes in cross-border knowledge transfer and learning processes as the results of the mixed effects derived from the inter-relationships among knowledge, organisational, contextual, and relational antecedents of international strategic alliance performance. Moreover, this research also enriches the methodological gap in the prior management literature by utilising PLS modelling approach to analyse the largely non-normalised data and the higher-order measurement models with formative nature. A detailed discussion about the theoretical and managerial implications on the research findings is provided in the following sections.

6.3.1. Theoretical Implications

Increasing numbers of firms have acknowledged international strategic alliances as useful means to explore the foreign markets, access the critical resources, and benefit from the cooperative efforts. Such acknowledgement of the importance of international strategic alliances has led to growing interests by academics in theorising their causes and consequences. The major theoretical implication of this research is to offer a co-evolutionary view on international strategic alliance performance with respect to getting more insights into the dynamic interactions among alliances, partner firms, and their environments.

Although it is a new perspective still in its early stages of development, the co-evolutionary perspective on strategic alliances has offered significant advantage of drawing attention to the dynamic confluence and interaction over time of forces stemming from strategic alliances, their environments, and the capacities of their management in response to these forces and, in a reciprocal term, to shaping the environments (Koza and Lewin, 1998; Rodrigues and Child, 2008). Yet it has been criticised for a lack of process-orientated framework to unpack how and why changes take place in strategic alliances (e.g., Koza and Lewin, 1998; Wilson and Hynes, 2009). In spite of the universal recognition on the importance of institutional environments, with one exception (Rodrigues and Child, 2008), most research applying co-evolutionary perspective has analysed examples of competitive firms and industries that are not subject to high levels of direct institutional influences, and it is almost needless

to mention that no research has been done to investigate the impacts of institutional factors on the alliance developmental processes in the international contexts. Furthermore, this research criticises that there has been a lack of co-evolutionary view on the alliance mechanisms, the processes through which alliance undertakings are specified, assigned, implemented, integrated, reformed and evaluated by partner firms, in the prior literature. In addition to the internal interactions between partner firms, such as knowledge transfer and learning processes, this research argues that institutional heterogeneities between the countries from where partner firms originate could affect international strategic alliance performance.

An international strategic alliance is a living entity that is highly interacted with its domestic and foreign environments. Growing empirical studies have focused on the various effects of country-level factors on firm/ alliance performance (e.g., Bennett et al., 2001; Wang and Kafouros, 2009). Thus unlike most prior research assuming environmental factors as evolving in a single context, such as the competitive structure and attractiveness of an industry (Rodrigues and Child, 2008), this research focuses on the relative dynamics of environmental conditions in the differing contexts of the partner firms within international strategic alliances. Consequently, the co-evolution of international strategic alliances is defined in this research as the simultaneous interactions of partner firms, alliances, and their contexts, domestically and internationally. Succeeding the prior literature (e.g., Barnett et al., 1994; Kale and Singh, 2007; Rodrigues and Child, 2008), this research also suggests that organisational learning in the firm-level is at the core of co-evolution of international strategic alliances in response to both internal and external influences of alliances. As international collaborations bring increased managerial complexity (Ul-Haq, 2005), due to heterogeneities of institutional or cultural backgrounds of the alliance partners or differing behaviours towards knowledge transfer and capacities to learn, the exploration and explanation of how the performance of international strategic alliances is affected by these changes, both externally and internally, therefore become the major theoretical contribution of this research.

To screen and formulate the appropriate theoretic lenses for conceptual model development, this research critically reviews the international strategic alliance theories in the arenas of internationalisation and strategy research. Unlike strategy theories focusing on the firm-level analysis, this research suggests that the internationalisation

theories placing more emphasis on the external environments are best suited to explain the contextual characteristics of international strategic alliances. Apart from transaction cost economics (Williamson, 1985), most theories within the internationalisation literature perceive external environments as focal determinants of firms' strategies to go abroad; yet only the institutional theory (North, 1990) and the advanced institution-based view (Peng et al., 2008) provide specifications on the environmental factors, which encompass regulatory, normative, and cognitive institutions in a given country. As the co-evolutionary perspective on international strategic alliances considers firms as living entities adapting to the external environments, the institutional theory possessing a conventional view on the static conditions of the firm contradicts the theoretical assumption and therefore is not employed in this research. Instead, the institution-based view assuming firms as proactive players adapting to the institutional influences derived from external environments is applicable to explain the contextual factors within the co-evolutionary framework.

