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EFFECTS OF FOCUS ON RESOURCE TYPES AND INDUSTRY GROWTH ON ALLIANCE AND ACQUISITION BEHAVIOURS AND FIRM PERFORMANCE

You (Betty) Shao

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Abstract

This study investigates how firms with different resource focus differ in their alliance and acquisition behaviours. It also considers how the relationships between resource focus and alliance and acquisition behaviours are moderated by industry growth. In addition, performance outcomes derived from alliance and acquisition activities among firms with different resource focus are examined. Using data of 1003 firm-year observations in the United Kingdom manufacturing sector, this study finds that different resource focuses lead to different alliance and acquisition behaviours. Further, Industry growth interacts with firms’ resource focus and impacts on their alliances and acquisitions differently, such that the relationships between resource focus and acquisitions are strengthened in low growth industries, whereas the effect industry growth has on the relationships between resource focus and alliances is unclear. With respect to performance outcomes, it is found that firms with greater technological knowledge-based resource focus perform better from acquisitions than from alliances, and firms with greater physical property-based resource focus experience similar performance outcomes. These findings have important implications for alliance and acquisition research. The distinction between knowledge-based resources and property-based resources also adds to a more fine-grained understanding of the resource-based view. In particular, this study highlights that alliance and acquisition decisions should be made upon assessing key underlying characteristics of a firm’s resource base against advantages and disadvantages of these strategies. By explaining how industry growth interacts with firms’ resource focus and alters their propensities to ally and acquire, this study confirms that the adoptions of alliances and acquisitions should not be purely internally driven decisions.
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List of Abbreviations

ABI – Annual Business Inquiry
IJVs – International Joint Ventures
MNCs – Multinational Corporations
NACE – Statistical Classification of Economic Activities in the European Communities
NAICS – North American Industry Classification System
OECD – Organisation for Economic Co-operation and Development
ONS – United Kingdom Office for National Statistics
R&D – Research and Development
ROA – Returns on Assets
UKSIC – United Kingdom Standard Industrial Classification
USSIC – United States of America Standard Industrial Classification
CHAPTER 1
INTRODUCTION
1 INTRODUCTION

1.1 Background

Alliances and acquisitions are often seen as alternative and complementary strategies for firms. While an alliance is a partnership formed among firms to achieve a mutual goal during which partner firms remain independent (Luo, 2007), acquisition constitutes a form of ownership change that creates more organisational hierarchies (Hagedoorn & Sadowski, 1999). Nonetheless, both strategies have become frequently adopted strategies by firms to offer them various advantages, such as market power improvement, achievement of economies of scale and scope, synergies from resource recombination, mitigation of competitive pressure, and acceleration of firm growth (Das & Teng, 2000; Gulati, 1998; Haleblian, Devers, McNamara, Carpenter, & Davison, 2009; Harrison, Hitt, Hoskisson, & Ireland, 2001; Hennart & Reddy, 1997; Powell, Koput, & Smith-Doerr, 1996). However, despite the perceived benefits that alliances and acquisitions may bring to firms, it has been observed that both strategies are subject to high failure rates in practice. A prior study reports that the failure rate of alliances is projected to lie between 40 to 70 percent (Taylor, 2005), and many studies put the failure rate of acquisitions somewhere between 70 and 90 percent (Christensen, Alton, Rising, & Waldeck, 2011).

In an attempt to establish a good understanding of alliances and acquisitions, academics and practitioners have conducted intensive research on these strategies. In the past three decades, there were more tomes being written on alliances and acquisitions than on any other topic (Dyer, Kale, & Singh, 2004). Earlier studies in these areas mainly focused their investigation on either one of these strategies but not both (e.g. Gulati, 1995a, 1995b, 1998; Seth, 1990a, 1990b). Few studies compare the two strategies as substitutes (e.g. Harrison, Hitt, Hoskisson,
& Ireland, 1991, 2001; Sawler, 2005). The literature on international market entry modes is amongst the earliest to compare these strategies (e.g. Hennart & Reddy, 1997; Kogut & Singh, 1988), which emphasises the relative advantages and disadvantages of acquisitions and alliances (most often joint ventures) vis-à-vis other options such as green fields, licensing and exporting. Financial rational such as real option and transaction costs are often applied to support arguments and predictions.

More recently, comparative studies into differences between alliances and acquisitions have received greater attention in the strategic management field (e.g. Dyer et al., 2004; Hagedoorn & Duysters, 2002; Roberts & Liu, 2001; Vanhaverbeke, Duysters, & Noorderhaven, 2002; Villalonga & McGahan, 2005; Wang & Zajac, 2007; Yang, Lin, & Lin, 2010; Yin & Shanley, 2008). These studies focus on firm-level (Hagedoorn & Duysters, 2002; Roberts & Liu, 2001; Vanhaverbeke et al., 2002; Villalonga & McGahan, 2005), dyadic-level (Wang & Zajac, 2007), network-level (Yang et al., 2010) and industry-level factors (Yin & Shanley, 2008) and investigate how these factors impact on firms’ choices of alliances vis-à-vis acquisitions. Specifically, factors that have been discussed and tested include: (1) knowledge about a potential partner/target firm; (2) focal firms’ resources and capabilities, (3) focal firm’s technology life cycle, (4) focal firm’s prior experiences; (5) resource complementarity and similarity between the focal firm and the partner/target firm, (6) business similarities and complementarity between these firms, (7) industry demands on significant commitment, (8) environmental pressure for flexibility, as well as (9) industry concentration and other institutional conditions have been included in the discussion.

Despite these efforts, few companies in reality treat acquisitions and alliances as substitutes (e.g. Dyer et al., 2004). In a survey of 200 U.S. firms, 82 percent of decision-makers indicated that they perceived acquisitions and alliances as two strategic alternatives that could
be used to achieve the same goals of firm growth, but only 24 percent of those that conducted acquisitions actually weighed the two options before making the decision. Moreover, only 14 percent of managers drafted specific guidelines or criteria when it comes to the decision for choice between the two mechanisms (Dyer et al., 2004). Although it is enticing to propose that knowing when to use which of the two strategies is of significant importance as it may be a greater source of competitive advantage (Dyer et al., 2004), this study argues that by attempting to compare alliances and acquisitions as alternatives in each decision-making, an assumption of rational choice between these options is made. As indicated by the survey result, alliances and acquisitions could be made in isolation or in tandem. Investigations into firms’ tendencies to ally and acquire without imposing the rational choice assumption may be an approach that better reflects the reality.

Although some commonalities are shared by alliances and acquisitions, many differences in practice do exist between these strategies. These differences are taken into consideration when firms conduct alliances and acquisitions. The degree of ownership, which determines the level of control and flexibility, has been highlighted as a major difference between alliances and acquisitions (Yin & Shanley, 2008). While alliances allow firms greater degrees of flexibility by retaining the capacity to alter the terms of agreement or to terminate as partners see fit (Hagedoorn & Duysters, 2002; Kogut, 1991), acquisitions provide firms with much more control and discretion of use over the acquired firm’s resources despite being less flexible (Hitt, Hoskisson, & Ireland, 1990; Yin & Shanley, 2008). On the other hand, alliances come with a major drawback resulting from less control. As firms must constantly interact with their partner firm(s), there are potential governance issues and conflicts of interest deriving from possible partner opportunistic behaviours (Park & Ungson, 2001). In comparison, acquisitions allow firms to avoid opportunistic behaviours associated with
alliance relationships (Khanna, Gulati, & Nohria, 1998). However, as the acquiring firm may sometimes acquire assets that are not desirable yet are inseparable from the valuable assets of the target firm, lack of flexibility may make disposal of these assets difficult or very costly for the acquiring firm. Such compromise can be nullified by alliances as firms engaging in a collaborative relationship can get access to desirable assets while enjoying a greater degree of freedom to maneuver and are not locked into major asset investment (Hagedoorn & Duysters, 2002; Yin & Shanley, 2008).

The research into how alliances and acquisitions facilitate resource access, deployment, and recombination has been intensive. However, an area that remains under-explored is the application of the resource-based view to investigate firms’ motivations and needs of conducting alliances and acquisitions. Given that firms predominantly utilise alliances and acquisitions to achieve resource access purposes, the resource-based view is of particular relevance to study firms’ alliance and acquisition behaviours. Specifically, the resource-based literature emphasises the critical role a firm’s resources play in determining its strategic positioning and competitive advantage (Barney, 1991; Peteraf, 1993). The resource-based view proposes that firm resource heterogeneity tends to sustain over time (Peteraf, 1993). Idiosyncratic resource characteristics underpinning resource heterogeneity amongst firms allow some firms to enjoy sustainable competitive advantage (Barney, 1991; Chi, 1994; Dierickx & Cool, 1989; Peteraf, 1993). In contrast to other rationale, such as the transaction cost logic in which the focus is on cost minimisation, the resource-based view places greater emphasis on value maximisation through pooling and utilising valuable resources. Firms make attempts to find the optimal way of resource combinations through which the value of their resources is better realised (Das & Teng, 2000). Based on this understanding, it is expected that differences in firms’ resource types and associated characteristics may lead to
variations in their needs and incentives to conduct alliances and acquisitions. A firm’s resource types and associated characteristics may also affect its perceived attractiveness to other firms, and subsequently impact on its ability and opportunities to conduct alliances and acquisitions.

Extant literature has identified various resource types and proposed a number of resource typologies accordingly. One of the simplest approaches is to distinguish resources based on tangibility (Grant, 1991). Barney (1991) classified resources into physical capital resources, human capital resources, and organisational capital resources. Other researchers break down resource types into financial, physical, managerial, human, organisational, and technological resources (Hofer & Schendel, 1978). Recognising the lack of adequate theoretical underpinnings for these typologies, Miller and Shamise (1996) proposed that resource types could be simplified into two broad categories, namely knowledge-based resources and property-based resources. Such a classification theme is based upon the notion of barriers to imitability. Knowledge-based resources refer to a firm’s intangible know-how and skills (Das & Teng, 2000), which can take the forms of particular skills, such as technical skills, creative skills, and collaborative skills (Miller & Shamise, 1996). Property-based resources, on the other hand, are defined as legal properties owned by firms, which encompass intellectual properties, financial capital, physical resources, and human resources (Das & Teng, 2000).

Both knowledge-based resources and property-based resources demonstrate certain degrees of imperfect mobility, imperfect imitability, and imperfect substitutability (Das & Teng, 2000). However, these resources differ in their effectiveness of protection and appropriability, and they reveal different key characteristics respectively. For knowledge-based resources, the protection of knowledge barriers is not perfect and they are more vulnerable to unintended transfers. Property-based resources, on the other hand, enjoy near-
perfect legal protection (Das & Teng, 2000; Miller & Shamsie, 1996). In terms of appropriability, since knowledge-based resources are less specific and more flexible in nature, and they are fungible, there is greater potential for other firms to appropriate such resources. In comparison, property-based resources are much more specific and fixed in nature, and they generate the most value when maintained in the location where they are developed (Miller & Shamsie, 1996; Chen & Chen, 2003). These characteristics make such resources more difficult for other firms to appropriate. Specifically, technological knowledge-based resources are characterised by greater tacitness and uncertainty in performance outcome. These resources are also more expensive to develop, revealing a higher level of path dependency. In comparison, physical property-based resources are characterised by scale and scope economies, which are often more valuable and deployable in the same or related sectors (Chatterjee & Wernerfelt, 1991).

It can be expected that because of the aforementioned differences, respective resources will match with advantages and disadvantages of alliances and acquisitions differently, which ultimately impact on firms’ use of these strategies and performance outcomes. For example, on the one hand, the characteristic of technological knowledge-based resources may lead to firms’ preference of alliances as mechanisms for resource access, exploration and exploitation. This is because alliances provide firms with rapid access to resources without the demands for huge resource commitment. The higher flexibility provided by alliances also reduces the risks and costs firms have to bear when they test out the deployment potential of such resources. Conversely, the imperfect protection of such resources gives rise to partner appropriation and opportunistic behaviours, which hamper the benefits that alliances create. Similarly, although perfect legal protection and difficult appropriability of physical property-based resources make firms contributing these resources into alliances safe in terms of
resource appropriation, these characteristics at the same time limit these firms’ opportunities to gain from collaborative relationships. This is because firms providing physical property-based resources often end up forming “shallow” alliances with others, which provide them limited access to valuable resources contributed by partner firm(s). On the other hand, acquisitions may be the preferred mechanisms for access to complementary resources and achievement of scale and scope economies. The majority or full ownership provided by acquisitions allows firms to initiate more in-depth resource recombination and calibration. Firms will also reap the entire benefit of the initiative without sharing this with others through conducting acquisitions.

Research has also recognised that industry environment plays a major part in alliance and acquisition decisions (Yin & Shanley, 2008). Most of these studies focus on explaining the direct impact various industry level factors have on alliances and/or acquisitions. For example, in highly concentrated industries, acquisitions can be difficult as they are expensive and likely to stimulate fierce competitor retaliations. Firms in such industries are also under strict surveillance of authorities that regulate antitrust activities (Hennart & Park, 1993). Industry dynamism is another frequently discussed industry-level factor that impacts on firms’ alliances and acquisitions. As industry dynamics refers to the unpredictability and the rate of external environment change that determines how rapidly a firm’s internal operation should change in order to align with its industry environment (Dess & Beard, 1984; Nadkarni & Narayanan, 2007), firms operating in highly dynamic industries are found to favour alliances as alliances allow them to remain structurally flexible (e.g. Hoffmann & Schaper-Rinkel, 2001; Kang, 2006; Meijboom, Voordijk, & Akkermans, 2007).

Besides the aforementioned factors, industry growth is another major industry-level factor that is proposed to influence firms’ strategic decisions (Park, Chen, & Gallagher, 2002;
Porter, 1980). Earlier research investigating acquisition activities in industries with slow growth proposed that managerial motivations to acquire were higher in these industries, because direct entry into a low growth industry was less likely to allow for an acceptable expansion rate, and there were more acquisition candidates available in such environments (Yip, 1982). Subsequent studies, however, presented opposing evidence and confirmed that companies have historically been more active in acquisition activities within high growth industries (Audretsch, 1989; Christensen & Montgomery, 1981; Schoenberg & Reeves, 1999). Studies into alliance activities have also shown mixed results. According to the resource-dependence theory, the extreme benevolence of a growing market reduces organisational dependence on key resources (Pfeffer & Salancik, 1978), which then reduces firms’ needs to use alliances to address resource discrepancies. Therefore, a negative relationship between alliance activities and industry growth is predicted. In contrast, some researchers from the strategy field placed greater emphasis on resource munificence. They perceived alliances as mechanisms to exploit market opportunities, and hence being adopted more frequently in growing markets (Harrigan, 1988b). Firms should be expected to become more active in alliance activities in order to invest in specific assets to enhance production, meet increasing demand, and exploit existing resources and opportunities (Kogut, 1988a). Furthermore, given the rising volatility during growth, competitors might endeavour to minimise market unpredictability and achieve dependability through strategic alliances (Oliver, 1990).

What appears to be under-explored in extant research is how industry growth interacts with firm-level factors in the decision to ally and acquire. As discussed previously, industry growth represent varying market opportunities and environmental change. Firms with different resource focus will possess varying resource characteristics. Such differences in turn
lead to divergence in their abilities to capture window opportunities emerging in the external environment and/or respond to environmental change and uncertainty. For example, although firms with a great focus on highly rigid resources that provide mainly efficiency based advantages may prefer acquisitions in general, such preference may become stronger in a low growth industry. This is because the inflexibility of acquisitions is of less a concern when the external environment is generally stable. Furthermore, when most firms are under greater growth pressure in a low growth industry, acquisitions allow for instant market share increase. They also ensure full integration that contributes to economies of scale and control. In comparison, firms with resources that are rigid and firm specific may not choose to engage in intensive acquisition activities in a high growth industry, as firms in a more dynamic environment prefer to remain as flexible as possible. Similarly, firms with resources that are costly to develop and uncertain in performance outcome may generally prefer alliances. Such preference is enhanced in a high growth industry where greater flexibility and sharing of risks and costs among partner firms are desirable. But in a low growth industry, firms place more emphasis on reserving their existing advantages. They are therefore more likely to prefer strategic mechanisms that better protect their valuable resources than those that allow for greater flexibility. Based on this understanding, it is of great importance to study how firms with different resource focus assess respective advantages and disadvantages of alliances and acquisitions and utilise them differently to satisfy their resource needs in industries with different growth rates.

1.2 Research Aim and Objectives

Despite extensive research into alliances or acquisitions using the resource-based view, there is limited parallel examination of these two strategies through this lens. Few researchers have addressed differences in firms’ adoption of alliances and acquisitions through analysing the
effect of resource types and their associated characteristics. As such, the idea proposed by Barney (1991) and Peteraf (1993) pertaining to the linkage between resources and sustainable competitive advantage, as well as how to utilise alliance and acquisition strategies to achieve value maximisation have not been explored adequately. Alliances and acquisitions are largely conducted for the purposes of resource access/acquisition, resource re-combining, resource re-deploying, and/or resource replacement. Firms differ in their focuses on resource types will vary in their needs to ally or acquire. Specifically, this study looks into how key resource characteristics are taken into consideration against advantages and disadvantages of alliances and acquisitions to influence firms’ decision making. Therefore, the first research question is:

*How does a firm’s focus on a certain resource type determine its alliance and acquisition behaviours?*

A few studies have provided some discussion about the impact industry growth has on alliance or acquisition activities. Limited understanding, though, is established towards how this factor interacts with firms’ resource focus to influence their use of alliances and acquisitions. Since high industry growth largely represents rapidly increasing market opportunities, firms with greater focuses on different resource types are endowed with different abilities to capture window opportunities emerging in the market place. Low industry growth, on the other hand, imposes stronger environmental stress on incumbents. In such environments, firms generally face both greater growth pressure and stronger resource constraints. It can be expected that firms with different resource focuses will differ in their strategic needs and abilities to maneuver in this environment.

Moreover, as discussed previously, industry growth is often associated with greater environmental change that derives from: (1) new entrants attracted into the industry that are
likely to compete differently and introduce more innovations in order to establish a strong competitive position for themselves; (2) potential emergence of new market niche; and (3) more frequent new product introductions to better satisfy customer demands. These environmental changes play an important role in determining how rapidly a firm’s internal operation should change in order to adapt to its industry environment (Dess & Beard, 1984; Nadkarni & Narayanan, 2007). With respect to high growth industries, while the environmental instability imposes stronger requirements on flexibility, rapid growth of market demands boosts managers’ confidence in future growth and profit potential. When managers become more confident about future growth and profit prospects, they will re-assess the advantages and disadvantages associated with alliances and acquisitions. For example, some of the perceived drawbacks of acquisitions may become more tolerable as acquisitions allow for immediate possession of valuable resources or establishment of market presence. These advantages are often valued highly in a high growth industry where everyone is motivated to capture emerging opportunities in a timely manner. In contrast, although alliances allow for much needed flexibility in a less stable environment, given that competitors’ behaviours become less predictable, partner opportunistic behaviours may become much greater problems for firms engaging in collaborative relationships. The opposite effect generally holds for low growth industries.

Because of differences in resource characteristics, firms with different resource focuses will demonstrate divergent needs towards flexibility and concerns over resource appropriation in different industry contexts with respect to the extent of environmental change. Industry growth also affects the value of these firms’ existing resources, and their resource access, acquisition, exploration and exploitation needs. For example, since significant resource development efforts are unlikely to be made in low growth industries, firms with greater
focus on technological knowledge-based resources may have higher concerns over resource appropriation as their existing resources are of greater value in such environments. In comparison, given the highly uncertain nature of technological knowledge-based resources and the instability associated with high growth industries, flexibility provided by alliances are highly preferred by these firms. With respect to physical property-based resources, since these resources are fixed and firm specific in nature, firms with greater focus on these resources may experience higher organisational inertia. It can be expected that they will restrain themselves from being overly aggressive in acquisition activities in high growth industries so that no additional organisational inertia develops in an environment where flexibility is of critical importance. However, firms with a similar level of physical property-based resource focus may be motivated to conduct more acquisitions in low growth industries as efficiency gains achieved through acquisitions are of critical importance. Therefore, industry growth will alter the relationships between firms’ resource focus and alliance and acquisition behaviours.