Given the lack of considerations on the contextual factors, nonetheless, this research considers that the strategy theories on international strategic alliances offer constructive explanations on the internal developments of the partner firms and pay much attention to the mutually-dependent partnerships. Unlike the resource-based view (Wernerfelt, 1984) and the resource dependency theory (Pfeffer and Salancik, 1978), the knowledge-based (Grant, 1996a, b) and relational views (Borgatti and Cross, 2003) specify the features of resources, such as knowledge, complementary and relational assets, to build and retain the interdependencies between alliance partners. As the aim of this research is to unpack the paradoxes in cross-border knowledge transfer and learning processes within international strategic alliances, the knowledge-based and relational theories recognising knowledge sharing routines between firms as the main rationales of alliance formation are thereby most relevant to formulate the co-evolutionary framework. As the core of the co-evolutionary perspective in the prior literature is organisational learning in response to both internal and external influences of alliances (e.g., Barnett et al., 1994; Kale and Singh, 2007; Rodrigues and Child, 2008), this research thereby incorporates the organisational learning with the knowledge-based and relational theories as the theoretical foundations of processual factors within the co-evolutionary framework.

Paralleling Wang et al.'s (2011) empirical study, this research incorporates macro- (i.e., the institution-based view) with micro-level (i.e., the organisational learning,

knowledge-based and relational views) theories to reconceptualise the co-evolutionary view on international strategic alliance performance. By the synthesis of these theories, this research advocates that the formation of international strategic alliances mainly relies on the demand for transferring or acquiring complementary knowledge-based resources between foreign and domestic firms with heterogeneous contexts. If the partner firms can understand the underlying mechanisms of alliance operations – cross-border knowledge transfer and organisational learning processes and inter-partner relationships – and the exogenous variables affecting these operations, both firms' and alliance's capabilities can be enhanced.

Through the large-scale and cross-sectional survey research on a sample of 671 Taiwan-based international strategic alliances, the findings of this research advance both conceptual knowledge and empirical understanding of the co-evolutionary perspective on international strategic alliances by simultaneously investigating the interplay between contextual and processual antecedents of international strategic alliance performance. Particularly, this research finds that institutional distance between partner firms negatively influences knowledge transfer processes in that it is positively associated with transferors' protectiveness behaviour towards knowledge transfer and with recipients' ambiguous perception towards the transferred knowledge, in turn weakening recipients' potential absorptive capacity and reducing the amounts and types of knowledge acquired; whereas relational capital accumulated by partner firms facilitates knowledge transfer processes because it is negatively related to the intrinsic protectiveness behaviour towards knowledge transfer by transferors and to the causal ambiguous perception towards the transferred knowledge by recipients, resulting in greater potential absorptive capacity as well as knowledge acquisition by recipients through international collaborations. However, this research claims that international strategic alliance performance is not purely determined by the extent of knowledge acquired by partner firms but rather relies on the firms' ability to transform and exploit the acquired knowledge into the alliance context. Consequently, the positive moderating role played by realised absorptive capacity in the relationship between knowledge acquisition and international strategic alliance performance is maintained in the empirical findings.

Overall, the findings of this research contributes most to the advancement of the co-evolutionary view on international strategic alliance performance by the integration of

the organisational learning, institution- and knowledge-based, and relational theories. As the core of the co-evolutionary view proposed in this research contains various levels of analysis, including the simultaneous interaction among partner firms, alliances, and their external contexts, the integration of the alliance theories is required to consolidate the theoretical framework. In this sense, the extension of the theories in the existing literature is worth discussing in details in the following.

By the integration of the institution- and knowledge-based views, the findings of this research are able to explain why and how cross-border knowledge transfer would fail. Specifically, this research discovered that the intrinsic competition between alliance partners could be reinforced by the diverse institutional environments between the countries from where the partners originate. Yet such neglect influence of institutional distance could essentially be mitigated by the high quality of partnership within an alliance, based on the additional association with the relational view in the existing literature. Also, this research extends the knowledge-based and organisational learning theories by highlighting the process-dependant nature of knowledge transfer and organisational learning processes through international strategic alliances in the theoretical framework. Despite the various theoretical assumptions of these theories as mentioned in Chapter 2, they are highly relevant and well-suited to be synthesised in terms of explaining the different layer of interactions among partner firms, alliances, and their external contexts in the co-evolutionary framework proposed in this research.

6.3.2. Managerial Implications

The growing research on knowledge transfer and learning is recognition that competitive advantage could no longer be simply ascribed to internal idiosyncrasies but also relies on knowledge resources acquired from external networks (Mathews, 2003; Squire et al., 2009). As the global competition continues to intensify, the acquisition of new organisational knowledge from external sources has become a managerial priority in that in provides the basis for organisational renewal and sustainable competitive advantage (Inkpen, 1998). By establishing international strategic alliances, firms nowadays can possess unique opportunities to leverage their strengths with the help of foreign partners and thus gain competitive advantage in the global markets. Although alliances create potential for learning, unfortunately, they cannot ensure that the learning potential can be realised by the partner firms. This is because only a few firms systematically manage the process of knowledge transfer and learning (Inkpen, 1998).

Most firms consider the key to international business success as inter-organisational knowledge transfer and learning; however, the dilemmas of gaining or giving access to the alliance partner often cause instability and failure of the existing partnership. Understanding cross-border knowledge transfer and learning is thus important because they are often frustrating and complicated processes. Therefore, the findings of this research provide answers and solutions for better management of cross-border knowledge transfer and learning by unpacking the paradoxes of knowledge transfer as intrinsic competition between firms, attributing such paradoxes as the consequences of inherent differences of institutional environments of the partners, and suggesting organisational learning as an important receiving mechanism of the transferred knowledge by the firms to develop and enhance capabilities in achieving the collaborative objectives.

Through the mediation analysis in Chapter 5, moreover, this research confirms that knowledge ambiguity is a full mediator of institutional distance, relational capital, and knowledge protectiveness on knowledge acquisition and on potential absorptive capacity. This advocates the critical role played by recipients' causal ambiguous perception towards the transferred knowledge in determining the consequences of knowledge transfer. Building upon Liu et al.'s (2010) research, this research argues that relational capital, which is characterised as on-going dynamics between firms, determines the amount of the acquired knowledge through reducing the possibility of misinformation and confrontation of difficulties in absorbing the knowledge by the recipient firm. Apart from the fact that relational capital in terms of partner interactions, mutual trust, and reciprocal commitment is important for creating harmonious environments to facilitate knowledge transfer between firms, however, this research suggests that institutional heterogeneities in the aspects of regulatory, normative, and cognitive distances plays the fundamental and noxious role in determining partners' behaviours and perceptions towards knowledge transfer processes within international strategic alliances.

Based on the Taiwanese context, this research further finds that the increase of institutional distance between Taiwanese information and communication technology manufacturers and their foreign partners can provoke transferors' protectiveness behaviour towards knowledge transfer as well as recipients' ambiguous perception

towards the transferred knowledge. With the hindrance of knowledge ambiguity, the recipient firm could not utilise its ability to assimilate and acquire the transferred knowledge, which subsequently leads to the limited amount of knowledge acquisition through international strategic alliances. Whereas if there are frequent partner interactions and high levels of mutual trust and reciprocal commitment between Taiwanese information and communication technology manufacturers and their foreign partners, on the contrary, knowledge transfer processes would be facilitated within international strategic alliances because transferors' protectiveness behaviour towards knowledge transfer could be lessened and recipients' causal ambiguous perception towards the transferred knowledge could also be reduced.

Specifically, it is the causal ambiguous perception but rather the protectiveness behaviour towards knowledge transfer which results in the insecurity of a cooperative relationship because it is negatively associated with the recipient's potential absorptive capacity and knowledge acquisition within the organisational learning process, and such ambiguous perception could be attenuated by the substantial level of relational capital accumulated by the alliance partners. This implies that in an international strategic alliance a certain level of knowledge protection by the transferor could be harmless only if the partners are open to each other by frequent, in person interactions and communications, profound mutual trust and respect, and the willingness to deal with the problems collaboratively.