Beyond investigations into firms’ alliance and acquisitions behaviours affected by both internal and external factors, it is also of critical importance to establish an understanding on performance outcomes derived from these activities. This is because performance is the ultimate test for all strategies. Inappropriate implementations of alliances and acquisitions with respect to resource focus can be detrimental and lead to unsatisfactory performance outcomes. For example, when a firm with lower focus on physical property-based resources development attempts to acquire these resources through acquisitions, their lack of capabilities to effectively manage and calibrate acquired external resources with their existing systems can result in integration failure. Given the higher costs of conducting acquisitions, unsuccessful transactions incur great opportunity costs to the acquirer. Therefore,
investigation into performance outcomes from alliances and acquisitions with respect to firms’ resource focus will provide important research and managerial implications. Therefore, the second and third research questions are:

How does industry growth moderate the relationship between resource type focus and alliance and acquisition behaviour? What are the performance implications?

The research objectives therefore are to empirically test:

1. Whether differences in firms’ resource type focus lead to different alliance and acquisition behaviours? More specifically, it is proposed that:

- A firm’s technological knowledge-based resource focus has a positive relationship with the number of alliances it conducts.

- A firm’s technological knowledge-based resource focus has a negative relationship with the number of acquisitions it conducts.

- A firm’s physical property-based resource focus has a positive relationship with the number of alliances it conducts.

- A firm’s physical property-based resource focus also has a positive relationship with the number of acquisitions it conducts.

2. How does industry growth interact with firms’ resource type focus and alter their alliance and acquisition behaviours? More specifically, it is proposed that:

- Industry growth moderates the relationship between a firm’s technological knowledge-based resource focus and the number of alliances it conducts, such
that the positive relationship is stronger in high growth industries in comparison to low growth industries.

- **Industry growth moderates the relationship between a firm’s technological knowledge-based resource focus and the number of acquisitions it conducts,** such that the negative relationship is stronger in low growth industries in comparison to high growth industries.

- **Industry growth moderates the relationship between a firm’s physical property-based resource focus and the number of alliances it conducts,** such that the positive relationship is stronger in low growth industries in comparison to high growth industries.

- **Industry growth moderates the relationship between a firm’s physical property-based resource focus and the number of acquisitions it conducts,** such that the positive relationship is stronger in low growth industries in comparison to high growth industries.

3. **What are the performance outcomes from alliance and acquisition activities for firms with a different resource focus?** It is proposed that:

- **Firms with greater focus on technological knowledge-based resources perform better from acquisitions than from alliances**

- **Firms with greater focus on physical property-based resources perform better from acquisitions than from alliances.**
1.3 Contributions of the Study

This study taps into a rather under-explored area of literature by conducting a parallel analysis of alliances and acquisitions from the resource-based view. It illuminates how differences in firms’ focus on resource types affect their alliance and acquisition behaviours. The arguments are put forward largely by examining key characteristics associated with respective resource types. This study provides empirical evidence to support the proposition that alliance and acquisition decisions should be made upon assessing critical resource-related issues (Dyer et al., 2004). While the flexibility and low demand on financial commitment that alliances offer fit well with utilisation and development of knowledge-based resources, the full integration opportunities and greater control obtained from acquisitions allow firms to enjoy greater economies of scale and scope. Through linking resource characteristics with advantages and disadvantages of alliances and acquisitions, this study contributes to a better appreciation of the differences between alliances and acquisitions and how they can be utilised. The specific distinction between knowledge-based resources and property-based resources also responds to one of the major criticisms that the resource-based view is overly inclusive and treats all types of resources in the same way (Kraaijenbrink, Spender, & Groen, 2010). The discussion on differences between firms’ focus on knowledge-based resources vis-à-vis property-based resources and how they affect firms’ value creation opportunities and their influence on the use of alliances vis-à-vis acquisitions contributes to a more fine-grained understanding of the resource-based view.

Prior research has largely focused on the direct impact that firm-level, dyadic-level and industry-level factors have on alliance and acquisition strategies (e.g. Hagedoorn & Duysters, 2002; Villalonga & McGahan, 2005; Wang & Zajac, 2007; Yin & Shanley, 2008). However, less is known in regard to how firm-level factors interact with industry-level factors to affect
firms’ use of alliances and acquisitions. This study adds to the literature by looking into the impact industry growth has on firms’ strategic behaviours. Specifically, it explains how firms’ adoptions of alliances and acquisitions are contingent on the interaction between their internal resource focus and industry growth. When industries demonstrate different levels of opportunities and experience varying rates of change, firms with different resource focus are endowed with different abilities to react to market conditions. Their needs and motivations to use alliances and acquisitions to access and exploit existing resources are also altered, which in turn affects their use of alliances vis-à-vis acquisitions. Through explaining how firms with different resource focus adjust their alliance and acquisition adoptions according to different industry contexts, this study lends support to the notion that firms must take internal and external factors into consideration when strategising, and the use of alliances and acquisitions should not be perceived as purely internally driven decisions (Dyer et al., 2004).

1.4 Structure of the Study

The next chapter presents the background literature and hypotheses development. It gives an overview of the relevant literature and contains the arguments leading to the hypotheses. Chapter Three describes the data and methodology used in the study. It details the sample selection and data collection procedure. It also elaborates on the operationalisation of variables and the analytical methods used in this study. Chapter Four reports the descriptive statistics and explains the results of the hypotheses testing. Chapter Five discusses the findings and concludes the study by highlighting limitations of the research and some suggestions for future research.
CHAPTER 2
LITERATURE AND HYPOTHESES
DEVELOPMENT
2 LITERATURE AND HYPOTHESES

DEVELOPMENT

This chapter provides a very detailed review of the alliance and acquisition literatures. A comprehensive account of the resource-based view and the industry growth literature is also given. More importantly, it includes critique of the current state of knowledge on all the relevant topics, which provides some major insights into these areas of research. In the first main section of the chapter, a definition of alliance is determined, followed by a review of research on major aspects of alliances, including alliance motivation, alliance formation, partner selection, alliance structure, management of alliances, alliance performance, as well as performance consequences on firms, and dissolution of alliances.

The second main section of the literature review is organized in a similar way. Adopting Hoffmann and Schaper-Rinkel’s (2001) definition, this study defines acquisition as the purchase of one business or company by another company or business entity. Therefore a distinctive characteristic of acquisitions is that they involve changes in ownership structure, where the acquired company is no longer an independent entity. The existing acquisition literature has looked at three main areas, including acquisition incentives ad partner selection, acquisition performance and post acquisition activities and challenges. Such review structure provides a clear and logical flow to the readers, which contributes to the development of a systematic understanding of the literature. Although alliances and acquisitions are often seen as alternative and complementary strategies for firms, they do differ in many major aspects. Therefore, a thorough review of comparative studies on these two strategies is given.
The resource-based view is one of the most influential theories within the strategic management field, which provides a profound theoretical underpinning of this study. A very comprehensive account of the resource-based view is provided in this chapter. The review starts from discussing the background and historical development of the theory, which is followed by a conclusion on what the resource-based view is about. It then reviews the application and empirical testing aspect of the resource based view. This study also acknowledges that along with its development and wide acceptance, the resource-based view has been extensively challenged and criticized. Therefore, in addition to an in-depth discussion of these critiques and challenges, this study also puts forward some suggestions on future direction of the resource-based view. In response to the call for a more “fine-grained” development of the resource-based view, this study specifically distinguishes technological knowledge-based resources from physical property-based resources and analyses key differences between these two types of resources.

The discussion on the linkage between firms’ alliance and acquisition behaviours and differences in firms’ resource needs resulted from varying resource focus leads to the development of first and second sets of hypotheses. Since the industry growth has been recognized as an influential factor impacting on firms’ alliance and acquisition activities, a thorough review of the literature on industry growth is provided. Instead of focusing on its direct impact, this study looks into how industry growth moderates the relationships between firms’ resource focus and their alliance and acquisition behaviours. The discussion comprises the third and fourth sets of hypotheses development. As performance outcome is the ultimate test for all strategies, the last part of this chapter consists of hypotheses examining firms’ performance outcome from alliance and acquisition activities.
2.1 Alliances

Numerous definitions of alliances have been developed in the literature. Alliances can be defined as collaborative relationships established by partner firms working together to achieve the same strategic objective (Luo, 2007). Glaister and Buckley (1996) define alliances according to the characteristics of the agreements. They argue that while alliances are formed to attain a mutually agreed goal, this does not lead to all the partners sharing the same perspective of the particular goal. According to Dacin, Oliver and Roy (2007), an alliance is a cooperative activity that creates opportunities for participating companies to benefit from their involvement. It is a voluntary relationship that firms form with the anticipation that their partners are going to uphold the mutual forbearance relationship. Gomes-Casseres’ (1996) definition highlights the limited control the focal firm has over its partner firm’s resources and capabilities when engaging in alliances. In the seminal work of Gulati (1998), alliances are also perceived as networks - as part of a net of connections whereby many firms are directly or indirectly linked to each other and work towards multiple goals. Yoshino and Rangan (1995) suggest that alliances generally encompass three necessary and sufficient characteristics. First, two or more firms must unite to pursue a set of agreed upon goals while remaining independent subsequent to the collaboration. Second, the firms must share benefits of the collaboration and control over the performance of assigned tasks. Third, the firms contribute on a continuing basis in one or more key strategic areas, e.g. technology, to the collaboration (p.45). Given its comprehensiveness and generalisability, this study therefore adopts Yoshino and Rangan’s (1995) way of defining alliances. In the next few sections, research on some major aspects of alliances are reviewed, including motivation, formation, partner selection, structure, management, alliance performance, performance consequences on firms, and dissolution of alliances.
2.1.1 Alliance Motivation

Many interpretations and propositions have been developed to explain why firms form alliances. Some frequently discussed incentives include: cost and risk sharing (e.g. Goerzen, 2007; Miner, Amburgey, & Stearns, 1990; Ohmae, 1989), product rationalisation, efficiency gains achieved from economies of scale (e.g. Garrette, Castaner, & Dussauge, 2009; Gomes-Casseres, 1994), access to critical resources (Gomes-Casseres, 1994; Gulati, 1998; Lei, Slocum, & Pitts, 1997; Teece, 1992) and complementary resources (e.g. Chung, Singh, & Lee, 2000; Glaister & Buckley, 1996; Harrison et al., 2001; Schmiedeberg, 2008), resource exploitation (e.g. Tsang, 2000) and knowledge sharing and inter-organisational learning (Grant & Baden-Fuller, 1995; Hamel, 1991; Hamel, Doz, & Prahalad, 1989; Harianto & Pennings, 1990; Inkpen, 1998; Khanna, Gulati, & Nohria, 1994; Shenkar & Li, 1999; Zahra, Nielsen, & Bogner, 1999). Some argue that firms form alliances to obtain market power and establish industry standard, though these are largely risky, especially in industries with rapid technological changes or where there are competing technological platforms (Bresser, 1988; Bresser & Harl, 1986; Nielsen, 1988). Moreover, researchers looking into organisational competencies suggest that engagement in alliances helps to prevent core competencies from turning into core rigidities, which could constrain a firm’s ability to adapt to changing competitive environments (Floyd & Wooldridge, 1999; Leonard-Barton, 1992). An important motive underlying all these aforementioned rationales is that firms often engage in alliances with the intention to improve internal competencies and competitive positions (Glaister, 1996; Porter & Fuller, 1986).

Transaction Cost theory also offers some explanations on firms’ alliance motivations (e.g. Balakrishnan & Koza, 1993; Hennart, 1988). An overall proposition is that firms are motivated to form alliances when transaction cost is at a level where it is too high for arm’s-
length market exchanges yet not high enough to justify vertical integration (Hennart, 1988). An important premise is that markets are at least efficient as hierarchies in organising the exchange of goods (Williamson, 1975, 1985). An institutional perspective has also been applied to explain alliance activities. It highlights firms’ legitimacy needs (i.e. market legitimacy, relational legitimacy, social legitimacy, investment legitimacy and alliance legitimacy) are important factors underpinning their alliance activities (Dacin et al., 2007). In a related vein, alliances are known as effective market entry mechanisms (Tse, Pan, & Au, 1997; Yasuda, 2005). By collaborating with local partners, alliances allow firms entering into foreign markets to minimise liability of foreignness through utilising their partner’s reputation, local knowledge and local networks (Tse et al., 1997). They are also able to reduce the time span required to get their product into the market (Glaister & Buckley, 1996; Yasuda, 2005).

With respect to the investigation of external factors influencing firms’ preferences to ally with others, it has been identified that environmental uncertainty, including demand uncertainty and competitive uncertainty, play an important role (e.g. Burgers, Hill, & Kim, 1993; Delvin & Bleackley, 1988; Hoffmann & Schaper-Rinkel, 2001). The central implication is that greater uncertainty is associated with firms’ increasing need to remain flexible (Wang & Li 2008), which increases their preferences for alliances. Beside environmental uncertainty, industry growth is also identified as a factor impacting on firms’ motivation to ally with others. While the resource dependence theory approaches the explanation through the lens of resource scarcity and increasing organisational dependency (e.g. Burgers et al., 1993; Eisenhardt & Schoonhoven, 1996; Oliver, 1990; Preffer & Salancik, 1978), the strategic management researchers tend to emphasise resource munificence associated with industry growth (e.g. Harrigan, 1988b; Kogut, 1988a; MacMillan, Siegel, & Narasimha, 1985; Park & Russo, 1996). Their suggestion that firms are more motivated to form alliances in growing markets forms a sharp contrast to predictions made by the resource dependence theorists.

2.1.2 Alliance Formation

Research into alliance formation concentrates on discussing and explaining the frequency of alliances, the likelihood of alliances, the “who ally with whom” question, and partner availability (Gulati, 1998). Larger firms are found to engage in more alliance activities compared to smaller firms (Berg, Duncan, & Friedman, 1982; Ghemawat, Porter, & Rawlinson, 1986; Hagedoorn & Schakenraad, 1994; Martin, Mitchell, & Swaminathan, 1995; Mitchell & Singh, 1992; Yeniyurt, Townsend, Cavusgil, & Ghauri, 2009). Powell et al. (1996), however, put forward a caveat on these findings and argue that firm size is an outcome rather than a determinant of collaboration. Mitchell and Singh (1996) further
suggest that business size and collaborations are reciprocal forces. Besides organizational size, Market complementarity, resource compatibility (Mitsuhashi & Greve, 2009), capability complementarity and status similarity (Chung et al., 2000) are some factors being perceived as having important and an often positive impact on alliance formations. More recently, Ariño and Ring (2010) propose that perceived distributive, procedural, interpersonal and informational fairness affect potential partners’ assessment of equity of the proposed alliance, which in turn impact on their ultimate decisions to form or to abandon the proposed alliance.

Prior experience with collaboration, particularly positive experience (Robertson & Gatignon, 1998), and positive reputation (Dollinger, Golden, & Saxton, 1997; Hakanson, 1993; Stuart, 1998) are also highlighted as factors leading to greater propensities to alliance formations. It is proposed that prior alliances increase inter-organisational cooperation and reciprocity, which are conducive to the formation of new alliances (Gulati, 1995a; Kogut, 1989; Kogut, Shan, & Walker, 1992; Mitchell & Singh, 1996; Walker, Kogut, & Shan, 1997). However, this effect does not hold under all circumstances. The distance between two firms in a social network of prior alliances reduces their propensities to form further alliances (Gulati, 1995b). Adding to this observation, Amburgey, Kelly, and Barnett (1993) find that the longer the duration since the last collaboration, the less the likelihood of subsequent alliance formations. According to Hamilton (1985, 1990), firms’ alliance formations demonstrate a diminishing trend, such that the number of alliances a firm forms is reduced to a few key arrangements when it faces decreasing technological and market uncertainties. In a recent study, Yeniyurt et al. (2009) observe an inverted U-shaped relationship between density and cross-border alliance experience on the propensity to engage in new international alliances. Such findings reveal a diminishing return of experiential learning.
The *Network* and *Inter-Organisational Relationship* perspectives have also been applied to explain alliance formations (e.g. Ahuja, 2000a, 2000b; Chung *et al.*, 2000; Gimeno, 2004; Gulati, 1995b, 1998, 1999; Hagedoorn, 2006; Kenis & Knoke, 2002; Koka & Prescott, 2002; Koza & Lewin, 1999; Rosenkopf & Padula, 2008; Sedaitis, 1998). Kenis and Knoke (2002) look into the rates of alliance formations. According to them, network density, reciprocity, centralisation, multiplicity and hierarchy may lead to nonlinear changes in the rates of alliance formations such that the impact is potentially stronger for new alliance formations compared to repeated alliance formations. Koza and Lewin (1999) recognise the inherent tension and instability of alliances. They define networks as transitional organisational instruments that facilitate some exploration and adaptation needs of firms. Being one of the most influential authors within the network perspective, Gulati (1995b) explains how prior alliances and considerations of strategic interdependence affect alliance formations. According to Gulati (1995b), a social network provides firms new to alliance formations valuable information on potential partners, which facilitates their decision-making. Following this study, Gulati (1999) looks into network location and learning. He addresses the importance of firms’ capabilities with alliance formation and highlights material resources as major determinants of alliance formations.

Subsequent studies make valuable additions to the *network perspective* by identifying other factors that interact with network attributes and impact on alliance formation. For example, Stuart (1998) finds that firms in a network with great density (i.e. crowded) with high prestige demonstrate the highest alliance formation rates. Tsai (2000), on the other hand, recognises the role dyadic-level factors play and reports that the interaction between social capital and strategic relatedness among firms significantly affects alliance formations. Gimeno (2004) examines how firms use alliances as a strategic defense to mitigate
competitive pressures imposed by alliance networks of their rivals. It is suggested that competitive embeddedness affects alliance formations beyond the local network. Ahuja (2000a) places a greater emphasis on firms’ capital stock (i.e. technical, commercial, and social capital) and finds that firms’ opportunities to ally with others and their possession of capital stocks are positively related. In saying this, it is still possible for firms lacking these accumulated resources to engage in alliances if they demonstrate technological capabilities. The major contribution of this study is that it increases the awareness that alliance formations are determined by both inducements and opportunities. In other words, a firm with great desire to engage in alliances should also be attractive to potential partners for formations of alliances to eventuate (Kogut et al, 1992; Shan, Walker, & Kogut, 1994).

Another stream of research analyses the impact of competitive dynamics on alliance formations (e.g. Gimeno, 2004; Park & Zhou, 2005; Silverman & Baum, 2002). Park and Zhou (2005) assert that alliance formations are determined by both internal and external conditions. They look at the resource condition of the firm and competitive dynamics in the market to conduct cost-benefit analyses and assess alliance formations. A dilemma is observed such that firms with stronger competitive positions demonstrate lower incentives to ally despite strong potential gains from alliances. Weaker firms, on the other hand, are often too eager to form optimal alliances and end up achieving little benefit. In a recent study, Park et al. (2002) also demonstrate a balanced focus on both internal and external drivers of alliance formation. They observe that alliance formations are affected by market growth conditions and firms’ own resource endowments. Their results indicate that alliances are often formed to address firms’ needs to rapidly capture emerging market opportunities. Compared to resource-rich firms who can better take advantages of alliances, resource-poor firms face constraints on engaging in alliances. Findings of this study also provide partial
support for Koza and Lewin’s (1998) proposition that firms are more active in forming alliances under changing environments than in stable ones.