Furthermore, a series of positive relationships among the variables in the organisational learning mechanism in the research framework suggest that for a firm as the recipient in the knowledge transfer process, despite its passive role, the negative influence of causal ambiguity on knowledge acquisition and alliance performance could essentially be mitigated by its strong potential and realised absorptive capacities in acquiring, assimilating, transforming, and exploiting the transferred knowledge into the alliance context, which then significantly contributes to the cooperative objectives. Most importantly, knowledge transfer is not a one-time event; it is a repeated game-playing between alliance partners. Hence, with more effort made by the recipient to knowledge application and realisation, more reciprocal commitment would be manifested in the alliance context; in the meanwhile, the transferor might unload its scepticism about the potential opportunistic behaviours by the recipient and disregard the needless protection on its knowledge.

To provide a holistic view on research findings for managerial implications, a 2 x 2 contingency table in conjunction with institutional distance and relational capital exogenous variables is compiled in Figure 11. The most promising situation (a) is when the institutional distance is small and the relational capital is high between alliance partners, in that the transferor would remove the needless restrictions to protect its knowledge and the recipient would not experience the difficulties and ambiguous perception towards the transferred knowledge due to intense interactions, trust, and commitment. Accordingly, the organisational learning mechanism would continue smoothly and the alliance performance would be favourable to all partners.

Figure 11: Managerial Implications about Research Findings

Note: KP = knowledge protectiveness; KAM = knowledge ambiguity; OLM = organisational learning mechanism; AP = alliance performance; 5 = higher/ better, 4 = high, 3 = medium, 2 = low, 1 = lower/ worse

The next situation (b) is when the institutional distance between alliance partners is large, the transferor would secure its knowledge by setting strict restrictions on knowledge accessibility; yet the recipient could encounter fewer difficulties and ambiguous perception towards the transferred knowledge owing to the strong relational capital built up by each other. In this regard, the organisational learning mechanism would be moderately affected by the negative impact of knowledge ambiguity and result in the relatively average alliance performance.

Given the institutional distance is small between alliance partners, the comparatively weak relational capital, nevertheless, could lead to an unfavourable situation (c) for the

cooperative relationship. This is because the recipient might increase its chance to experience difficulties and ambiguous perception towards the transferred knowledge as a result of the paucity of partner interactions, trust, and reciprocal commitment during cooperation. Regardless of the low knowledge protection by the transferor, the alliance performance might still suffer from the recipient's limited abilities to acquire, assimilate, transform, and exploit the transferred knowledge into the cooperative context.

The worst situation (d) for the international collaboration is when the institutional distance is large and the relational capital is weak between alliance partners. Apart from the negative impact of excessive knowledge protectiveness by the transferor, the recipient might also experience ambiguous perception and misunderstandings towards the transferred knowledge because of the imperfect partnership. The difficulties in absorbing the knowledge could not only lessen the functionalities of the organisational learning mechanism, reflecting in the insufficient knowledge acquired by the firm, but also damage the sustainability of the cooperative relationship due to unsatisfactory alliance performance.

Having acknowledged the inherent institutional distance between alliance partners, this research suggests that relational capital is indicative of a key drift to improve and sustain the cooperation. Indeed, international collaborations could involve too many unknowns, such as partnering with a new firm, entering an unfamiliar foreign market, or co-developing a new product line. This research provides alliance managers with pivotal insights into institutional distance, one of the major unknowns confronted by the firms, for better analysing and assessing the conceivable differences between alliance partners.

By associating institutional distance with knowledge transfer in the research framework, alliance managers could now recognise different institutional backgrounds between alliance partners as an important driver of knowledge protection by the transferor, which significantly relates to knowledge ambiguity by the recipient during knowledge transfer. However, the research finding of a negative relation between relational capital and knowledge ambiguity could remind alliance managers to mitigate the unwilling effect of knowledge protectiveness on knowledge ambiguity by enhancing the quality of partnerships.

Based on the co-evolutionary framework, this research suggests that both external and internal conditions of the alliance stand of equal importance for strategy formulation and realisation by alliance managers. All in all, the process-orientated model encompassing patterns, determinants, and consequences of knowledge transfer and organisational learning mechanisms within international strategic alliances in this research offers fundamental ideas for alliance managers for better understanding and management of the underlying mechanisms of cross-border knowledge transfer and learning.

6.4. Limitations and Future Research Directions

Some limitations of this research are worth mentioning here. Firstly, the execution of survey research is only dependent on the one-sided perspective, that is, the Taiwanese information and communication technology manufacturers' judgements about the cooperation with foreign partners from 29 countries. Data collected from matched samples of international strategic alliances would be more preferable and balanced; notwithstanding, the option is not feasible in this research because most firms are not willing or are restricted from disclosing their partners' information due to confidentiality.

Next, the unit of analysis is based on international strategic alliances in Taiwanese information and communication industries, which is too broad to consider the heterogeneities of the alliance types and industrial classifications. In particular, different streams of industrial network positions of the firms might involve different cooperative types of alliances, which in turn, could lead to different levels and kinds of knowledge transfer and learning behaviours. Future research might benefit from examining a specific alliance set, such as international buyer-supplier relationships, to suggest detailed implications for the better management of cross-border knowledge transfer and learning in differing cooperative structures. For example, it might be intriguing to do research on examining the impacts of cross-border knowledge transfer and learning on innovative performance of R&D-based or internet-based alliances so as to enrich and advance the current understanding of knowledge transfer, learning and spillover effects in the international contexts.

Finally, due to the time constraint in the 3-year doctoral research programme, this research might suffer from the relative static research framework and cross-sectional

research design to empirically examine the co-evolutionary view on international strategic alliance performance. Yet this research opens up a promising research domain in alliance literature by advancing a co-evolutionary view on international strategic alliances and by advocating the contextual and processual concern while investigating the diffusion of an alliance over time. Future research thus can benefit from the findings of this research and is believed to resolve the limitation of this research by longitudinal research design.

Appendix 1: Survey Questions with Item Codes

Basic information about the international strategic alliance

1. Your firm's name? _____

2. The foreign partner's country of origin is _____

3. How long has your firm cooperated with the foreign partner? ___year(s)___month(s)

4. The collaboration is □ equity-based or □ non-equity alliance

5. Which role has your firm played in the knowledge transfer process?

   □ Transferor – please answer questions in **Section A and C**

   □ Recipient – please answer questions in **Section B and C**

   □ Both – please answer questions in **Section A, B and C**

SECTION A

Knowledge Protectiveness (KP) – adapted from Nielsen and Nielsen (2009); Simonin (1999a, b, 2004)

Please answer the following questions by circling the chosen number.	Very low				Very high
6. To what extent has your firm restricted the foreign partner's access to your knowledge base? (KP1)	1	2	3	4	5

Knowledge Ambiguity (KAM) – adapted from Nielsen and Nielsen (2009); Szulanski (2000)

Please answer the following questions by circling the chosen number.	Very low				Very high
7. To what extent has your firm experienced difficulty in transferring knowledge to the foreign partner? (KAM1)	1	2	3	4	5
8. To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from your firm? (KAM2)	1	2	3	4	5

Knowledge Acquisition (KAC) – adapted from Liu et al. (2010); Tsang (2002); Tsang et al. (2004)

Please answer the following questions by circling the chosen number.	Very low				Very high
To what extent has the foreign partner acquired the following knowledge from your firm?					
9. New technological technique/ expertise (KAC1)	1	2	3	4	5
10. New marketing technique/ expertise (KAC2)	1	2	3	4	5
11. New product development technique/ expertise (KAC3)	1	2	3	4	5
12. New managerial technique/ expertise (KAC4)	1	2	3	4	5
13. New manufacturing technique/ expertise (KAC5)	1	2	3	4	5

Potential Absorptive Capacity (PAC) – adapted from Jensen et al. (2005); Zahra and George (2002)

Please answer the following questions by circling the chosen number.	Very low				Very high
14. To what extent has the foreign partner been able to assimilate and acquire the transferred knowledge from your firm? (PAC1)	1	2	3	4	5
15. To what extent has the foreign partner's cooperative structure in learning been open and flexible? (PAC2)	1	2	3	4	5
16. To what extent has the foreign partner's knowledge infrastructure been effective? (PAC3)	1	2	3	4	5

Realised Absorptive Capacity (RAC) – adapted from Jensen et al. (2005); Zahra and George (2002)

Please answer the following questions by circling the chosen number.	Very low				Very high
17. To what extent has the foreign partner been able to transform and exploit the acquired knowledge into the alliance context? (RAC1)	1	2	3	4	5
18. To what extent has the foreign partner clearly known the cooperative objective(s)? (RAC2)	1	2	3	4	5
19. To what extent has the foreign partner clearly known its responsibility in the cooperation? (RAC3)	1	2	3	4	5