In recognition of the role management plays in strategic actions, Tyler and Steensma (1995) suggest that managers’ experiences, perceptions and cognitive limitations affect their assessment of technological alliance opportunities, which in turn impact on alliance formations. Building upon Gulati and Westphal’s (1999) study that proposes the importance of CEO-board relations on joint venture formation, Rosenkopf, Metiu and George (2001) paid attention to mid-level managers instead and developed a bottom-up model. Consistent with some of the findings from studies applying the network perspective, this study reports that participation in technical committees by mid-level managers contributes to better partner identifications. Inter-personal bonds formed among these managers lead to greater inter-organisational relationships, which facilitate knowledge exchange for firms with relatively less prior alliance experience.

A large body of research explains alliance formations from a technology-related perspective (e.g. Anand, Oriani, & Vassolo, 2010; Bayona, García-Marco, & Huerta, 2001; Colombo, Grilli, & Piva, 2006; Lavie & Rosenkopf, 2006; Miotti & Sachwald, 2003; Rothaermel & Boeker, 2008; Sakakibara, 2002; Sandhya & Visalakshi, 2000; Steensma et al., 2000; Zhang & Baden-Fuller, 2010; Zhang, Baden-Fuller, & Mangematin, 2007). It is suggested that high-tech startups often seek alliance partners in possession of specialised complementary assets that could facilitate their commercial process (Colombo et al., 2006). Anand et al. (2010) show that in the face of technological discontinuity, firms possessing strong capabilities in emerging technological fields demonstrate fewer propensities to form alliances. Firms lacking such capabilities yet possessing important complementary capabilities, on the other hand, can utilise alliances as mechanisms to enter into new technological domains. Lavie and
Rosenkopf (2006) suggest that while absorptive capacity leads to increasing propensities to form explorative alliances, path dependence associated with a technology base often results in formations of exploitative alliances. Overtime, firms balance their tendencies to conduct both types of alliances. Looking at the formation of R&D consortia, Sakakibara (2002) explains that lower levels of competition and appropriability conditions are two major drivers for firms’ participation in such consortia.

With respect to the relationships between firms’ technological knowledge base and capabilities and alliance formations, Miotti and Sachwald (2003) propose that industry technology intensiveness, firm-level possession of technological resources and absorptive capacity are positively related to the propensity to cooperate on R&D. Rothaermel and Boeker (2008) assert that broad technological capabilities are effective predictors of alliance formations. Zhang et al. (2007) and Zhang and Baden-Fuller (2010) identify linkages between a firm’s knowledge base depth, breadth, centrality of its R&D organisation structure (i.e. whether the technological knowledge base is concentrated at the corporate level or dispersed at the divisional level) and its absorptive capacity. According to these authors, absorptive capacity is a critical factor impacting on a firm’s propensity to engage in alliances.

Since the mid-1990s, the institutional impact on alliance formation has received increasing attention (e.g. Osborn & Hagedoorn, 1997; Song, 1995). Some authors approach the topic through the lens of national culture. For example, Steensma, Marino, Weaver, & Dickson (2000) found both direct and indirect relationships between the culture and the formation of technology alliances. Their study suggests that while a resource dependence-based rationale better explains technology alliance formations in markets where cooperative values and uncertainty avoidance are important, the preference of equity-based alliances is evident in societies that value individualism. This lends supports to a transaction cost-based rationale.
2.1.3 Alliance Partner Selection

Partner selection is deemed to be a critical process underpinning a successful alliance. The importance of potential partner firm’s resource endowment is discussed (e.g. Hitt, Dacin, Levitas, Arregle, & Borza, 2000). With respect to reputation, it is suggested that regardless of whether the partner firm is a supplier or a competitor, product and management reputation of the partner is a critical selection criterion (e.g. Saxton, 1997; Dollinger, Golden, & Saxton, 1997). From the focal firm’s perspective, a firm’s position in the value chain and the level of technological sophistication and resource constraints also determine its partner selection criteria (Powell et al., 1996).

Some researchers conduct investigations through the lens of concerns over resource protection and uncertainty associated with collaborative relationships (Beckman, Haunschild, & Philips, 2004; Li, Eden, Hitt, & Ireland, 2008; Li & Rowley, 2002). For example, Li et al. (2008) argue that prudent partner selection contributes to effective protection of valuable technological assets from appropriation risk. Li and Rowley (2002), on the other hand, suggest that firms tend to favour past alliance partners for new alliance formations. Such inertia derives from concerns over uncertainties associated with new partners. They also confirm that firms draw on their local networks for partner identification and selection to reduce the uncertainty inherent in alliance decisions (Chung et al., 2000; Gulati & Gargiulo, 1999; Podolny, 1993). Beckman et al. (2004) looks into firm-level and market-level uncertainties and change of alliance networks. They assert that while firm-level uncertainty provokes broadening of the existing alliance networks and interlock formations with new partners, market-level uncertainty leads to reinforcement of existing alliance networks and preferences to ally with past partner firms. Integrating cultural differences and partner selection, Wuyts and Geyskens (2005) propose that while uncertainty avoidance and
collectivism increase firms’ preferences to select past partners, power distance decrease past partner selection.

Also looking into the impact of a firm’s existing relationships, Elg (2000) proposes that the threat of important domestic alliance partners being approached by foreign firms and concerns over high dependency on existing domestic partner firms often lead to focal firms’ alliance formation with foreign firms. Shah and Swaminathan (2008) examine how the alliance management process and performance outcomes determine the relative importance of trust, commitment and complementarity. They conclude that when both management processes and performance outcomes are difficult to assess, trust is the most important factor to consider during the partner selection process.

A large body of literature also emphasises an important dyadic-level factor, namely resource and skill complementarity between partner firms (e.g. Dymsza, 1988; Geringer, 1991; Kogut, Walker, & Kim, 1995; Lewis, 1990: 217; Mitchell & Singh, 1992; Mowery, Oxley, & Silverman, 1998; Rothaermel & Boeker, 2008; Shenkar & Li, 2009). Similarities in strategic and organisational traits as well as in organisational climate are also highlighted as important partner selection criteria (Fey & Beamish, 2001; Luo, 1997). It is suggested that competitive position differentials should be taken into consideration when selecting partners as alliances formed between a strong firm and weak firm often generate mediocre performance (Bleeke & Ernst, 1991; Burger et al., 1993).

With respect to impact macro-environment has on partner selection, Peterson and Shimada (1978) highlight the role cultural difference plays. They discuss such differences between American and Japanese partners and argue that emphasis on trust vis-à-vis legal protection affect partner selection initiated by American firms and Japanese firms. Focusing on the
impact institutional environment has on partner selections, Hitt et al. (2000) and Hitt, Ahlstrom, Dacin, Levitas and Svobodina (2004) observe that a more stable and supportive institutional environment is conductive to firms’ long-term focus, which leads to greater emphasis on a partner firm’s intangible assets, and technological and managerial capabilities. In contrast, firms operating in an unstable institutional environment demonstrate a short-term focus and often form alliances to gain financial resources and complementary resources for a rapid improvement in their capability to survive a turbulent environment.

More recently, Holmberg and Cummings (2009) propose a four-step alliance partner selection process, which include (1) ensure alignment of alliance objectives and strategies with overall corporate objectives; (2) develop appropriate critical success factors for better assessment of alliance activities; (3) screening for potential alliance partner; and (4) final selection of partner firms. As suggested by Harbison and Pekar (1998), rigorous evaluation of strategies and objectives are the cornerstone of successful alliances. Engagement in alliances only makes sense when they allow for more efficient and effective ways of achieving corporate objectives (Holmberg & Cummings, 2009). Identification of critical success factors for the continuous assessment and monitoring of alliances should therefore be closely linked to firms’ strategic and corporate objectives (Holmberg & Cummings, 2009). With objectives and critical success factor delineated, firms are prepared to initiate a thorough screening and mapping of potential alliance partners. This process should start from the macro-level environment, which constitutes industries and industry groups along the value chain (e.g. competitors, suppliers, customers, and complementors). The last step is to evaluate and identify optimal partners within targeted industries or industry groups that demonstrate the highest level of congruence with the focal firm in terms of resources, capabilities and objectives (Holmberg & Cummings, 2009). The contribution this four-step model makes is to
demonstrate how a good partner selection process prepares firms for a greater chance of achieving alliance success and illustrates how this process can be initiated in a systematic way.

2.1.4 Alliance Structure

Another aspect of alliances that has drawn great research attention is the choice of governance structures. The governance structure of the alliance is often known as the formal contractual structure participants used to formalise the collaborative arrangement. Poppo and Zenger (2002) add that relational mechanisms also significantly contribute to the success of alliance governance. Various structural solutions can be used to align the interests of the participating partners (Hennart & Zeng, 2005). Extensive literature has been conducted to examine the role trust plays in influencing decisions on alliance governance structures (e.g. Currall & Inkpen, 2002; Faems, Janssens, Madhok, & Looy, 2008; Gulati, 1995a; Inkpen & Currall, 2004; Nooteboom, Berger, & Noorderhaven, 1997; Parkhe, 1998; Ring & Van de Ven, 1992). Trust and control are generally perceived as parallel and supplementary factors that collectively impact on partner cooperation (Das & Teng, 1998). Das and Teng (1998, 2000) propose that the preferences of governance modes are largely dependent on the interaction effects of resource types (financial, physical, technological and managerial) and associated risks (relational and performance related) on the objectives of the prospective alliance partners. Extending Das and Teng’s (1998, 2000) proposition, Hoetker and Mellewigt (2009) provide empirical evidence indicating that the optimal configuration of alliance structure requires a balanced approach of deploying formal and relational mechanisms. While formal mechanisms fit well with property-based assets, relational mechanisms are better suited to knowledge-based assets.
A large body of research into governance structures looks specifically into equity-based alliances vis-à-vis non-equity based alliances. According to transaction cost economists, equity alliances take one of two forms (Pisano, 1989): while a joint venture provides joint ownership and control over the use of assets (Kogut & Singhm 1988), minority equity alliances are those arrangements in which one of the partners takes a minority equity position in the other partner or partners. These two forms of equity-based alliances, however, are justified as under one category as “a direct equity investment by one firm into another essentially creates an equity joint venture between one firm’s existing shareholders and the new corporate investor” (Pisano, 1989, p.111).

Non-equity alliances, by their name, refer to those arrangements that do not involve the sharing or exchange of equity. Firms participating in this type of alliance remain independent and there is no creation of a new organisational entity. According to Gulati (1995a), nonequity alliances largely resemble an arm’s-length market exchange on the continuum of market to hierarchy. Non-equity alliances include unidirectional agreements, such as licensing, second-sourcing, and distribution agreements, and bidirectional agreements, such as joint contracts and technology exchange agreements (Gulati, 1995a).

Compared to non-equity alliances, equity-based alliances may be more effective in terms of allowing firms to bypass market inefficiencies. Equity control and the sharing of financial payoff through equity-based alliances better align the interests of the parent firms, which help to minimise opportunistic behaviours (e.g. Balakrishnan & Koza, 1993; Klein, Crawford, & Alchian, 1978; Pisano, 1989; Pisano, Russo, & Teece, 1988). Among equity-based alliances, joint venture is one of the most intensively studied governance modes. A major theory applied in this area of research is transaction cost economics. In explaining why firms decide to share equity, Hennart (1988) distinguishes between “scale” joint ventures and “link” joint
ventures. While scale joint venture is driven by an inefficiency in obtaining full ownership of relevant assets from a failing market, link joint venture is chosen when there is a simultaneous failing of the markets for two or more assets whenever these assets are firm-specific (i.e. non-tradable assets, acquisition of the firm holding them would entail significant management costs).

The range of benefits accruing via joint venture are grouped into four categories: (1) economies of scale accrue through partners combining distinct activities under one entity; (2) access to complementary assets is the pooling of partners’ assets in such areas as production, marketing, design, and manufacturing; (3) cost or risk-sharing confers benefits through joint ventures in areas characterised by extremely high development costs and uncertain demand or short product or technology life cycles; (4) shaping the scope and basis of competition confers benefits by pre-empting existing or potential competitors (Koh & Venkatraman, 1991), markets, and partners (Sarkar, Cavusgil, & Aulakh, 1999).

Following Porter and Fuller (1986), there are three types of potential costs associated with joint ventures: (1) the coordination costs resulting from the need for ongoing coordination between partners, which may be difficult to achieve when they have divergent interests; (2) the erosion of a competitive position occurring when a competitor becomes more formidable through the transfer of proprietary expertise and market access as well as the lowering of entry barriers; (3) the creation of an adverse bargaining position, which may occur if one partner is able to capture a disproportionate share of the value a joint venture creates because the other partner has an adverse bargaining position resulting from specialised and irreversible investments (Balakrishnan & Koza, 1988). Another major pitfall of joint venture pertains to the reduced speed with which many actions in pursuit of global strategies can be taken (Harrigan, 1988a). Therefore, building upon Bradach and Eccles’ (1989) transaction
cost economics literature review, Gulati (1995a) highlights the important role trust plays in governance mode choice decisions and confirms its impact beside the other two primary governance mechanisms (price and authority).

Prior research has also found that different modes of organisation for collaboration have differentiated impacts on the characteristics of technology sharing and economic consequences for participating businesses (Buckley & Casson, 1988; Hagedoorn & Narula, 1996; Krubasik & Lautenschlager, 1993, p.60; Osborn & Baughn, 1990; Williamson, 1975, 1985). Alliances pertaining to technological development, in turn, influence the preference of governance modes. Higher hierarchical control is preferred when appropriation risks are severe (Oxley, 1997). As observed by Colombo (2003), the likelihood of choosing an equity form for such alliances increases with the divergence of the technological specialisation of partner firms. Realising that even “protective mechanisms” such as joint ventures may provide insufficient protection to induce extensive knowledge sharing among alliance participants, Oxley and Sampson (2004) propose the appropriately structured “scope of alliances” as an effective alternative mechanism against the hazards of R&D cooperation.

Costs associated with alliances of all sorts have also consistently drawn attention from researchers. For example, Gulati and Singh (1998) found that the magnitude of hierarchical controls is influenced by the anticipated coordination costs and by expected appropriation concerns. Gulati and Singh (1998) and White and Lui (2005) also suggest that the choice and magnitude of hierarchical controls in alliances is influenced by the anticipated coordination costs (i.e. interdependence between partners is positively related to coordination costs) and by appropriation concerns regarding potential partners. In a more recent study, White and Lui (2005) elaborate on the distinction between cooperation costs and transaction costs, and consequently argue that cooperation costs should be incorporated into studies that compare
the choice of alternative partners and alliance structures. Dyer (1997), however, argues that transaction costs do not necessarily increase with an increase in relation-specific investments, and a network that can simultaneously achieve the twin benefits of asset specialisation and lower transaction costs will have efficiency advantages over less specialised networks with higher transaction costs.

Contractual design and modification constitute an important part of alliance governance (Joskow, 1988; Poppo & Zenger, 2002). Extant research has looked into factors determining contractual design (Luo, 2002; Ryall & Sampson, 2003). Some researchers also investigated the relationships between contractual characteristics and alliance outcomes and subsequent modifications of the contracts (Deeds & Hill, 1998; Parkhe, 1993b; Reuer & Ariño, 2002; Reuer, Zollo, & Singh, 2002). Previous alliance experience and prior ties with past partners have been repeatedly highlighted and discussed as major determinants of contractual designs (Luo, 2002; Ryall & Sampson, 2003). According to Reuer et al. (2002), previous alliance experience, technological experience, prior ties with an alliance partner and transactional features (i.e., alliance scope, divisions of labour and relevance of the collaboration to the parent firm) will impact on the likelihood of ex post adjustments in governance structures. While alliance relevance leads to greater likelihood of change in contract alterations, board changes and monitoring mechanisms adjustment, technological experience is negatively related to board changes. Partner experience, on the other hand, tends to increase the likelihood of monitoring mechanism adjustments. Reuer and Ariño (2007) look into contractual complexity and firms’ adoptions of various contractual provisions. They argue that the complexity of contracts is positively related to two aspects of alliances: (1) asset specificity; and (2) the pre-specified alliance’s duration. Furthermore, instead of observing reduced negotiations on enforcement provisions, Reuer and Ariño (2007) report a decrease in
adoptions of contractual provisions that are informational within repeat collaborators. This finding adds to the discourse on how previous collaborative relationships and trust affect subsequent alliance governance structures.

Some researchers paid specific attention to macro-level factors such as national and cultural differences (Oxley, 1997, 1999; Parkhe, 1993a). It is suggested that when intellectual property protection is weak in a nation, higher hierarchical controls are preferred (Oxley, 1997, 1999). The observation that alliance governance structures and performance outcomes are affected by partners’ nationalities indicates that there are needs to develop routines that better address differences between partner firms (Parkhe, 1993a). Michailova and Ang (2008) investigated cross-border alliances established by emerging economies firms. Findings of their study provide evidence for institutional explanations of the adoption of an equity alliance mode in cross-border collaborations. Differences in terms of the explanatory power of each pillar of institutional theory, i.e. regulative, normative and cognitive, are observed when those firms establish alliances in developed vis-à-vis emerging host countries.

2.1.5 Alliance Management

The importance of good alliance management to the success of the collaboration has been addressed in the literature (e.g. Hamel et al., 1989; Ireland, Hitt, & Vaidyanath, 2002; Narus & Anderson, 1986; Schreiner, Kale, & Corsten, 2009; Spekman, Forbes, Isabella, & MacAvoy, 1998). As suggested by Narus and Anderson (1986), well-managed alliances will lead to increasing commitment from both parties and an atmosphere of good will. Such an outcome is conducive to alliance success. However, the difficulty to govern and manage alliances is also evident (Morris & Hergert, 1987). Alliances with competitors are often characterised by simultaneous competitive and cooperative forces (Hamel et al., 1989;
Hamel, 1991; Lei & Slocum, 1991; Lorange, Roos, & Brønn, 1992; Teece, 1992). It can be argued that firms that ally with their competitors may benefit from short-term synergies, but misalignment of individual goals to the collective goals of the alliance often lead to alliance failure (Park & Ungson, 2001; Porter, 1990, p.66).

Attempts to establish a good understanding on how to achieve effective management of alliances have been made. Ireland et al. (2002) propose that good partner selection enables subsequent effective alliance management. Furthermore, alliances must be managed to build social capital and knowledge should be encouraged. To achieve these goals and maximise cooperation among the partners, a trust-based relationship must be developed. Young-Ybarra and Wiersema (1999) look into flexibility (modification and exit) required in information alliances. They also highlight the role trust plays in alliance management. Dyer et al. (2001) call for a dedicated strategic alliance function to be implemented in place. By a dedicated strategic function, Dyer et al. (2001, p.38) refer to “coordinate all alliance-related activity within the organization and (to institutionalize) processes and systems to teach, share, and leverage prior alliance-management experience and know-how throughout the company”.

By a similar token, alliance management routines are deemed of critical importance (Ireland et al., 2002). Drawing from Prahalad and Bettis (1986) and Lampel and Shamsie (2000), Ireland et al. (2002) define alliance management routines as mechanisms to govern alliance-related decision-making processes throughout the firm. These routines represent a shared belief about how some activities should be accomplished, which should focus on key areas of alliances such as knowledge management, establishing cooperation, and ensuring accountability (Dyer et al., 2001). Defining the scope of alliances, selecting the right partner, joint participation of partners to design the governance structure, willingness to accommodate partners’ needs, effective management of information flows between partner firms,
maintaining partner fit and appreciation of reciprocity are some of the important building blocks for effective management routine development (Barringer & Harrison, 2000; Douma, Bilderbeek, Idenburg, & Looise, 2000; Gulati, 1998; Ireland et al., 2002). Schreiner et al. (2009) provide some empirical evidence to demonstrate that alliance management capability is composed of skills to coordinate, communicate and establish bonding with partner firms.