Knowledge Protectiveness (KP) – adapted from Nielsen and Nielsen (2009); Simonin (1999a, b, 2004)

Please answer the following questions by circling the chosen number.	Very low				Very high
20. To what extent has the foreign partner restricted your firm's access to its knowledge base? (KP2)	1	2	3	4	5

Knowledge Ambiguity (KAM) – adapted from Nielsen and Nielsen (2009); Szulanski (2000)

Please answer the following questions by circling the chosen number.	Very low				Very high
21. To what extent has your firm experienced difficulty in absorbing the transferred knowledge from the foreign partner? (KAM3)	1	2	3	4	5
22. To what extent has your firm found unclear linkages between causes and effects, inputs and outputs, and actions and outcomes related to the transferred knowledge from the foreign partner? (KAM4)	1	2	3	4	5

Knowledge Acquisition (KAC) – adapted from Liu et al. (2010); Tsang (2002); Tsang et al. (2004)

Please answer the following questions by circling the chosen number.	Very low				Very high
To what extent has your firm acquired the following knowledge from the foreign partner?					
23. New technological technique/ expertise (KAC6)	1	2	3	4	5
24. New marketing technique/ expertise (KAC7)	1	2	3	4	5
25. New product development technique/ expertise (KAC8)	1	2	3	4	5
26. New managerial technique/ expertise (KAC9)	1	2	3	4	5
27. New manufacturing technique/ expertise (KAC10)	1	2	3	4	5

Potential Absorptive Capacity (PAC) – adapted from Jensen et al. (2005); Zahra and George (2002)

Please answer the following questions by circling the chosen number.	Very low				Very high
28. To what extent has your firm been able to assimilate and acquire the transferred knowledge from the foreign partner? (PAC4)	1	2	3	4	5
29. To what extent has your firm's cooperative structure in learning been open and flexible? (PAC5)	1	2	3	4	5
30. To what extent has your firm's knowledge infrastructure been effective? (PAC6)	1	2	3	4	5

Realised Absorptive Capacity (RAC) – adapted from Jensen et al. (2005); Zahra and George (2002)

Please answer the following questions by circling the chosen number.	Very low				Very high
31. To what extent has your firm been able to transform and exploit the acquired knowledge into the alliance context? (RAC4)	1	2	3	4	5
32. To what extent has your firm clearly known the cooperative objective(s)? (RAC5)	1	2	3	4	5
33. To what extent has your firm clearly known your responsibility in the cooperation? (RAC6)	1	2	3	4	5

SECTION C

Relational Capital (RC) – adapted from Cousins et al. (2006); Liu et al. (2010); Kale et al. (2000)

Please answer the following questions by circling the chosen number.	Strongly disagree				Strongly agree
34. Your firm has been very friendly and respectful to the foreign partner. (PI)	1	2	3	4	5
35. Your firm has made frequent communications and interactions with the foreign partner. (PI2)	1	2	3	4	5
36. Your firm has never cheated or misled the foreign partner. (MT1)	1	2	3	4	5
37. Your firm has offered a fair deal to the foreign partner.	1	2	3	4	5

(MT2)					
38. Your firm has made all decision based on the mutual benefits. (REC1)	1	2	3	4	5
39. Your firm has been highly committed to work with the foreign partner to solve problem(s). (REC2)	1	2	3	4	5
40. The foreign partner has been very friendly and respectful to your firm. (PI3)	1	2	3	4	5
41. The foreign partner has made frequent communications and interactions with your firm. (PI4)	1	2	3	4	5
42. The foreign partner has never cheated or misled your firm. (MT3)	1	2	3	4	5
43. The foreign partner has offered a fair deal to your firm. (MT4)	1	2	3	4	5
44. The foreign partner has made all decision based on the mutual benefits. (REC3)	1	2	3	4	5
45. The foreign partner has been highly committed to work with your firm to solve problem(s). (REC4)	1	2	3	4	5

International Strategic Alliance Performance (ISAP) – adapted from Griffith et al. (2001); Lunnan and Haugland (2008); Tsang et al. (2004)