One stream of studies looks specifically into international joint venture (IJV) management. Shenkar and Zeira (1987) highlighted a few prevalent personal problems in IJVs, which lead to the realisation that human resource management is an integral part of effective IJV management. Inkpen and Beamish (1997) suggest that acquisition of local knowledge by partners is a key factor contributing to the instability of a relationship due to shifts in bargaining power. Therefore, for local firms expecting a stable collaborative relationship, managing the transfer and continuing development of local knowledge is an important skill to develop. Following Cullen, Johnson and Sakano (2000), who emphasise the role trust and commitment into IJVs play in successful IJV management, Johnson, Korsgaard and Sapienza (2002) address the importance of procedural justice, strategic decision control, and organisational commitment.

2.1.6 Alliance Performance

Given the complex and conflicting tensions underlying alliances, the difficulty and complexity of defining and measuring the performance of alliances has been recognised (Gulati, 1998). Different from assessing a single firm’s performance, alliance performance is rather difficult to gauge due to the lack of simple and comprehensive criteria of success associated with alliances (Geringer & Hebert, 1991; Lorange & Roos, 1992). The exception
is joint ventures. Since a new entity is created through a joint venture, its performance can be evaluated in the same way as a single firm’s performance (Anderson, 1990).

Despite the recognised challenge in measuring alliance performance, various approaches have been adopted, with goal accomplishment being a critical benchmark (Beamish & Delios, 1997; Lin & Germain, 1998). One branch of studies uses alliance duration and survival as the main indicator of alliance performance (e.g. Harrigan, 1988a; Lu & Xu, 2006). In a similar vein, some researchers adopt longevity and stability of alliances as the measurement for alliance performance (e.g. Kogut, 1988a; Parkhe, 1991). These measurements have received some challenges regarding their validity. As explained by Yan and Zeng (1999), alliance success is independent of its longevity. If an alliance was expected to endure a certain duration, but the actual existence falls short of this predicted period, it should be considered a failure. By a similar token, changes and instability of alliances may result from various reasons, if modifications are made for the purpose of adjusting for initial misfit (Gomes-Casseres, 1987) or for better adaptation to environmental change (Yan, 1998), they are conducive to alliance success and should not be interpreted as failure.

With respect to alliance termination and dissolution, they can be explained by both social and task-related causes (Greve, Baum, Mitsuhashi, & Rowley, 2010). Differences between partners (Parkhe, 1991; Serapio & Cascio, 1996), low levels of perceived strategic importance, new formation (Lunnan & Haugland, 2008), false expectations about partners’ capabilities (De la Sierra, 1995), partners’ self-interest, opportunistic threats and rivalry (Park & Ungson, 1997, 2001; Polidoro Jr., Ahuja, & Mitchell, 2011), and the deteriorating balance and quality of relationships (Ariño & Torre, 1998) are identified as factors leading to premature termination of alliances. Termination and dissolutions derived from these circumstances often have negative consequences. More positively, alliances can be
terminated upon fulfillment of partners’ goals or changes in strategic objectives and focus. As argued by Singh and Mitchell (1996), mutual decisions to end a relationship are unlikely to exert a negative impact on the performance of either partner as firms rarely end valuable relationships. Therefore, terminations and dissolutions of alliances are not equivalent to failure (Zajac, 1998).

Another line of research measures alliance performance on the basis of a partner’s satisfaction with the overall performance of the alliance (e.g. Beamish, 1988; Geringer & Hebert, 1991; Glaister & Buckley, 1998; Killing, 1982, 1983; Lin & Germain, 1998; Parkhe, 1993b). Yan and Gray (1994) also perceive satisfaction of both partners’ strategic objectives as the way to judge alliance performance. Closely related to these organisational effectiveness measures, another possible measurement of alliance performance is the net spillover effect. While capability gains and better understanding of the application of know-how are perceived as positive spillovers, stronger subsequent competition between prior alliance partners (Khanna et al., 1998; Becerra, Lunnan, & Huemer, 2008) represent negative spillover effects.

More recent attempts to measure alliance performance integrate multiple criteria. While Beamish and Jung (2005) look at both profitability and survival of joint ventures, Lunnan and Haugland (2008) address the complexity of measuring alliance performance by looking into abrupt termination, short-term performance (measured as the perceived benefits not long after the formation) and long-term performance (the same indicator measured at a later period). In a more recent study, multiple criteria have been adopted to investigate collaboration performance. For example, Beamish and Jung (2005) looked at both profitability and survival of joint ventures. Lunnan and Haugland (2008) addressed the complexity of measuring
alliance performance by looking into abrupt termination, short-term performance and long-
term performance.

Beyond measurements of alliance performance, great effort has been made to identify major
determinants of alliance performance. It is suggested that satisfactory alliance performance
begins with selecting the right partners (e.g. Dacin et al., 2007; Draulans, deMan, &
Volberda, 2003). This is because good partner selection processes enable a better match
between participating firms, which allows for greater value creation and minimisation of
partnership risks (Gomes-Casseres, 1993). Looking into partner characteristics in regards to
similarity and complementarity, Harrigan (1988a) and Saxton (1997) find a positive impact
partner similarity has on alliance performance. In contrast, Killing (1982, 1983) finds the
moderating effect relatedness has on the positive relationship between numbers of alliances
and innovation performance. With respect to resource complementarity, while some
researchers failed to find supporting evidence for a positive impact on alliance performance
(e.g. Hill & Hellriegel, 1994), others have generated some confirmative results (Gulati,
Nohria, & Zaheer, 2000; Madhok & Tallman, 1998; Sarkar, Echambadi, Cavusgil, & Aulakh,
performance of alliances is related to access to complementary and critical resources, long-
term performance is primarily affected by specific investment and partner capability. Overall,
this stream of studies has generated some inconclusive findings, which are still open to future
investigations.

Since alliances provide firms with opportunities to learn and gain access to valuable
resources, alliance success can be explained by successful learning, resource exploration,
exploitation and creation. Fang and Zou (2009) find marketing dynamic capabilities are
positively related to international joint ventures’ competitive advantage and performance. Zhan and Luo (2008), on the other hand, observe better international joint venture performance in emerging when foreign partners were better able to exploit resources contributed by local partners while continuously upgrading and developing new capabilities. Lambe, Spekman, and Hunt (2002) propose that resource acquisition and creation largely contribute to alliance success. In a study that looks into contractual alliances and performance outcomes, Lunnan and Haugland (2008) observe that short-term performance of an alliance is significantly affected by access to complementary and critical resources.

Another major factor impacting alliance performance is inter-organisational relationships. Trust is generally perceived as a positive determinant (e.g. Bidault & Castello, 2009; Kale, Singh, & Perlmutter, 2000; Krishnan et al., 2006; Kumar, 1996; Lane, Salk, & Lyles, 2001). It is found that the amount of trust between partners influences the level of investment and the success of the relationship, which is crucial for alliance success (Bidault & Castello, 2009). While exploiting power may generate some short-term benefits, it is detrimental for long-term performance (Kumar, 1996). Krishnan et al. (2006) add that the positive relationship between trust and alliance performance is stronger under behavioural uncertainty but not so under environmental uncertainty. Against the general perception that trust is positively related to alliance performance, a caveat is that some conflicts are beneficial for creativity and innovation (Jehn & Mannix, 2001). When there is too much trust, the beneficial task-oriented conflicts may be reduced and negatively affect alliance performance (Bidault & Castello, 2009).

Beside trust, mutual dependency (Doz & Hamel, 1998, p.82; Robins, Tallman, & Fladmoel-Lindquist, 2002), partner substitutability and repeated partnerships (Park & Ungson, 1997; Xia, 2011), shared decision-making (Saxton, 1997), higher levels of partner cooperation
(Pearce, 2001), structural embeddedness (common partners) (Polidoro Jr. et al., 2011), and procedural fairness (Luo, 2007, 2008) are generally perceived as having a positive impact on alliance stability and performance. Shipilov (2009) adds that firms’ scope experience, low centrality in alliance networks and historic multimarket contact with partners positively impact on alliance performance, as these factors contribute to increased absorptive capacities, bargaining power and reduced partner non-cooperative behaviour. While Luo (2008) confirmed the positive effect an in-depth integration has on alliance stability, it is observed at the same time that in-depth integration between alliance partners demonstrates a curvilinear effect on alliance profitability. This is because on an optimal level an alliance’s profitability will be more significantly determined by various capabilities, strategies, and operations rather than structural characteristics. From a bargaining power perspective, both Yan and Gray (1994) and Pearce (1997) highlight that changes in bargaining power between partner firms can lead to alliance performance changes.

With respect to factors that negatively impact on alliance survival and performance, partners’ opportunistic behaviour is generally highlighted as a major detrimental factor (Koza & Lewin, 1998, 1999; Luo, 2007; Parkhe, 1993b). Echoing Yan and Grey (1994) and Pearce (1997), Inkpin and Beamish (1997) argue that a shift in a partner’s bargaining power is a major factor causing instability of international joint ventures. Furthermore, competition between joint venture partners outside the agreement also forms a major threat that impairs survival chances of the venture (Das & Teng, 2000; Park & Russo, 1996, 2001). Difficulties to manage, coordinate and align two separate organisations also pose challenges to alliance success (Park & Russo, 2001).

Looking into the impact governance structure has on alliance performance, Delios and Beamish (2004) report that joint ventures had a fifty percent higher survival rate than co- and
minority-owned joint ventures. Similarly, Dhanaraj and Beamish (2004) reported that the
alliance dissolution rate was phenomenally high at very low equity levels. Buchel and Thuy
(2001) also affirm the positive relationship between equity-based governance structure and
alliance performance. Such inferences, however, are challenged by Child (2002), who
suggests that better joint venture performance derives from the combination of ownership,
resourcing and management factors, the credit should not be given to ownership alone.
Garrette and Dussauge’s (1995) study into patterns of strategic alliances between rival firms
also fails to observe a relationship between legal structure and alliance performance. More
recently, Hoetker and Mellewigt’s (2009) findings that a mismatch between governance
structure and asset type can harm the performance of the alliance lend support to Das and
Teng’s (2000) proposition that governance structure should be designed contingent upon
resources involved in the alliances. Looking into international joint venture performance,
Gong, Shenkar, Luo, and Nyaw (2007) observe a positive relationship between contract
completeness and venture performance. In their investigation into R&D intensity and
international joint venture performance in an emerging market, Zhang, Li, Hitt, and Cui
(2007) argue that local-market-related and local-partner-related appropriation hazards are
evident. A positive relationship between R&D intensity and joint venture performance is
found when multinational corporations in possession of valuable innovations and
technological resources have a majority ownership.

Past studies have also identified the impact previous alliance experience has on alliance
performance (e.g. Anand & Khanna, 2000; Heimeriks & Duysters, 2007; Kale, Dyer, &
that for alliance experience to generate satisfactory outcomes, it must be internalised and
codified into collaborative know-how. Zollo et al. (2002) specify that partner-specific
experience is of particular importance for alliance performance and such effect is stronger in the absence of an equity-based governance structure. However, Hoang and Rothaermel (2005), observe a negative relationship between partner-specific experience and joint project performance. According to their study of joint ventures formed between large pharmaceutical firms and small biotechnology firms, performance outcome is only positively influenced by the general alliance experience of small biotechnology partners. Such relationships also exhibit diminishing returns.

Akin to research in other areas of alliances, some researchers approach alliance performance investigations by focusing on some macro-level factors. For example, Kogut (1988b) finds that joint ventures are less stable in highly concentrated industries. Hamel (1991) and Lin and Germain (1998) observe that national differences impact on the outcome of international collaborations. Li, Lam, and Qian (2001) also address cultural influence on joint venture behaviour and performance in the context of the Chinese market. Li, Zhang, and Jing’s (2008) study documented the opposite, suggesting cultural difference is not a hindering factor to performance; in fact, heterogeneity has provided joint ventures (JVs) with better outcomes. Lu (2007) also casts doubt on the direct relationship between cultural differences and collaboration performance and suggested specifically that the nature of the performance measure influences the correlation between cultural impact and performance. Steensma, Tihanyi, Lyles and Dhanaraj (2005) demonstrate how institution and economic transformation alters foreign parents’ roles in the success of and knowledge acquisitions within joint ventures. Others, in comparison, emphasise the influence of organisational factors. Zhan and Luo (2008), in comparison, confirmed the moderating effect of environmental dynamism on international joint venture performance in emerging market contexts.
Looking into international joint ventures, Lu and Ma (2008) observe that a local partner’s affiliation to regional and national business groups contributes to good international joint ventures (IJVs) performance when the partner is located in a region that restricts foreign direct investment (FDI), and when it is operating in a FDI-restricted industry. These findings highlight the value of business group affiliations in emerging economies and their considerable importance when selecting partners in IJVs. Isobe, Makino, and Montgomery (2000) found resource commitment, entry timing, strategic importance of the venture, parental control, and foreign supportive infrastructures collectively contribute to international joint venture performance outcomes. Hambrick, Li, Xin, and Tsui (2001) argue that increasing levels of managerial tension and conflict will have a negative impact on venture success.

Control is another key element being emphasised as strongly influencing international joint venture performance (e.g. Calantone & Zhao, 2001; Choi & Beamish, 2004; Guidice & Cullen, 2007; Luo, Shenkar, & Nyaw, 2001; Mjoen & Tallman, 1997; Steensma & Lyles, 2000; Tiwana, 2008). Steensma and Lyles (2000) warned that although the foreign parent often contributes critical resources to the venture and possesses greater bargaining power and higher levels of influence, an imbalance in management control could lead to detrimental effects on venture survival. Choi and Beamish (2004) suggest that multinational corporations (MNCs) and local partners’ split of control positively impact on international joint venture performance, as such implementation allows for chosen activities to be matched with their respective firm-specific advantages. Guidice and Cullen (2007), on the other hand, identified interaction effects between partner experience, strategic interdependence and control on alliance performance. They also addressed the value of using informal control.
2.1.7 Performance Consequence from Alliances

According to Gulati (1998), alliance performance should be distinguished from performance consequence from engaging in alliances on the ground that the latter focuses more at the firm level of performance outcome. In investigating whether firms benefit from entering alliances, some researchers look into stock market reactions upon announcement of alliances (e.g. Das, Sen, & Sengupta, 1998; Kale et al., 2002; Koh & Venkatraman, 1991; Madhavan & Prescott, 1995; Merchant & Schendel, 2000; Suarez & García-Canal, 2003). Overall, these studies produced mixed evidence on the benefit shareholders receive as a consequence of entering into alliances (Gulati, 1998). More recently, some researchers have reported stronger positive stock market reactions for alliance formations when partner firms share higher degrees of complementarity (e.g. Suarez & García-Canal, 2003) and some degree of business relatedness (Merchant & Schendel, 2000). Madhavan and Prescott (1995) warn that market valuation of an announced joint venture could be affected by industry-level information processing loads. Examining the impact of environmental munificence on abnormal returns resulted from alliances of e-commerce firms, Park and Mezias (2005) add that stock market reactions to alliance formations are largely contingent on the level of environmental munificence such that higher abnormal returns are achieved in the period of low environmental munificence.

From a growth outcome perspective, Sarkar, Echambadi, and Harrison (2001) find that proactive firms, in terms of collaboration actions, generate superior market-based performance (i.e. sales growth, market share, market development and product development) and that this positive relationship is moderated by firm size and environmental uncertainty. Looking into the impact competitive intensity has on collaboration and firm growth across technological environments, Ang (2008) observed higher growth from collaborations for firms facing lower levels of competitive intensity in more technology intensive industries. In
comparison, firms facing higher levels of competitive intensity often achieve higher growth from collaborations in less technology intensive industries. The findings that growth outcomes from collaborations are contingent on firm competitive intensity and technology environments help to explain why previous research into benefits from alliances generates inconclusive results (Stuart, 2000). Tong, Reuer, and Peng (2008), on the other hand, report that international joint ventures do enhance firms’ growth under the condition that they are minority IJVs and/or diversifying IJVs. Such findings highlight the impact ownership structure, product-market relatedness, and geographic location as important contingencies impacting on growth options.

Another approach to assess the consequences of alliance engagement is to examine how survival of firms involved in alliances is affected (Gulati, 1998). Singh and Mitchell (1996) suggest that higher dependence on partner firms could bear negative consequences when partner firms shut down or form new alliances. When either or both of these situations occur, firms that fail to form new alliances themselves are subject to higher threats of business failure. On the other hand, these authors look into how business survival can be improved through engaging in alliances to develop complex technologies and commercialise technologically complex goods (Mitchell & Singh, 1996; Singh, 1997). The results of these findings generally indicate that developing complex technologies and commercialising technologically complex goods lead to higher risks of business failure. While Singh (1997) finds that alliances partially moderate the risks associated with developing complex technologies, the study on survival of business though collaboration to commercialise technologically complex goods generate some results that worth careful interpretation. Mitchell and Singh (1996) find that although alliances help to mitigate the risks of business failure when the environment changes gradually, sudden environmental shock affects the
benefits provided by alliances. Specifically, following the sudden shock, alliance activities that are outside the focus of the shock will exhibit higher survival chances than alliances with activities that are more central to the shock. The critical assessment of consequences of engaging in alliances provides empirical evidence on the generally perceived yet under-tested benefits alliances provide.

With respect to value creation and rent generation through alliances, Lavie (2006) discusses both private (i.e. internal and spillover rents) and mutual rents (i.e. relational rents) for alliance partners. It is proposed that internal rents derived from effective utilisation of the focal firm’s own resources are contingent upon shared and non-shared resources of its alliance partners. While generation of inbound spillover rents are dependent on the strength of the focal firm’s bargaining power and absorptive capacity, outbound spillovers are often reduced when the focal firm has stronger isolating mechanisms. When greater overall relational rents are developed and shared between alliance partners, both inbound and outbound spillover rents will be generated. Aggarwal, Siggelkow, and Singh (2011) show that firm performance improves when a better fit between coordination needs and explorative activities (i.e. activities that allow for opportunities identification, risk taking, experimentation, flexibility, discovery and innovation (March, 1991)) within an alliance is achieved. Lin, Yang, and Arya (2009) observe that allying with partners demonstrating high resource complementarity and social status are instrumental for firm performance. They also confirm that firms with a low social status benefit more performance-wise when allying with partners that have a high social status, and this effect is particularly strong for young firms.

With respect to the role external environment plays, it is suggested the aforementioned relationships are stronger in a stable environment. Jiang, Tao, and Santoro (2010) suggest that higher firm performance can be achieved when firms seek to maximise resource and leaning
opportunities by allying with a variety of partners dispersed among the value chain. Regarding cross-border alliances, Makino and Delios (1996) report a substitute effect between foreign firms’ own local knowledge accumulation and the formation of joint ventures with local partners.

Some investigations have been conducted to examine the impacts of firms’ value chain and relational positions. Some researchers focus on benefits derived from engaging in vertical relationships (Heide & Miner, 1992; Helper, 1991; Rothaermel, Hitt, & Jobe, 2006). It is suggested that a balanced approach of engaging in vertically related collaborative relationships and conducting vertical integrations has a positive impact on product portfolio development, product success and subsequently firm performance (Rothaermel et al., 2006). Regarding value creation through engaging in horizontal alliances, Wassmer and Dussauge (2011) highlight the importance of network resource stocks and flows. They posit that synergistic combinations of new and existing network resources help the focal firm to extract greater value from alliance activities. Shipilov (2009), on the other hand, explains how multimarket contact with alliance partners contributes to reduce risks of non-cooperative partner behaviours. This provides the focal firms greater abilities to augment their performance in open networks. With respect to the effect prior partnering experience on value creation in new alliances, Gulati, Lavie, and Singh (2009) assert that prior experience with the same partner provides greater benefits than general partnering experience.

From a negative viewpoint, Lavie (2007) finds that the relative bargaining power of partners in an alliance portfolio is negatively related to the focal firm’s market performance and such a relationship is stronger when many of these partner firms are within the focal firm’s core industry. The proposed impact bargaining power has on performance outcome is also confirmed by other researchers (e.g. Adegbesan & Higgins, 2011). By a similar token, Bae
and Bargiulo (2004) address the costs derived from a dominant position and non-substitutability of alliance partners. A solution that may help to mitigate such costs is to engage in third-party ties and gains from indirect leverage on those partners.