Please answer the following questions by circling the chosen number.	Strongly disagree				Strongly agree
Overall, the collaborative results of the international strategic alliance have…					
46. increased profitability (ISAP1)	1	2	3	4	5
47. resulted in sales growth (ISAP2)	1	2	3	4	5
48. accelerated the speed of new product development (ISAP3)	1	2	3	4	5
49. increased the number of patents (ISAP4)	1	2	3	4	5
50. increased manufacturing efficiency (ISAP5)	1	2	3	4	5
51. increased the production quality (ISAP6)	1	2	3	4	5
52. increased market penetration of new products (ISAP7)	1	2	3	4	5
53. increased customer satisfaction (ISAP8)	1	2	3	4	5

54. Overall, your firm has been satisfied with the cooperative outcomes. (ISAP9)	1	2	3	4	5
55. Overall, your firm is willing to keep the cooperation with the foreign partner(s) / cooperate with the foreign partner(s) again. (ISAP10)	1	2	3	4	5

Appendix 2: Formative Construct Validation Roadmap
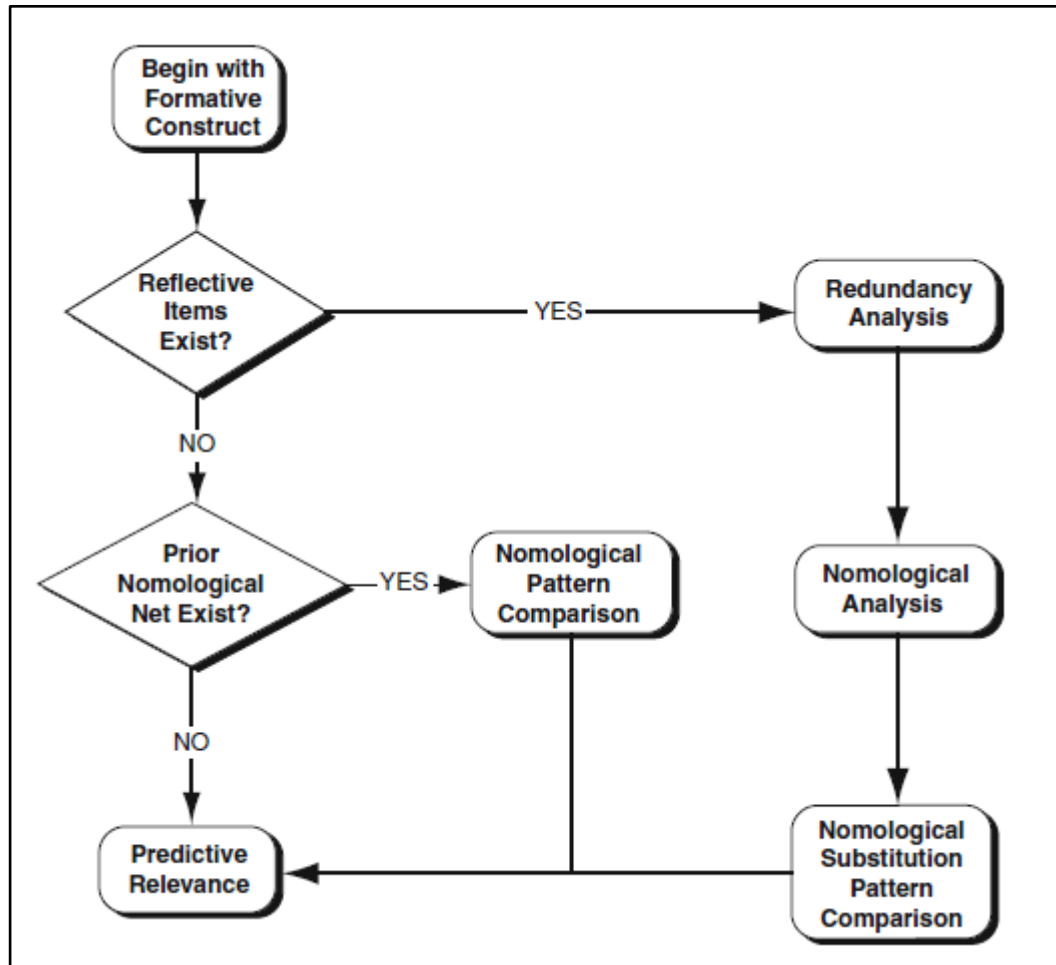
Source: Chin (2010: 687)

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