Furthermore, an investigation into the impact repeated partnerships have on firm performance reports a negative relationship and that such a relationship is stronger in environments with high technological uncertainty (Goerzen, 2007). This finding lends support to Burt’s (1992) argument that over time, the simple enlargement of networks leads to reduced efficiency and effectiveness and fails to generate valuable new knowledge and ideas. In more turbulent environments, new knowledge generation and learning are of critical importance to firm performance. Looking across alliance type, evolution of the alliance, and strategic consequences for each partner firm and impact on competition, Dussauge and Garrette (1997) propose that extension or continuation of a market-penetration-driven alliance by one partner may lead to one-way skill appropriation, which leads to increasing competitive intensity between partner firms.

A vast amount of studies have been conducted to examine the relationship between alliances and technological output (e.g. Ahuja, 2000a; Capaldo, 2007; Duysters & Lokshin, 2011; Ernst, Lichtenthaler, & Vogt, 2011; Faems, Looy, & Debackere, 2005; Fang, 2011; Grimpe & Kaiser, 2010; Hess & Rottaermel, 2011; Karamanos, 2012; Kim & Song, 2007; Lavie, Kang, & Rosenkopf, 2011; Lin, Wu, Chang, Wang, & Lee, 2012; Neyens, Faems, & Sels, 2010; Phelps, 2010; Schilling & Phelps, 2007; Shan et al., 1994; Soda, 2011; Vanhaverbeke, Gilsing, Beerkens, & Duysters, 2009). Many of these studies approach the topic through the lens of a network perspective (e.g. Ahuja, 2000a; Capaldo, 2007; Duysters & Lokshin, 2011; Faems et al., 2005; Karamanos, 2012; Phelps, 2010; Schilling & Phelps, 2007; Soda, 2011; Vanhaverbeke et al., 2009). Majority of these studies confirm positive impacts of various
forms that alliance network involvement has on innovation output. A few caveats have been put forward: Ahuja (2000a), Capaldo, (2007), Karamanos, (2012), Schilling and Phelps, (2007), Shan et al. (1994), and Soda (2009) address the importance of network structure and positioning. Duysters and Lokshin (2011), on the other hand, call for more awareness about cognitive constraints. They propose that despite some evident advantages derived from increasing alliance portfolio complexity, firms will start to experience diminishing returns due to higher management complexity and cognitive limit when alliance portfolio complexity increases beyond a certain level.

Adding to Phelps’s (2010) discussion regarding partner technological diversity and the focal firm’s explorative innovation output, Sampson (2007) suggests that the highest level of innovation performance is achieved when technological diversity is at a moderate level. But hierarchical control and equity engagement improve innovation performance with high levels of technological diversity. Lin et al. (2012) place greater emphasis on absorptive capacity and argue that firms with high levels of such capacity are equipped to reap greater benefit in terms of innovation performance from alliance engagement. They also observe that innovation performance peaks when moderate levels of technological distance exist between partner firms engaging in R&D alliances. Hess and Rothaermel (2011) argue that asset complementarity is instrumental to innovation performance, yet it is contingent on the position of alliances along the value chain. Specifically, they propose that resource combinations within upstream activities are substitutes due to greater knowledge redundancies. Higher performance outcomes derive from resource combinations integrating different parts of value chains that generate a greater complementarity. Fang (2011), on the other hand, observes that while environmental dynamism and process interdependency
strengthen the positive relationship between knowledge complementarity and innovation performance, process complexity and appropriation risks weaken such relationship.

Rothaermel and Deeds (2004) investigate both exploration and exploitation aspects of organisational learning and propose close linkages of exploration alliances with products in development and exploitation alliances with products on the market. While empirical evidence confirms the positive impact exploitation alliances have on products on the market, it also reveals that as firms grow in size, they tend to withdraw from product development and discovery commitments and turn to pursue vertical integrations that allow for commercialisation of promising projects. Lavie et al. (2011) also address the importance of maintaining a balance between explorative and exploitative alliances to achieve optimal performance outcomes. In a similar vein, Grimpe and Kaiser (2010) address the importance of balancing internal and external technological acquisitions. They argue that excessive R&D outsourcing could lead to deterioration of integrative capabilities, which negatively impact on innovation performance. Such effect is more evident when internal R&D expenditures are high and breadth of technological alliances is wide. Ernst et al. (2011), on the other hand, demonstrate the important impact technological experience accumulation and reactivation have on R&D performance.

In contrast to studies reporting positive relationships between alliance engagement and innovation performance, in a recent study of the effect patent pools (a unique form of R&D consortia) have on firm performance in innovation, it is found that licensors and licensees engaging in patent pools suffer from both the quantity and quality of patents subsequently generated compared to nonparticipants (Joshi & Nerkar, 2011). Kim and Song (2007) identify how path dependence of technology base affects new technology generation through alliances. They observe that new technology development through alliances will increase
initially, but when path dependence reaches a certain level, joint invention starts to decrease. Hoang and Rothaermel (2010) also suggest that the R&D project outcome is contingent on relevant alliance experience: while alliance exploitation experience has positive effects on R&D project performance, alliance exploration experience imposes negative effects. These empirical findings offer an important caveat for the taking for granted perception that engaging in alliances may always generate positive innovation outcomes.

With respect to absorptive capacity, attempts to establish a better operationalisation and understanding of the construct have been made. For example, Vasudeva and Anand (2011) further classify absorptive capacity into “latitudinal” and “longitudinal” components. While the former refers to the use of diverse knowledge, the latter is related to the use of distant knowledge. These authors find that while medium diversity in firms’ portfolios demonstrates a positive impact on optimal knowledge utilisation, simultaneous increasing demand on firms' longitudinal absorptive capacity generates a negative impact on knowledge utilisation. Lewin, Massini, and Peeters (2011) decompose absorptive capacity into internal and external absorptive capacity and explain why optimal configuration of routines underlying these two components leads to some firms’ superior abilities to adopt emerging external technological knowledge. These studies contribute to a better understanding of how absorptive capacity acts as an important mediator on alliances (e.g. Koza & Lewin, 1998).

Beyond innovation output, some studies look into the relationship between technological alliances or alliances formed by high-tech firms and general firm performance (e.g. Baum, Calabrese, & Silverman, 2000; Belderbos, Carree, & Lokshin, 2004, 2006; Faems, De Visser, Andries, & Looy, 2010; Gulati & Higgins, 2003; Stuart, 2000; Stuart, Hoang, & Hybels, 1999). Distinguishing R&D alliance partners between competitors, suppliers, customers and research institutes, Belderbos et al. (2004) suggest that R&D alliances formed with different
partners demonstrate variations in emphasis on innovation. While improvement in efficiency can be expected from collaborations with suppliers that focus on incremental innovations, collaborations with research institutes and competitors that place greater emphasis on novel product development are instrumental for firm growth. In a subsequent study, these authors observe that higher managerial costs and complexity derived from engaging in multiple alliances with different innovation objectives could lead to diseconomies of scale in pursuing multiple R&D alliances by smaller firms. Baum et al. (2000) look into startups’ performance in relation to alliance network composition. Their findings show that differences in alliance network composition significantly explain variations in early performance of startups. Examining forces contributing to the establishment of a dominant design, Soh (2010) proposes that the focal firm’s R&D investment, amount of repeated partnerships, and network density largely explain who is more likely to win the race to define a dominant design.

Some researchers suggest that collaborating with young ventures and exploiting complementary technological assets contribute to the incumbent firms’ superior performance (e.g. Rothaermel, 2001, Stuart, 2000). However, this strategy may not generate infinite returns. It is observed that information overload, increasing transaction costs and managerial burdens associated with alliances start to take a toll on incumbents’ abilities to continue enjoying the benefits of resource exploitation as they engage in too many alliances simultaneously (Rothaermel, 2001). Furthermore, although it has been proposed that small firms’ alliances with established incumbents could generate an endorsement effect (Stuart, 2000; Stuart et al., 1999), the other side of the story is these new ventures are often subject to exploitative behaviours by established firms given their financial constraints. Gulati and Higgins (2003) also fail to observe any obvious effects of alliances between young firms and well-established firms on their initial public offering. A study into technology alliance
portfolio diversity and its impact on firms’ financial performance reports that value-enhancing and cost-increasing effects co-exist in technology alliances in pursuit of open innovation (Faems et al., 2010).

Looking into cross-border alliances, Lavie and Miller (2008) warn that national differences and mounting conflicts derived from these differences between foreign and local partners often impose a negative impact on subsequent firm performance. Shrader (2001) looks into the relationship between collaboration and firm performance in foreign markets among young high-technology manufacturing firms. It is suggested that when using collaboration to achieve foreign entry, difficulties associated with transferring and protecting technological advantages will negatively impact on firm performance.

2.1.8 Summary of Alliance Literature Review

The proliferation of alliances has led to a growing stream of research by strategy and organizational scholars who have examined some of the causes and consequences of such partnerships. In this study, a review of this vast field of research is conducted by looking at some of the key facets of firms’ alliance behaviour in the form of the sequence of events. This sequencing includes the decision to enter an alliance, the choice of an appropriate partner, the choice of structure for the alliance, the dynamic evolution of the alliance, and performance consequences both in terms of the performance of the alliance relationship itself and the performance of firms entering alliances. Such an organization ensures a logical flow of the review, which allows readers to develop a clear understanding some of the reasons firms enter alliances, structure them in certain ways, manage and change them, and the performance benefits sought from them.
2.2 Acquisitions

Acquisition is a ubiquitous phenomenon and there are various ways of defining this corporate action. Adopting Hoffmann and Schaper-Rinkel’s (2001) definition, this study defines an acquisition as the purchase of one business or company by another company or business entity. Therefore a distinctive characteristic of acquisitions is that they involve changes in ownership structure, where the acquired company is no longer an independent entity. Overall, the existing acquisition literature has looked at three main areas, including acquisition incentives and partner selection, acquisition performance and post acquisition activities and challenges.

2.2.1 Acquisition Incentives and Partner Selection

The incentives to acquire mainly concern speed and need for growth and diversification (e.g. Kumar, 2005; Seth, Song, & Pettit, 2002; Singh & Montgomery, 1987), acquiring knowledge-based assets (e.g. Barney, 1988; Chi, 1994; Haspeslagh & Jemison, 1991) and technological assets (Belderbos, 2003), asset sharing and reverse internalisation of valuable intangible assets (Seth et al., 2002), improving market power, consolidating an industry’s businesses (e.g. Bower, 1986; Galbraith & Stiles, 1984; Preffer, 1972; Wood, 2009), achieving product market entry, or changing supply chain relationships (e.g. Bain, 1956; Caves, 1981; Lee & Lieberman, 2010; Singh & Montgomery, 1987), achieving internal efficiencies (Seth & Easterwood, 1993; Teece, 1982; Williamson, 1975), lowering systematic risks (Chatterjee & Lubatkin, 1990; Jensen & Ruback, 1983; Lubatkin, 1987), increasing leveraging potential, creating more stable cash flows (Amit & Livnat, 1988), and enhancing strategic focus (Seth & Easterwood, 1993). One stream of studies has specifically focused on how acquisitions are utilised to better manage and deploy resources (Anand & Singh, 1997; Capron, Dussauge, & Mitchell, 1998; Karim, 2006; Karim & Mitchell, 2000). Casciaro and
Piskorski (2005) elaborated on the resource dependence model and found that acquisitions activities were positively related to firms’ mutual dependence but were impeded by power imbalance between the firms.

Research looking into firms’ motivation to conduct acquisitions has also highlighted the connection between managerial and social embeddedness and acquisition motivations (Deutsch, Keil, & Laamanen, 2007; Palmer & Barber, 2001). Managerial mistakes and/or self-wealth maximisation could have contributed to the continuous engagement in acquisition activities regardless of performance uncertainty (Kroll, Wright, Toombs, & Leavell, 1997; Lubatkin, 1983). This is especially true for firms that have size-related CEO compensation. Size-related compensations motivate managers to undertake acquisitions as increase in the size of the firm leads to more power and pay (Geiger & Cashen, 2002).

In a more recent investigation of acquisitions through the behavioural lens, it has been suggested that performance outcome relative to aspiration level, slack, and proximity to bankruptcy influence acquisition motivations and decisions (Iyer & Miller, 2008). The results are that firms’ performances are negatively related to their acquisition activities. This finding lends support to the prediction put forward by the behavioural theory such that firms are more likely to take risks when they are performing poorly or below expectations (Greve, 1998; March & Shapira, 1987). The role firms’ financial conditions play has also been highlighted. The finding of a positive relationship between financial slack and acquisition activities indicates that levels of financial constraint are a major stumbling block for firms to conduct acquisitions.

Some researchers address the importance of observing multiple decisions and calculate criterion with respect to firms’ acquisition activities and argue that this approach will
generate greater insights and understanding of their acquisition motivations compared to simply asking subjects about their acquisition decision policies (Stahl & Zimmerer, 1984). Consistent with this proposition, Haleblian, Kim, and Rajagopalan (2006) look into the impact prior acquisition experience, recent acquisition performance, and the interaction between these two factors have on the likelihood of subsequent acquisition activity. They report a positive relationship, which highlights the role increasing confidence plays in affecting firms’ acquisition behaviours. Adding to this stream of research, Yang, Lin, and Peng (2011) found that an explorative learning approach and joint and relative alliance network embeddedness contributed to the acquisitions of alliance partners.

Acquisitions and divestitures are also investigated together in research pertaining to corporate portfolio restructuring. Bergh and Lawless (1998) observe directly opposite acquisition and divesture behaviours between less diversified and more diversified firms. While the former firms acquire under increasing uncertainty and divest under decreasing uncertainty, the later firms act in opposite directions. Findings pertaining to highly diversified firms are consistent with previous findings on portfolio restructuring and uncertainty, which highlights the role information-processing load plays in affecting restructuring activities (Alexander, 1991; Galbraith, 1973; Lawrence & Lorsch, 1967). On the other hand, empirical results provide support for less diversified firms’ utilisation of “portfolio management” approach to address changes and uncertainty (Bergh, 1998). Adopting the adaptation and selection perspective from evolutionary theory, Fortune and Mitchell (2012) proposed that acquisitions facilitate an exit of the market for struggling firms. While exit by dissolution represents selection of both firms and capabilities, exit by acquisition represents firm selection but capability adaptation.

One stream of research focuses specifically on the substitution effect between internal versus external development of technology in the context of acquisition activities (Benson &
Ziedonis, 2009; Blonigen & Taylor, 2000; Capon & Glazer, 1987; De Bondt, 1997; Hagedoorn & Wang, 2012; Heeley, King, & Covin, 2006; Hitt et al., 1990, 1991; Hitt, Hoskisson, Johnson, & Moesel, 1996; Kamien & Schwartz, 1982; Lichtenberg, 1992; Ravenscraft & Scherer, 1987; Ruckman, 2009). Reasons identified for internal development of technology include potentially cheaper cost, relatively close technological distance, development of expertise in a particular technological area, confidential knowledge, and the “invented here” syndrome. In comparison, firms that choose to obtain technology through acquisitions are motivated by avoidance of overlapping effort, faster growth and catch up with competitors, complex technology needs, and risk reduction (Capon & Glazer, 1987). This stream of studies generally reports that firms’ technology investments and acquisition activities are negatively correlated (Benson & Ziedonis, 2009; Blonigen & Taylor, 2000; De Bondt, 1997; Heeley et al., 2006; Hitt et al., 1990, 1991; Hitt et al., 1996; Kamien & Schwartz, 1982; Lichtenberg, 1992; Ravenscraft & Scherer, 1987; Ruckman, 2009). Firms often acquire other firms to obtain and explore their technological resources (Ahuja & Katila, 2001; Bresman, Birkinshaw, & Nobel, 1999; Capron & Mitchell, 1998; Heeley et al., 2006; Ranft & Lord, 2000; 2002; Zhao, 2009).

Some empirical evidence lends strong support to the notion that increasing spending on acquisitions aiming at obtaining external technological assets largely hinders organisations’ internal knowledge development (e.g. Benson & Ziedonis, 2009). However, Prabhu, Chandy, and Ellis (2005) find that for firms that first engage in knowledge development, acquisitions contribute to better innovation performance. In a more recent study, Kaul (2012) argues that technological innovations could lead to increasing needs for firms to reconfigure their corporate portfolio, which enables resources to be deployed in areas of new opportunity. Simultaneous implementations of resource-seeking acquisitions and divestment out of
existing noncore businesses facilitate successful innovation. Furthermore, it is observed that this relationship is moderated by the level of investible resources available to the firm, which lends further support to the notion that resource constraint plays a significant role in determining firms’ abilities to conduct acquisitions. Kaul’s (2012) study also reports that beside internal motivations, rival firms’ innovation activities provide strong stimuli for focal firms to initiate resource-seeking acquisitions. Hagedoorn and Wang (2012) look at both complementarity and substitutability between internal and external R&D and conclude that when the focal firm demonstrates stronger R&D commitment, external R&D is complementary to internal effort. In comparison, when internal R&D investment is low, external R&D becomes an effective substitute.

With respect to the impacts macro-level factors have on acquisition behaviours, McCarthy (1963) has suggested that acquisitions might be simply another form of investments that would prosper during rapid market expansion as many other types of investments do. More recently, McNamara, Halebian and Dykes (2008) found evidence that environmental munificence and dynamism both affect firms’ acquisition activities. While the former motivates firms to seize early mover advantages, the latter often leads to bandwagon pressures due to increasing uncertainty about the market environment.

International market entry mode choice is another research area that includes some detailed discussion of acquisitions, with a large body of the literature focusing on analysing the choice between greenfield vis-à-vis acquisition (e.g. Andersson & Svensson, 1994; Barkema & Vermeulen, 1998; Brouthers & Brouthers, 2000; Caves & Mehra, 1986; Cho & Padmanabhan, 1995; Hennart, Larimo, & Chen, 1995; Hennart & Park, 1993; Kogut & Singh, 1988; Padmanabhan & Cho, 1995). Several major factors have been highlighted as leading to firms’ preferences of acquisitions over other modes, which include: CEO
throughput functional experience and international experience (Herrmann & Datta, 2006), higher costs of setting up green field operations compared to entry via acquisitions (Shaver, 1998), entry into new business lines (Chang & Rosenzweig, 2001), adoption of a multidomestic strategy (Harzing, 2002), desirable assets detached with unwanted assets, greater host market experience, and very slow or very rapid industry growth in the host market (Hennart & Reddy, 1997), other firms’ entry via acquisitions (Lu, 2002), high industry-level profitability and plant scale (Elango & Sambharya, 2004) and a high level of industry concentration (Chatterjee, 1990).

In a more recent attempt to investigate entry mode adoptions, Anand and Delios (2002) observe that upstream capabilities are geographically more fungible and downstream capabilities tend not to be geographically fungible. This difference leads to variations in acquisition motives such that while the absolute level of downstream capabilities in the host market increases firms’ propensities to enter through acquisitions, the relatively higher upstream capabilities in host markets explains firms’ preference to enter via acquisitions. These findings demonstrate that acquisitions are utilised for capability seeking and exploitation purposes.

On the other hand, cultural distance and uncertainty avoidance (Kogut & Singh, 1988), high host country risk (Erramilli & Rao, 1993) relatedness of the entered industry (Chatterjee, 1990; Hennart & Reddy, 1997), and a relatively bigger asset base of the focal firm (Kogut & Singh, 1988) are negatively related to the choice of acquisitions as the preferred mode of entry. Barkema and Vermeulen (1998) observed that while multinational diversity leads to preferences of foreign entry via start-ups rather than acquisitions, product diversity and firms’ propensities to entry via acquisition demonstrates a U shaped relationship, and the effect becomes weaker at higher levels of multinational diversity.
With respect to disincentives to acquire, Singh and Montgomery (1987) suggest that unavailability of potential acquisition candidates and price and transaction cost concerns are the major factors. Sanders (2001) found executives’ risk propensities in particular relation to stock ownership versus option pay significantly influence a firm’s acquisition activities. Specifically, while there is a negative relationship between CEO stock ownership and firm acquisition activities, CEO stock option pay is positively related to firm acquisition activities. Such contrast boils down to risk-seeking vis-à-vis risk aversion behaviours provoked by different compensation structures. Given the high-perceived risks associated with acquisitions, it is expected that risk aversion behaviours stimulated by stock ownership structure will be reflected in acquisition activities. Given the increasing awareness of post-acquisition challenges, Shaver and Mezias (2009) have warned decision makers to take into consideration diseconomies derived from managing the combined entities after acquisition when forming acquisition strategies.

Selection of an acquisition target constitutes an important part of the entire acquisition process (Barney, 1988; Harrison et al., 1991; Ramaswamy, 1997; Singh & Montgomery, 1987). Knowing what are expected from the target and the acquiring firms that contribute to the fulfillment of acquisition purposes will generate good performance outcome. Some researchers observed a learning effect during this process. For example, Baum, Li, and Usher (2000) reported that while experiential learning leads to replication of target preference and selection, vicarious learning motivates decision makers to imitate other visible and relevant organisations’ acquisition behaviour.

Research built upon a behavioural perspective has also highlighted risk as an important factor influencing a manager’s acquisition target selection, acquiring decisions, processes, and outcomes (e.g. Pablo, Sitkin, & Jemison, 1996). Experiential learning and mimetic behaviour
in acquisition activities have been observed. It is argued that firms are more likely to follow
the crowd in exploring new strategies (e.g. March, 1991; Rosenkopf & Nerkar, 2001; Yang &
Hyland, 2006). On the other hand, over-commitment to the acquisition of particular targets
has been observed, which could be influenced by three factors: personal responsibility for the
decision to acquire the target, competition for the target, and whether the decision to acquire
the target is public. It is suggested over-commitment could lead to unsatisfactory outcomes
(Haunschild, Davis-Blake, & Fichman, 1994). Looking into factors leading to resistance for
acquisitions, managerial prestige and power changes are identified as playing an important
role (D’Aveni & Kesner, 1993).

Some research focuses on information dilemmas and uncertainty, especially relating to
acquisitions involved with obtaining knowledge-based assets (e.g. Coff, 1999). It is
highlighted that relatedness plays an important role in such contexts, while buyers cope with
such issues by offering lower bid premiums (Akerlof, 1970), using contingent payments (Chi,
1994; Eckbo, Giammarino, & Heinkel, 1990) and increasing information both through
lengthy negotiations (Pruitt, 1983) and by avoiding tender offers, when buyer and target firms
are unrelated, these mechanisms are not often deployed (Coff, 1999). The role human capital
plays in affecting acquisition activities (e.g. Coff, 2002) has also been looked at. It has been
suggested that shared expertise mitigates hazards derived from uncertainty associated with
human capital in acquisitions (Coff, 2002).

2.2.2 Acquisition Performance

As reflected in a recent meta-analysis of post-acquisition performance (King, Dalton, Daily,
& Covin, 2004), a great proportion of the research adopts accounting-based financial
performance to assess performance outcomes of acquisition activities. Beside these measures,
some studies also look into stock market reaction as an indicator for acquisition performance (e.g. Bessler & Murtagh, 2002; Capron & Shen, 2007; Carow, Heron, & Saxton, 2004; Rosen, 2006). This measurement contrasts financial based measurement in the way that it normally reflects short-term/immediate effect. An event study methodology (Shelton, 1988) is normally employed (e.g. Flanagan, 1996). Overall, research into acquisition performance has generated some mixed findings. While some studies report a positive relationship between acquisition experience and performance outcome (e.g. Barkema, Bell, & Pennings, 1996; Bruton, Oviatt, & White, 1994; Fowler & Schmidt, 1989; Power, 1982), others found no significant relationship (e.g. Bruton et al., 1994; Hayward, 2002; Kroll et al., 1997; Newbold, Stray, & Wilson, 1976; Wright, Kroll, Lado, & Van Ness, 2002; Zollo & Singh, 2004) or U-shaped relationships (Haleblian & Finkelstein, 1999; Porrini, 2004b). A negative relationship between acquisition and performance is also reported (e.g. Fowler & Schmidt, 1988; Krishnan, Hitt, & Park, 2007).

Several common firm- and transaction-level factors have been identified as impacting on the financial performance of acquiring firms, which include: relative size, acquisition rate, industry commonality, timing, type of consideration, acquire profitability and price paid (Booz, Allen, & Hamilton, 1960; Kusewitt, 1985; Laamanen & Keil, 2008; Lubatkin, 1983; Rockwell, 1968), number of bidders, regulatory changes (Datta, Pinches, & Narayanan, 1992), and strategic fit and/or similarity between acquirer and the acquired firms (e.g. Ramaswamy, 1997; Uhlenbruck & De Castro, 2000). Moreover, prior acquisition experience is perceived as having a positive impact on acquisition performance (e.g. Hayward, 2002; Szulanski, 1999). However, some researchers found no support for such relationships (e.g. Haleblian & Finkelstein, 1999; Kusewitt, 1985) while others argue that the relationship is contingent on the types of acquisition experience (Ellis, Reus, Lamont, & Ranft, 2011;
Haspeslagh & Jemison, 1991). By a similar token, the impact of acquiring prior alliance partner on acquisition performance is examined (e.g. Zaheer, Hernandez, & Banerjee, 2010). Zaheer et al. (2010) report that previously frequent and in-depth interactions with alliance partners contribute to partner-specific absorptive capacity, which helps to reduce information asymmetry in acquisitions. When acquiring alliance partners under such condition, better value creation through acquisitions can be achieved.

Many studies emphasise the importance of synergy creation through acquisitions (Chatterjee, 1992; Haspeslagh & Jemison, 1991; Hitt, Harrison, & Ireland, 2001; Larsson & Finkelstein, 1999). It is suggested that acquisitions are often followed by asset divestiture and resource redeployment, which contribute to the creation of synergy (Anand & Singh, 1997; Capron, 1999; Capron et al., 1998; Capron, Mitchell, & Swaminathan, 2001; Karim & Mitchell, 2000; Seth et al., 2002). The importance restructuring and its impact on acquisition performance are well addressed in Barkema and Schijven’s (2008) study. Technological and marketing complementarity between an acquirer and the target firm is also perceived as positively relating to synergy creation (King, Slotegraaf, & Kesner, 2008). Resources and capabilities characteristics (e.g. Anand & Singh, 1997; Capron & Hulland, 1999) and direction of assets transferring and reconfiguration (e.g. Capron, 1999; Capron & Hulland, 1999; Capron & Pistre, 2002) are highlighted as two specific determining factors on post-acquisition firm performance. While Anand and Singh (1997) address the important impact of fungibility on post-acquisition performance outcome, Capron and Hulland (1999) explain the relationship between resource immobility and revenue-based synergy creation for overall firm performance.

A positive performance outcome is also expected when there is a complementarity between acquirer and target firms (e.g. Capron et al., 1998; Harrison et al., 1991; Kim & Finkelstein,
2009; King et al., 2008; Wang & Zajac, 2007). Out of these studies, complementarities between technology and marketing resources are highlighted as of greater importance. Chatterjee (1992) addressed the importance of value creation from a post-acquisition restructuring process such that if little restructuring were initiated at the target firm, little value would be created. In a more recent study, Barkema and Schijven (2008) proposed that optimal synergy from acquisition is achieved over extended periods of time, during which restructuring following initial integration is required. During the process of integrating knowledge-based assets, codification and exploitation of knowledge play a critical role, which have a significant positive impact on post-acquisition performance (Vermeulen & Barkema, 2001; Zollo & Singh, 2004).

From a value creation perspective, Chatterjee (1991) reports that acquirers from concentrated markets conducting acquisitions in fragmented markets achieve the highest level of gains and enjoy significant market power improvement. Uhlenbruck, Hitt, and Semadeni (2006) also observe marker power improvement and achievement of scale and scope economies derived from acquisition activities. Kitching (1967), Salter and Weinhold (1978) and Biggadike (1979) found that value would be created when there was little size differential between the acquirer and acquired as the match in size facilitates achievement of the critical mass. These findings are confirmed by Gluck (1979), Kumar (1977) and Terry (1982), who warn acquirers not to conduct very small acquisitions. Some authors suggested that success of an acquisition strategy would depend significantly on the attributes of the target firms (e.g. Kroll & Caples, 1987), such as pre-acquisition performance of the acquired firms (e.g. Seetoo, 1977), and such factors should be taken into consideration when planning a transaction (Bradley & Korn, 1981, p.86; Salter & Weinhold, 1979, p.162). However, a review of Federal Trade Commission data revealed that many companies were bought despite their
operational and/or financial struggle, which might be due to the confidence of acquirers to redepoy valuable resources and turn around the situation (Kusewitt, 1985). A very recent study looking into the impact prior resource allocation decisions have on post-acquisition performance highlights that in the absence of prior communication, the development and transference of pre-acquisition stage routines may be inappropriate post-acquisition. This could lower post-acquisition performance (Agarwal, Anand, Bercovitz, & Croson, 2012).

With respect to both synergy creation and value creation, many studies generated results in support of horizontal acquisitions and related acquisitions (e.g. Anand & Singh, 1997; Flanagan, 1996; Hopkins, 1987; Rumelt, 1974; Shelton, 1988; Shleifer & Vishny, 1991; Singh & Montgomery, 1987). Within the economic field, horizontal acquisitions are seen as mechanisms to reduce competition and increase a firm’s influence over the market (Heflebower, 1963; Scherer, 1970; Scherer & Ross, 1990; Stigler, 1964). Efficiency gains in terms of economies of scale and scope are the other major advantage provided by horizontal acquisitions (Capron et al., 1998; Dutz, 1989; Jensen, 1986; Lubatkin, Schweiger, & Weber, 1998). However, the proposition regarding market power improvement through eliminating numbers of competitors has been severely challenged and received little support (e.g. Eckbo, 1983; Scherer & Ross, 1990; Stilan, 1983), except suggestions from some authors that these gains may still matter in declining industries (e.g. Anand & Singh, 1997; Dutz, 1989). Efficiency-linked effects, on the other hand, received much stronger support (e.g. Anand and Singh, 1997; Capron, 1999; Capron and Mitchell, 1997; Capron et al., 1998; Capron et al., 2001; Seth, 1990b).

Horizontal acquisitions have also been considered as allowing firms to obtain complete knowledge systems (Tsoukas, 1996) that are brought under a unified control (Nelson & Winter, 1982) and entire sets of critical resources and capabilities. As highlighted by Teece
and Pisano (1994), certain specialised resources may be subject to market failure, which makes purchasing companies and business units containing valuable and strategic resource bundles a quick and effective way to obtain desirable assets. Capron et al.’s (1998) observation that acquirers and acquired firms tend to redeploy resources that are frequently facing market failure, to a large extent, provided strong support for this proposition. Transfer of resources and knowledge within one company is also believed to be easier to implement and more effective than in other forms of arrangements (Eschen & Bresser, 2005; Reuer, 2001; Teece, 1986). Consistent with this idea, Karim and Mitchell (2000) identify acquisitions as important mechanisms for business reconfigurations as they allow firms to leverage of existing resources and obtain different resources. Seth et al., (2002) have also shown supporting evidence within a cross-border context.

Value created through related acquisitions is largely classified as synergy creation (Brush, 1996; Singh & Montgomery, 1987), reduced information asymmetry and buffer of market movement (Chatterjee & Lubatkin, 1990). Hopkins (1987) compared and contrasted three acquisition strategies, namely the conglomerate, technology-related and marketing-related strategies and results of the study suggested that all three acquisition strategies were associated with declining market position, but marketing-related acquisitions were associated with a superior position. This study, to an extent, confirms the proposition that related acquisitions allow for the leverage and deployment of valuable resources, which lead to better performance compared to conglomerate acquisitions.

Singh and Montgomery’s (1987) study also demonstrated that related acquisitions had greater total dollar gains than unrelated acquisitions. In particular, they suggested that related target firms benefited more from the acquisition than unrelated target firms. In a subsequent study,
Pennings, Barkema, and Douma (1994) compared and contrasted different expansion modes and directions. According to them, firms’ expansions were more sustainable when relating to their core skills, were fully owned and the result of acquisition rather than internal development. Anand and Singh (1997) approached the topic through an asset redeployment perspective. Results suggested that under declining industries, consolidation-oriented acquisitions outperformed resource-redeployment oriented acquisitions. In contrast, Fowler and Schmidt (1989) did not find evidence supporting the proposition that related acquisitions lead to better performance. Instead, they observed that post-acquisition performance improved significantly when the acquiring firms had previous acquisition experience, obtained a higher degree of ownership control, or were older. Barney (1988), on the other hand, proposed that related acquisitions only contribute to better returns when bidding firms enjoy private and uniquely valuable cash flows with targets, inimitable and uniquely valuable synergistic cash flows with targets, or unexpected synergistic cash flows. Drawing on work from transfer theory at the individual unit of analysis, Finkelstein and Halebian (2002) suggest that similarity in industry characteristics between acquirers and the acquired firms positively impact on post-acquisition performance.

In contrast to these studies that are particularly in favour of related acquisition strategies, Seth (1990a) found no evidence supporting the propositions that related acquisitions create more value than unrelated acquisitions on average, large relative size of target firms is observed to strongly affect results in favour of related acquisitions. Seth (1990b) also suggests that while related acquisitions generate value through economic efficiencies and from market power, value creation can be achieved through a coinsurance effect in unrelated acquisitions. Park (2003), in comparison, observed that acquiring firms that were more profitable in their industries prior to acquisition often acquired related businesses; and related acquirers were
often operating in more profitable industries than unrelated acquirers, prior to acquisition. Clougherty and Duso (2009), on the other hand, draw on multiple theoretical disciplines (strategic management, industrial organisation economics, finance, and organisational ecology) and argue that it is beneficial not to participate in horizontal mergers. This is because non-merging rivals could free ride on advantages derived from merging firms, such as reduced competition and a merger failure-induced decline in performance of merging rivals. In the investigation of performance outcome of acquiring financially distressed firms, Bruton et al. (1994) reported that neither relatedness between acquiring and acquired firms nor prior acquisition experience matters in terms of generating desirable outcomes when acquired firms were financially distressed. These findings, to a large extent, cast doubt on the proposition that better performance post-acquisition is a result of relatedness. It may simply reflect systematic ex ante performance differences.

Chatterjee and Lubatkin (1990) also found that both related and unrelated acquisitions are effective at mitigating general environmental risk. However, these authors clarified that these findings did not indicate whether a conglomerate strategy should be pursued, as conglomerate diversification strategies connote firms whose businesses are essentially unrelated, which leads to a single act of corporate acquisition into unrelated areas. Lubatkin and O’Neill’s (1987) study examined previously proposed relationships between different types of acquisitions and risk reduction and reported that all types of acquisitions are associated with significant increases in unsystematic risk. However, related acquisitions are associated with a significant decline in systematic risk and total risk compared to other types of acquisitions. Bergh (1997) highlighted four advantages for conducting unrelated acquisitions (i.e. financial synergy, governance efficiency, managerialism and coinsurance). According to Bergh, unrelated acquisitions are subject to divestiture when failing to deliver expected benefits.
Barkema and Schijven (2008) observed that the impact of an additional related acquisition on a firm’s performance becomes less positive as its acquisition sequence grows and the probability of restructuring increases with relatedness between acquirers and the acquired firms. Their findings largely reflect the initial increase of inefficiencies potentially derived from suboptimal organisational fit, asymmetry in culture, structures, systems, routines, and aspects alike, which leads to managerial resources being overstretched and subsequently compromising of effectiveness and efficiency of integration.

Diversification has been frequently linked with acquisitions and performance consequences as well (e.g. Baker, Miller, & Ramsperger, 1981; Kitching, 1967; Song, 1983). Some pioneering research analysed varying degrees of diversification (e.g. Rumelt, 1982), and different types of acquisitions, e.g. vertical, horizontal, concentric marketing, concentric technology and conglomerate (Baker et al., 1981; Kitching, 1967). Song (1983) suggested that firms tend to use acquisitions to balance their business segments in terms of product life-cycle stages. Significant structural matches between the acquired and acquiring firms allow for better exploitation of strengths and overcoming weaknesses. Similar to the findings for relationships between related and unrelated acquisitions on firm performance, results within this stream of research are also inconclusive in terms of whether diversification-driven acquisitions would outperform related acquisitions (Kusewitt, 1985).

Besides firm-level and dyadic-level factors, industry and market conditions have long been seen as significantly affecting acquisition behaviours and consequently performance outcomes. Many researchers observed accelerations of acquisition activities during rapid market expansion and vice versa (e.g. Beman, 1973; Bradley & Korn, 1981; Kumar, 1977; Lynch, 1971; McCarthy, 1963; Pangarkar & Lie, 2004; Salter & Weinhold, 1979, 1982). Wan and Yiu (2009) posit that compared to periods before and after an environmental jolt,
corporate acquisitions during a jolt would be positively related to firm performance, and such relationships are moderated by firms’ financial slack.

In addition to these aforementioned studies, one research line looks specifically at the linkage between acquisitions and firms’ innovation performance (e.g. Graves & Langowitz, 1993; Hitt et al., 1990; Hitt et al., 1996; Kapoor & Lim, 2007; Keil et al, 2008; Makri, Hitt, & Lane, 2010; Phene, Tallman, & Almeida, 2010; Puranam, Singh, & Zollo, 2006; Tsai & Wang, 2008; Valentini, 2012). On the negative side, it was observed that due to increasing managerial responsibilities, information processing load, and costs derived from purchasing, there is a tradeoff between growth by acquisitions and managerial commitment to innovation (Hitt et al., 1990). Decreasing returns to scale in R&D as rising levels of R&D expenditure were also observed within the pharmaceutical industry, of which Graves and Langowitz (1993) warned the wave of mergers and acquisitions may yield less innovative productivity than managers expected. Hitt et al. (1996) have also reported that firms engaging in acquisitions and divestitures tend to compromise strategic controls hence internal innovation for financial controls, but their motivation to search for external innovation that provides short-term benefits in competitive advantage increases. Valentini (2012) examines the impact acquisitions have on patenting quantity and quality. It is observed that while acquisitions tend to increase patenting quantity, they demonstrate a negative effect on overall patenting quality in regards to impact, originality and generality.

More recently, Keil et al. (2008) observed that modes of governance and relatedness of external business development interact to impact on innovation performance. Tsai and Wang’s (2008) investigation of how external technology acquisition affects firm performance finds that external technology acquisition is positively related to firm performance, and such relationships are stronger when greater internal R&D efforts have been made. Their finding
indicates that increasing absorptive capacity developed through higher internal R&D commitment allows firms to better utilise externally acquired technological resources. Makri et al. (2010) also confirm that both complementary technologies and knowledge relatedness positively impact on innovation outcomes in high technology related acquisitions. Kapoor and Lim (2007) look specifically into the impact of acquisitions on the productivity of inventors from the acquired firms. The findings showed higher productivity is achieved when there is greater overlap in routines and moderate overlap in skills, whereas relatively larger size of acquired firms helps to maintain an incentive system, which in turn contributes to greater productivity. These results highlight the importance of incentive-based and knowledge-based determinants for post-acquisition innovative performance. As suggested by Puranam et al. (2006), to truly benefit from acquisitions motivated by a desire to obtain knowledge assets, a high degree of post-acquisition integration may be needed. This is because integration helps acquirers to reconfigure their own resource base by recombining those with acquired firm’s knowledge and these newly developed resources as inputs to generate new innovation (Puranam & Srikanth, 2007). In a recent study looking into technological resource exploration and exploitation, Phene et al. (2012) found that although comprehension is necessary for exploitation through acquisitions, novelty and comprehension are needed to truly benefit from acquisitions in pursuing exploration.

In contrast to these studies, Ahuja and Katila (2001) distinguished between non-technological and technological-based acquisitions. Their findings demonstrate that technological acquisitions do improve post-acquisition innovative performance. In addition, when conducting technological acquisitions, the absolute size and relative size of knowledge bases between acquirer and the acquired firm, as well as relatedness have varying impacts on innovative performance. This study not only provides support for propositions stating value
generated from economy of scale and scope, and importance of obtaining external sources of technology, but also confirms the three kinds of deficiencies in the context of organisational learning highlighted in prior literature: underestimation of challenges in the integration process; over-exploration, or venturing into completely new knowledge; and overexploitation of immediate neighbourhoods of the already well-known while being short-sighted for the more distant options (Levinthal & March, 1993). Puranam and Srikanth (2007) argued that post-acquisition integration helps acquirers use the acquired firms’ existing knowledge as an input to their own innovation processes, but it simultaneously hinders their reliance on the acquired firms’ independent capability to contribute to ongoing innovation. They also showed that experienced acquirers are better able to mitigate the disruptive consequences of the loss of autonomy entailed by integration.

When seeking reasons for the poor performance of acquisitions, human and behavioural factors are among the most critical aspects (Cartwright & Cooper, 1992; Hunt, 1990; Napier, 1989). Larsson and Finkelstein (1999) observed a negative relationship between employee resistance and the realisation of synergies potentially available through an acquisition. Birkinshaw, Bresman, and Håkanson (2000) also conclude that a badly managed human integration can severely sabotage the post-acquisition integration process. Furthermore, stress, uncertainty, and rumouring in times of acquisitions have been found to impact the financial performance of the parent firm (Buono & Bowditch, 1989; Davy, Kinicki, Kilroy, & Scheck, 1988; Marks & Mirvis, 1985). Badly managed acquisitions also lead to labour and managerial turnover (Hambrick & Cannella, 1993; Hayes, 1979; Krug & Nigh, 2001; Very, Lubatkin, Calori, & Veiga, 1997) and higher degrees of absenteeism (Davy et al., 1988). Both of these activities will have a potentially detrimental effect on firm effectiveness. The significance of the people dimension gains more weight if considered in terms of the long-
term nature of these reactions—they persist and tend even to become emphasised over time (Schweiger & DeNisi, 1991). In contrast to all these arguments and evidence, Teerikangas (2012) reported different findings in a very recent revisit of the topic. In this study, it is found that when a proposed acquisition brings perceived opportunities to the target firm, employee reaction is more positive. The profound implication of this study therefore is that change associated with acquisition does not necessarily bring negative human reactions that sabotage performance. Positive acquirer behaviour and future intentions may contribute to employee motivations, which are constructive to acquisition performance.

Another stream of research places emphasis on management and ownership structure and the impact these factors have on acquisition behaviours and performance consequences. For example, Wright et al. (2002) observed influence of executive equity stakes and stock option on firms’ risk-taking and acquisition returns. McDonald, Westphal, and Graebner (2008) also propose that outside directors’ prior acquisition experience positively contributes to firms’ acquisition decisions and performance, especially when the firm’s board is independent of management. However, firms that pursue acquisitions as a result of managerial hubris or self-interest have a greater tendency to end up with poor performing acquisitions. Diminishing performance is inevitable when managers over-value the benefits from acquisition and paying a significant amount of acquisition premiums (Hayward & Hambrick, 1997). This negative consequence on performance is heightened when managers are over-confident in their ability to restructure and improve poorly performing targets (Roll, 1986). Subsequent studies established further connections between different ownership structure (e.g. Kroll et al., 1997) as well as acquisition performance assessing criteria and CEO rewards (e.g. Wright, Kroll, & Elenkov, 2002). Lane, Cannella, and Lubatkin (1998) however, found no supporting evidence—suggesting that ownership control and monitoring had little effect on acquisition decisions.
and performance of firms (e.g. risk and return). Managerial perceptions regarding the acquisitions (i.e. loss of autonomy, inferior status, not being appreciated) are also found to affect acquired firm performance (Very et al., 1997).

Comparing performance consequences derived from method of payment and price paid, some researchers found that cash acquisitions were associated with better return on total invested capital and earnings per share (EPS) than stock options (Nielsen, 1972). Price premium paid was highlighted as one of the principal determinants of profitability in acquisitions (e.g. Hogarty, 1970), which generally appeared to be negatively related to post-acquisition shareholder wealth and performance outcome (e.g. Beckman & Haunschild, 2002; Hayward & Hambrick, 1997). In a meta-analysis of factors influencing wealth creation from mergers and acquisitions, Datta et al., (1992) found that the use of stock financing has a negative impact on the wealth of both the target and bidding firms’ shareholders. McNamara et al. (2008) reported that method of financing moderates the relationship between timing of participation in an acquisition wave and firm performance. Kusewitt (1985), on the other hand, found no evidence of a payment-related effect on acquisition performance. Laamanen (2007) also argued that the acquisition premium paid for R&D-related assets was not a major factor leading to negative abnormal returns. Instead, the overall target price levels independent of premia was an important determinant of abnormal returns. One stream of research looks specifically into conflicting interest in the relationship between investment bankers and the firms they represent during merger and acquisition negotiations (e.g. Bazerman, Neale, Valley, Zajac, & Kim, 1992; Kesner, Shapiro, & Sharma, 1994). In general, these studies confirmed that inflated premiums lead to unsatisfactory results.

In a similar vein, some investigations are conducted to explain the impact of anti-takeover provisions in acquisition premiums on post-acquisition outcome (e.g. Thosar, 1996; Turk,
1992). Overall, it is reported that while such provision demonstrates a negative impact on the acquiring firms’ shareholder value, target firms’ shareholders gains from it. Sundaramurthy (2000) has looked further into the phenomenon and developed a framework explaining when rather than whether such behaviour enhances or erodes shareholder value. Specifically, he suggests that while provisions including unfair pricing are adopted without shareholder consent lead to negative outcomes, those ones including fair price do not demonstrate a damaging effect on shareholder value.

2.2.3 Post Acquisition Activities and Challenges

Effective post-acquisition integration is highlighted as an important factor influencing performance outcome (Chatterjee, Lubatkin, Schweiger, & Weber, 1992; Cording, Christmann, & King, 2008; Datta, 1991; Haspeslagh & Jemison, 1991; Larsson & Finkelstein, 1999; Larsson & Lubatkin, 2001; Puranam, Singh, & Chaudhuri, 2009). Ellis, Reus, and Lamont (2009) specifically discuss how procedural justice and informational justice independently and interactively impact on during and post-acquisition integration and consequently value creation for related acquisitions. Ranft and Lord (2002), on the other hand, highlight the role technological knowledge characteristics (i.e. tacitness and social complexity) play in post-acquisition assets transfer. They also explain how key dimensions of implementation (i.e., speed, communications, autonomy and retention of key employees) mediate the relationship between management practices, acquisition context and the success of asset transfer. Given the observation that post-acquisition integration often leads to destruction of valuable innovative capabilities of the acquired firms (e.g. Birkinshaw et al., 2000; Chaudhuri & Tabrizi, 1999; Graebner, 2004; Puranam et al., 2003; Ranft & Lord, 2002), Puranam et al. (2009) investigate into when structural integration is not necessary. They conclude that pre-existence of shared and common knowledge between the acquiring
and the acquired firms can lead to alternative organisation of coordination, which may be less disruptive than structural integration.

Resource redeployment is an important post-acquisition process. With respect to integration challenge and impact on performance, King and Zeithaml (2001) conclude that intra-firm ambiguity hinders a manager’s ability to identify, appropriate and transfer resources to combine and improve performance. Thus, the integration process becomes more difficult with intra-firm ambiguity. Shaver (2006) also warned that integrating businesses to realise synergy might actually adversely affect the distribution of potential outcomes through contagion and capacity effects. The former effect derives from increased connectivity and dependence between acquirer and the target firms, which raises the chance of these businesses suffering from changes in the environment or actions by competitors. The latter effect reflects combined firms’ reduction in slack resources hence decreasing ability to capitalise on positive external shocks.

The negative impact of employee resistance on integration and synergy creation is also evident (Larson & Finkelstein, 1999; Birkinshaw et al., 2000). Unfortunately, one of the events frequently associated with acquisitions is layoff of employees (e.g. Iverson & Pullman, 2000; O’Shaughnessy & Flanagan, 1998) and consequences pertaining to employee coping processes (e.g. Amiot, Terry, Jimmieson, & Callan, 2006). By a similar token, another frequently observed post-acquisition phenomenon is top management turnover (Buchholtz, Ribbens, & Houle, 2003; Cannella & Hambrick, 1993; Datta, 1991; Graebner, 2004; Krug & Hegarty, 1997, 2001; Shanley & Correa, 1992; Walsh, 1988; Walsh & Ellwood, 1991; Zollo & Singh, 2004). Within this stream of literature, the negative effect of executive departures on the performance of acquired firms is well recognised (e.g., Cannella & Hambrick, 1993; Zollo & Singh, 2004). Complementing this perspective, Graebner (2004) posits that acquired
firm managers play an important role in creating both expected and serendipitous value post-acquisition.

With respect to managerial influence, Shanley and Correa (1992) specified that agreement between top management teams is a multi-dimensional construct, which impacts on post-acquisition integration. Even in related acquisitions, differences exist between the acquirer and the acquired firm. The assumed homogeneity causes significant post-acquisition problem for agreements in many areas to be reached. Differences in management styles represent another factor that has been identified as significantly impacting on post-acquisition integration (Datta, 1991). In a test for opposing views on how the organisational tenure of executives impact on post-acquisition performance outcome, support for the positive impact longer organisational tenure is found and it is suggested that retention and departures of the wrong top executives within the acquired firms largely explained the high frequency of acquisition failure (Bergh, 2001).

Among other studies looking into post-acquisition challenges, some authors took a process approach to identify various sources of impediments for successful integration (e.g. Datta & Grant, 1990; Haspeslagh & Jemison, 1991; Jemison & Sitkin, 1986; Shanley, 1994; Zollo & Singh, 2004). Strategic and/or organisational misfit, escalating momentum, expectational ambiguity, management system misapplication (Jemison & Sitkin, 1986), and administrative heritage differences underpinned by national differences (Lubatkin, Calori, Very, & Veiga, 1998) have been particularly highlighted and discussed. Reviewing the stream of research approaching post-acquisition challenges from a cultural perspective, Stahl and Voigt (2008) suggest that cultural differences affect social-cultural integration, synergy realisation, and shareholder value in different and sometimes opposing ways. These effects are then moderated by the degree of relatedness and dimensions of cultural differences. Puranam et al.
(2006) and Paruchuri, Nerkar, and Hambrick (2006) look into acquisitions within which technological resources constitute an integral part of the transaction. According to these authors, structural integration leads to disruption of target firms’ routines and autonomy, which trigger talent loss and reduced innovative capability and intrinsic incentive to innovate.

More recently, a few studies addressed the issue relating to speed of integration (e.g. Bragado, 1992; Gerpott, 1995; Haspeslagh & Jemison, 1991; Homburg & Bucerius, 2005, 2006; Inkpen, Sundaram, & Rockwood, 2000; Olie, 1994; Ranft & Lord, 2002). Some authors suggest that speed of integration is an important factor influencing post-acquisition results (e.g. Inkpen et al., 2000). In contrast, other researchers found that a slow integration process can be more appropriate under certain circumstances (e.g. Olie, 1994; Ranft & Lord, 2002). Extending these arguments, Haspeslagh and Jemison (1991), Bragado (1992) and Homburg and Bucerius (2006) proposed that the effect of integration speed depends on the level of relatedness. Homburg and Bucerius (2006) have also further distinguished relatedness into internal (i.e. strategic orientation, management style and performance) vs. external relatedness (i.e. customer similarity, quality, price positioning) and observed that speed generates positive results when internal relatedness is high and external relatedness is low, and vice versa.

2.2.4 Summary of Acquisition Literature Review

Acquisition has been a highly popular form of corporate development in the past a few decades. The complex phenomenon of acquisitions has attracted the interest and research attention of a broad range of management disciplines encompassing the financial, strategic, behavioural, operational and cross-cultural aspects of this challenging and high risk activity. In recent years research into the human and psychological aspects of acquisition have also
increased in prominence (Cartwright & Schoenberg, 2006). This study summarises the vast field of acquisition research into three main areas of focus, including acquisition incentives and partner selection, acquisition performance and post acquisition activities and challenges. Similar to the approach adopted to review the alliance literature, the discussion follows the sequence of acquisition events and provides readers a clear and structured flow of content. This enables readers to establish a comprehensive and systematic grasp of this area of research.

2.3 Alliances vis-à-vis Acquisitions

A large body of research into alliances and acquisitions is conducted by applying the resource-based view (e.g. Chi, 1994; Dussauge et al., 2000; Harrison et al., 2001; Wiklund & Shepherd, 2009). It is suggested there are limitations with reliance solely on resources internal to the firm to generate new productive resource combinations. Over time, firms develop routines of limited scope, which constrain their ability to recombine existing resources (Nelson & Winter, 1982). Path dependency in activities and resource use also limit the possibility for learning outside of areas that firms are familiar with (Cohen & Levinthal, 1990; Teece, 1987). As acquisitions and alliance both represent attractive means for resource access and/or integration, uncertainty is also known to play a significant role for the selection of the strategy (Hitt, Keats, & DeMarie, 1998; Hoskisson & Busenitz, 2001; Kogut, 1991). Since alliances provides access to complementary assets yet do not require the investment or long-term commitment to those assets in comparison to acquisitions (Ireland & Hitt, 1999), it is often preferred under high levels of perceived uncertainty.
Chi (1994) integrates the resource-based view with transaction costs (i.e. adverse selection, moral hazard, cheating, and hold-up) and argues that a collaborative arrangement provides a great degree of structural flexibility in dealing with multiple transaction cost problems affecting the resources from both of the transacting parties. Because of such a major advantage, it is a more robust mode of transaction than acquisition. Dussauge et al. (2000) looked specifically at resource/capability complementarity and similarities and they observed that alliances emphasising different and complementary resources/capabilities are more likely to end in acquisition by one of the partners. This observation lends support to uncertainty reduction and commitment delay arguments for alliance and acquisition decisions.

The other key argument among studies applying the resource-based view is relating to synergy creation through integrating resources. One group of studies postulates resource similarities (e.g. Ansoff, 1965; Grant, 1988; Prahalad & Bettis, 1986; Yavitz & Newman, 1982), similarities in resource allocation (Hitt & Ireland, 1986), and managerial logics (Grant, 1988; Prahalad & Bettis, 1986) between acquirer and acquired firms contribute to synergy creation. Another research line focuses more on resource complementarity and proposes that value is created through combining and integrating different yet complementary resources (e.g. Harrison et al., 1991; Hitt, Harrison, Ireland, & Best, 1998; Salter & Weinhold, 1979). More recently, researchers added to the resource complementary argument by raising the point that resource complementarity by itself is insufficient as a condition for synergy creation (Harrison et al., 2001; Wiklund & Shepherd, 2009), and factors impacting on the deviation of realised value from potential value (i.e. acquired firms resistance, cultural/organisational fit) deserve more attention and caution when choosing alternative strategies.
Not many comparative studies on alliances and acquisitions have been conducted to date. In an investigation of value creation in the face of declining performance, acquisition is perceived to be more effective for firm performance compared to alliances (Morrow, Sirmon, Hitt, & Holcomb, 2007). This is because firms suffering from declining performance may be subject to abuse of power by alliance partners. Acquiring new resources through acquisitions also has a positive effect on investors’ expectation. In a more recent study looking into firms’ sequence patterns of conducting alliances and acquisitions, Shi and Prescott (2011) observe that firms vary in repetitive acquisition and alliance behaviors. While some firms demonstrate a predictable and predominant sequence of conducting alliances and acquisitions, others reveal unpredictable or un-focused patterns. With respect to performance consequence, the results indicate that focused and dual (conduct alliances and acquisitions simultaneously) strategies with predictable sequence have a positive effect on performance.

In some comparative studies, multiple theoretical perspectives are employed to construct a comprehensive framework, which constitutes the basis for comparison (e.g. Folta, 1998; Villalonga & McGahan, 2005). Folta’s (1998) findings largely support transaction costs economics, information asymmetry, and real option theoretic arguments. The observation of greater preferences for equity collaborations in technological fields that are more competitive also supports the view that an increased likelihood of preemption is negatively related to firms’ incentive to defer commitment (Kulatilaka & Perotti, 1995; Trigeorgis, 1991). Villalonga and McGahan (2005) found that explanations for choices between acquisitions and alliances are largely underpinned by various theories including the resource based view, transaction costs, internalisation, organisational learning, social embeddedness, asymmetric information, and real options. Similarly, one of the most recent comparative studies conducted by Yang, Lin, and Lin (2010) looked across individual, dyadic and network levels
and explained that choice between acquisitions vis-à-vis alliances for external resource access is determined by a combination of factors from all these levels.

Beside strategic management research, the stream of research on foreign entry modes has also looked into both alliances and acquisitions (e.g. Buckley & Casson, 1996; Chang & Rosenzweig, 2001; Jandik & Kali, 2009; Meyer, Estrin, Bhaumik, & Peng, 2009; Woodcock, Beamish, & Makino, 1994; Xia, Tan, & Tan, 2008). Buckley and Casson (1996) identify cultural distance as a major obstacle to international joint ventures, which contradicts Kogut and Singh’s (1988) findings. They also highlight several obstacles to acquisitions (i.e. protection of firm’s independence, scope economies in technology, unrelated to other technologies of the acquiring firm) and suggest that preference of joint ventures might be driven by volatility on both the pace of technological change and the rate of interest. Myer et al. (2009) recognise the resource obtaining effect from both alliances and acquisitions, but acquisition is suggested as a more effective entry mode as it allows for accessing resources that are intangible and organisationally embedded under a stronger institutional environment. Jandik and Kali (2009), on the other hand, observed that improvement in legal systems and reduced information asymmetry contribute to a transition from relational, “firm-like” arrangements to arm’s length, “market-like” arrangements. When institutions continue to improve, there exists a threshold after which arm’s length deals edge out internal firm contacting.

In a study emphasising firms’ mimetic behaviour in regards to choosing entry strategy, Xia et al., (2008) perceived joint ventures and acquisitions as alternative strategies, the adoption of which largely depend on the host country’s institutional constraints and choice/preference of other firms with the reference groups. Chang and Rosenzweig’s (2001) observation that while certain factors have persistent importance in shaping entry mode choice, others vary in
importance depending on sequence (i.e. R&D differences, international sales, cultural distance) which casts doubt on the importance of experience in foreign investment. They also reported a strong association between a prior joint venture mode choice with subsequent adoption of acquisitive mode, which lends supports to uncertainty reduction and learning arguments. In contrast to studies perceiving alliances and acquisitions as alternative strategies on a proximately equal ground, Woodcock et al., (1994) recognise acquisitions as an inferior entry mode in comparison to alliances as the former incurs less resource deficiency costs.

More recently, a realisation has been reached that extant research pertaining to entry modes has generally focused on rational choice models and the impact noneconomic factors (including the orientation and attitudes of managers involved in the decision making) on entry mode decisions was largely ignored (Brothers & Hennart, 2007). Building on this point, Datta, Musteen, & Herrmann (2009) revealed that firms with boards characterised by a higher proportion of outside directors, independent leadership structures (i.e. the absence of duality), and where insiders have greater equity ownership and compensation structures that are more closely linked to long-term firm performance prefer acquisitions to joint ventures. Although managers tend to be uncertainty avoidant and minimize risk-taking, the noneconomic factors recognised in this study could be used and implemented properly to motivate long-term orientation and necessary risk-taking behaviour in strategic decision-making.

A number of comparative studies of alliances vis-à-vis acquisitions involve discussion on technological resources and sourcing for these resources via alliances and/or acquisitions. Hagedoorn and Duysters (2002) identified macro (industry level technology intensity) and micro (external sources of capabilities relating to core versus non-core business of the focal firm, regime of appropriability, previous experience/preference) levels of factors that could
have an impact on the choice between these mechanisms. It is suggested that while there is a
greater acquisition propensity in industries characterised with high technology intensity, low
technology intensive industries demonstrate greater utilisations of alliances for external
technological capabilities sourcing. Further, acquisitions are often used when external sources
of capabilities relating to the core business area of the focal firm. These relationships are
affected by the effectiveness of firms’ protection regimes for resource appropriation and
previous alliance and acquisition experience.

Steensma and Corley (2000) also examined the choice and outcome of technology sourcing
partnerships among licensing, collaborations and acquisitions. Their findings suggest that
while uniqueness and inimitability of technology interact with tightly coupled partnerships
such as acquisitions and joint ventures and positively impact on sourcing performance,
uncertainty associated with technology interacts with these mechanisms but negatively
impacts on sourcing performance. In a subsequent study, Schilling and Steensma (2002)
found that technological dynamism and barriers to imitation indirectly reduce the preference
of alliances due to an increasing perceived threat of opportunism. Uncertainty in the success
of the commercialisation of technology, on the other hand, directly and negatively impacts on
preference for acquisition.

Another investigation into the choice between innovation-related alliance and acquisition is
conducted by Vanhaverbeke et al. (2002). These researchers show that a series of strategic
alliances between two partners increase the likelihood of one acquiring the other
subsequently, and acquirers in such cases are likely to be those firms occupying a central
location within the network. Porrini (2004b) found previous alliances with target firms
engaging technology transfer, manufacturing and marketing functions, benefit subsequent
acquisition performance. On the other hand, previous indirect ties tend to increase probability of formation of strategic alliances.

To summarise, although alliances and acquisitions are often seen as alternative and complementary strategies for firms, they differ in many aspects and firms do make a choice between them in many instances. While an alliance is a partnership formed among firms to achieve a mutual goal during which partner firms remain independent (Luo, 2007), acquisition constitutes a form of ownership change that creates more organisational hierarchies (Hagedoorn & Sadowski, 1999). This study provides a thorough review of studies that have looked at how firm-level, dyadic-level, network-level and industry-level factors impact on firms’ strategic choices. It identifies that compared to research that focuses only on alliance or acquisition, comparative study of these strategies remains one of the under-explored areas of research despite increasing attempts in recent years. This leads to the theoretical development of this study such that firms’ alliance and acquisition behaviours are examined in tandem through the lens of the resource-based view.

### 2.4 The Resource-Based View

The resource-based view has become one of the most influential and cited theories in the strategic management field. It aspires to explain the internal sources of a firm’s sustained competitive advantage. Its central proposition is that if a firm is to achieve a sustained competitive advantage, it must obtain and control resources with four major attributes, namely valuable, rare, inimitable, and nonsubstitutable (Barney, 1991a, 1994, 2002). Given its elegant simplicity and its immediate face validity, the core message of the resource-based view is appealing, easily grasped, and easily taught. Yet it has also been extensively criticized
for some weaknesses. This study aims to provide a comprehensive account of the resource-based view so that readers have a clear understanding of what this theory is about. This section of the review includes an in-depth discussion of background and historical development of the theory, application and empirical testing aspect of the theory, critiques and challenges of the theory, as well as suggestions on future direction of the theory.

2.4.1 Background

In a review of theory and research in strategic management field conducted by Hoskisson, Hitt, Wan and Yiu (1999) remarked that theoretical development in the strategic management field has gone through some major evolutions since its inception in the early 1960s. As highlighted by Hoskisson et al. (1999), early development demonstrates an internal focus, featuring the discussion upon strategy and structure (Chandler, 1962), corporate strategy (Andrews, 1971; Ansoff, 1965) and business policy (Learned, Christensen, Andrews, & Guth, 1965/1969). Scholars made significant attempts to identify the firm’s “best practices” and placed great emphasis on the fit between internal strength and external opportunities. Entering into the 1970s, there was an obvious shift of focus within the strategic management field. Industrial Organization Economics (IO) with its theoretical roots based on Mason (1939) and Bain (1956, 1968) began to establish a dominant position. Michael Porter’s work was recognised as some of the most influential research within the field. This stream of studies looked specifically into industry structures and competitive position in the industry.

Subsequently, the IO research is extended to investigate competitive dynamics and boundary relationships between the firm and its environment (e.g. Chen, 1996; Gimeno & Woo, 1996; Karnani & Wernerfelt, 1985), which is known as Organizational Economics. Oligopolistic competition (e.g. Edwards, 1955) and game theory are the two major theoretical rationales
that underpinned the development of this sub-field. Compared to conventional IO economics, much more attention is paid to the firm level and to the analysis of direct competitive rivalry between specific firms in the competitive environment (Chen, 1996).

Increasing attention into boundary relationships gives rise to the analysis on transaction costs (Williamson, 1975, 1985), the focus of which is on contractual or exchange-based relationships. *Transaction costs economics* approaches the discussion on firm boundaries through comparing markets and hierarchies. Such an approach has inspired many studies into the adoption of multidivisional structure, vertical integration and strategic alliances (Kogut, 1988a). In addition to *transaction costs economics*, *agency theory* is another Organizational Economics theory that is contractual and exchange-based. According to this theory, a firm is defined as a “nexus of contracts” (Jensen & Meckling, 1976). Many studies into mergers and acquisitions, divestitures, downscoping (e.g. Hitt *et al.*, 1990; Hoskisson & Hitt, 1994) and leverage buyouts (e.g. Wiersema & Liebeskind, 1995) are conducted using this theory.

Despite the swing back of attention on firm characteristics among analyses of competitive dynamics and research within the boundary school, the major re-focus on firms’ internal strength is evidenced with the emergence and vast adoption of the resource-based view. This theory is recognised as “an important conceptualization in the field of strategic management” and is “one of the most important redirections of the (content of) strategy research in this decade” (Zajac, 1995, p.169). The popularity of the resource-based view comes from its effectiveness in explaining the idiosyncratic characteristics of firms and sustained competitive advantage that derives from these characteristics (e.g. Barney, 1991; Wernerfelt, 1984). Interestingly, as suggested by Hoskisson *et al.* (1999), the returned focus on factors inside firms marked a dramatic “back to the starting point” development within the strategic management field.
According to Hoskisson et al. (1999), early management works laid solid foundations for the subsequent development of the resource-based view. As early as 1957, Selznick’s idea of an organisation’s “distinctive competence” shares great similarities with the resource-based view. Subsequently, Andrew (1971) proposed the importance of “an internal appraisal”. He suggested that the assessment of internal strengths and weaknesses allows for the identification of distinctive competencies. Ansoff (1965), on the other hand, defines synergy as “one internally generated by a combination of capabilities or competencies”. These propositions also demonstrate great commonalities with the fundamental notion announced by the resource-based view.

The footprint of specific discussion on the importance of resources can also be traced back to 1959. In that year, Penrose has argued that firms are composed of various productive resources, and resource heterogeneity between the focal firm and other firms contributes to its uniqueness. However, as argued by Rugman and Verbeke (2002), although Penrose’s seminal work “Theory of the Growth of the Firm” did raise the awareness of the relationship between resource attributes and rent generation, her main intention was on explaining the process of firm growth. Therefore, despite its roots in Penrose’s work, the publication of Wernerfelt’s (1984) “A Resource-Based View of the Firm” and Barney’s (1991) “Firm Resources and Sustained Competitive Advantage” marked the beginning of the resource-based view as a dominant framework within the strategic management field.

Barney made an attempt to compare the resource-based view with both neoclassical economics and evolutionary theory in his 1991 study. According to Barney, one major difference between the resource-based view and neoclassical microeconomics is that the former assumes the elasticity in the supply of factors of production (Barney, 1991; Direickx & Cool, 1989). However, some resources and capabilities can only be developed over long
periods of time, and it may not always be possible to understand how to develop these capabilities in the short to medium term. Some resources and capabilities are even subject to high levels of market failure that are difficult to sell and buy via open markets. It is supply inelasticity that makes firms possess these kinds of resources and capabilities better able to generate above-normal returns. Supply inelasticity thus can be seen as a source of sustainable competitive advantage (Peteraf, 1993).

Across theoretical disciplines, evolutionary theory also has a long history in the field of economics, with Nelson and Winter’s (1982) book as one of the most influential works. This stream of theory suggests that firms differ in their routines of conducting business. The outcome of the selection mechanism is that firms that are the most effective and efficient enjoy greater chances of survival in the long run, whereas those ones with the least efficient and effective routines must abandon or change their routines to remain in business. The connections between the resource-based view and evolutionary theory rest mainly upon this very concept of routines, as firms’ resources and capabilities are largely produced and embedded within organisational routines. Heterogeneities among firms derive from historical development and initial firm endowments also underpin both theories. However, during the early 1990s when population ecology established a predominant position within the evolutionary economics field, firms’ abilities to change and make strategic choice were strongly denied. The study of populations of firms was the only legitimate application of evolutionary thinking (Hannan & Freeman, 1977). Disagreement with such an extreme claim departs the resource-based view from the evolutionary theory (Barney, 2001).

Following Barney’s effort, Conner (1991) expanded the comparison to five major streams of antecedent theories, such as the neoclassical perfect competition model, Bain-type industrial organization economics, the Schumpeterian and Chicago responses to Bain-type industrial
organization economics, and transaction cost economics. In her study, resource-based view is perceived as reaching closer for a theory of the firm (Conner, 1991). It is noticed that some notions from the other theories are incorporated into the development of the resource-based view and a firm is defined as input-combiner, and efficiency-seeker in production and distribution. However, the resource-based view distinguishes itself from the other theories by rejecting the ideas that resources are mobile and divisible and information that firms make their decisions upon is perfect as suggested by the neoclassical theory (Conner, 1991).

In terms of long-term earnings, the resource-based view resembles the Bain-style industrial organization economics, which suggests that above-normal returns can persist in the long run. However, instead of explaining such sustained above-normal returns through the perspectives of monopoly power or collusion, and entry deterrence and predation, the resource-based view demonstrates the importance of costly-to-imitate attribute of resources. In addition, the resource-based view identifies opportunities for value creation through related diversification and vertical integration as these activities allow for better utilisation of resources. This further deviates the resource-based view from the Bain-type industrial organisation economics (Conner, 1991), as the later theoretical perspective focuses more on the market-power and extension of monopoly arguments. According to Conner (1991), the resource-based view can be distinguished from the transaction costs economics based on the absence of assumption of opportunistic behaviours. However, Mahoney (2001) challenged such a notion and suggested that the difference between these two theories lies in what they aim to explain: transaction costs economics is a theory of the existence of the firm, but the resource-based view is a theory of firm rents.
2.4.2 What Is the Resource-Based View About?

As mentioned previously, the resource-based view emerged as an alternative approach to explain firms’ competitive advantage with a major focus on a firm’s internal strengths and weaknesses. According to this view, a firm is a bundle of unique resources. There are various ways of defining resources: according to Wernerfelt (1984, p.172), resources are “those (tangible and intangible) assets which are tied semi-permanently to the firm.” In Barney’s (1991) seminal work “Firm resources and sustainable competitive advantage”, Daft’s (1983) definition of firm resources is adopted. All assets, capabilities, organisational processes, firm attributes, information, and knowledge, among other factors, controlled by firms upon which strategies are formulated and implemented to improve their effectiveness and efficiency are included as firm resources based on this definition. In comparison, traditional strategic analysis simply defines firm resources as strengths that firms can use to develop and implement strategies (Learned et al., 1969; Porter, 1981).

Researchers have also generated numerous ways of classifying resources. While Barney (1991) identified three major categories, namely physical capital resources (Williamson, 1975), human capital resources (Becker, 1964), and organisational capital resources (Tomer, 1987), other authors further breakdown resource types into financial, physical, managerial, human, organisational, and technological resources (Das & Teng, 1998; Hofer & Schendel, 1978). Recognising the lack of adequate theoretical underpinnings for these typologies, Miller and Shamise (1996) proposed that resource types could be simplified into two broad categories, namely property-based resources and knowledge-based resources. Such a classification theme is based upon the notion of barriers to imitability. It is recognised that not all the aspects of a firm’s resources contribute to the development and implementation of
sound strategies, and such recognition stimulates the specification of conditions under which a firm’s resources can be a source of sustainable competitive advantage.

Competitive advantage and sustainable competitive advantage are key concepts central to the resource-based view. According to Barney (1991), a firm enjoys a competitive advantage when its strategy creates value that is not implemented by any other current or potential competitors. From these definitions, a few important notions deserve attention: First of all, the assessment of a firm’s competitive position relative to other firms should go beyond existing players operating within the focal industry. Following Baumol, Panzar, and Willg (1982), a more accurate screening of the competitive landscape should be based upon both current and potential competitors at some future date (Barney, McWilliams, & Turk, 1989). This is because competition is never in a static state. This notion is largely confirmed by Chen (1996) in his study “Competitor analysis and interfirm rivalry: Towards a theoretical integration”.

Secondly, in contrast to some authors who define sustained competitive advantage as a duration in terms of calendar time (Jacobsen, 1988; Porter, 1985), Barney (1991) proposes that the sustainability of a competitive advantage is fundamentally determined by the possibility of competitive duplication. Following Lippman and Rumelt (1982) and Rumelt (1984), a competitive advantage endures as long as other firms fail to duplicate the advantage. Sustained resource heterogeneity is a potential source of competitive advantage (Das & Teng, 2000). In this sense, this definition of sustained competitive advantage is an equilibrium definition (Hirshleifer, 1982). Theoretically, a major advantage this equilibrium definition has over the calendar time-based definition is that no specific length of calendar time needs to be defined and justified to qualify a competitive advantage as being “sustained” across different industry contexts.
Finally, Barney (1991) specifies that a sustained competitive advantage should not be interpreted as an advantage that lasts forever. It is quite possible that unanticipated changes in the industry environment and structural revolutions that have been referred to as the “Schumpeterian Shocks” (Barney, 1986c; Rumelt & Wensley, 1981; Schumpeter, 1934, 1950) could completely wipe out existing competitive advantage. New definitions of relevant strategic attributes and competitive advantage will be made under these circumstances. Therefore, a firm that is currently enjoying a sustained competitive advantage is still subject to the possibilities of major external shocks that make its competitive advantage obsolete.

Being well armed with the key concepts of resources, competitive advantage and sustained competitive advantage, a fundamental principle of the resource-based view is developed. That is, the basis for a competitive advantage of a firm lies primarily in the application of the bundle of valuable resources at the firm’s disposal (Penrose, 1959; Rumelt, 1984, p.557-558). Barney (1991) argued that sustained competitive advantage is achieved when a firm’s resources and capabilities are valuable, rare, imperfectly imitable, and not substitutable. A firm’s resources are valuable when their deployment contributes to the improvement of the firm’s effectiveness and efficiency. Specifically, these resources should allow firms to develop and implement strategies that better exploit opportunities or neutralise threats in the external environment. In addition to being valuable, resources should not be obtained and controlled by a large number of current or potential competitors. The rarer a valuable resource is, the less chance other firms can exploit the resources in the same way and implement similar strategies. While the perfect situation would be absolute exclusiveness, it is possible for a small number of firms in an industry that possess a particularly valuable resource to enjoy a sustained competitive advantage. As long as the number of firms that possess a particular valuable resource (or a bundle of valuable resources) hasn’t reached the
critical mass for perfect competition dynamics in an industry (Hirshleifer, 1980), the resource has the potential to serve as a source of competitive advantage (Barney, 1991).

While valuable and rare are two important premises for firms to generate competitive advantage, it is the imperfect imitability that significantly contributes to sustained competitive advantage. Firm resources are imperfectly imitable under one or a combination of three conditions: The first condition is often known as time compression diseconomies, which emphasises the importance of historical development. It is suggested that time compression diseconomies are underpinned by early-mover advantages (Dierickx & Cool, 1989). Asset Mass Efficiencies is another concept that is closely related to historical conditions. It is suggested the development of asset mass efficiencies is a positive cycle: while incremental addition to an existing asset stock helps to enhance its sustainability, this process itself is facilitated by high levels of initial stock developed over time. Therefore, it is difficult for other firms with low initial levels of resource stock to “catch up” hence suffering from a competitive disadvantage (Dierickx & Cool, 1989). Furthermore, the challenge for these firms to catch up also relates to the low initial level of other resources that are complementary to the focal resource (Dierickx & Cook, 1989).

The second condition causal ambiguity refers to the stochastic nature of the resource accumulation process. For some resources it may be difficult or impossible to fully specify which factors play a role in their accumulation process, even for the firms who develop and utilise the resources themselves (Nelson & Winter, 1982). Causal ambiguity is captured by the notion of “uncertain imitability” (Lippman & Rumelt, 1982). When this is in place, it becomes almost impossible for competitors to imitate such resource. In regards to the third condition social complexity, it is recognised that many firm resources could be of such nature. Examples include interpersonal relations among managers in a firm (Hambrick, 1987),
organisational culture (Barney, 1986b), firm-supplier relations (Porter, 1980) and customer relations (Klein et al., 1978; Klein & Lefler, 1981). Firms without these resources may find it rather difficult to engage in systematic efforts to create these resources (Barney, 1989b; Dierickx & Cook, 1989), and the process of social engineering may be beyond the capabilities of many firms at least for a certain period of time (Barney, 1986b; Porras & Berg, 1978). The last requirement for resources to be a source of sustained competitive advantage is that there must be no strategically equivalent valuable resources that are equally rare and inimitable. When there is another valuable resource (or another bundle of valuable resources) that is strategically equivalent to the focal firm’s resource, other firms could potentially obtain such resources and exploit them separately to develop and implement the same strategies.

2.4.3 Development and Application of the Resource-Based View

Like many other theories, the resource-based view has undergone various stages of development (Barney, Ketchen, & Wright, 2011). As discussed previously, a major contribution the resource-based view has made within the strategic management field is redirecting the research focus from external environment to inside the organisation (Hoskisson et al., 1999). In discussion of the future of the resource-based view, Barney et al. (2011) highlighted the most influential works on the resource-based view within each stage of development. During the early introduction stage, many important articles were published, which paved the way for future scholars to continue developing and applying the theory. While Penrose’s (1959) seminal work about the impact resources have on firm growth sets the stage for intellectual conversation regarding resource attributes, firms’ heterogeneity and rent generation, Lippman and Rumelt’s (1982) made significant contribution towards the development of the resource-based view by introducing and explaining the concepts of
inimitability and causal ambiguity. These attributes later became some of the key tenets of the resource-based view.

In a similar vein, Dierickx and Cool (1989) elaborated on inimitability and causal ambiguity, and developed the notion that resources are especially useful when no effective substitutes are available. It is fair to say that the work conducted by Lippman and Rumelt (1982) and Dierickx and Cool (1989) prepared Barney for his influential work published in 1991, which articulated the four fundamental premises under which resources have the potential to generate sustained competitive advantage. Beside Barney, Wernerfelt is the other major author that contributed significantly to the early development of the resource-based view. He coined the term “resource-based view” in his 1984 study and specifically addressed the importance of focusing on firms’ resources rather than on their output.

Beyond the attempts to define the resource-based view and discuss how resources contribute to organisational success, a series of studies established the linkages between the resource-based view and other phenomena. For example, Barney (1986b) theorised about how organisational culture could be a source of sustained competitive advantage, whereas Fiol (1991) identified the development of organisational identity as a core competency that leads to competitive advantage. Castanias and Helfat (1991) characterised CEOs as firm resources and articulated the importance of CEOs’ idiosyncratic qualities and quantities of skills. Harrison et al., (1991) provided detailed discussion on the value of resources and synergy between resources in the context of diversification. Conner’s (1991) major contribution is her effort to compare and contrast the resource-based view with five major streams of theories to demonstrate that the development of the resource-based view is an important shift towards a theory of the firm.
According to Barney et al. (2011), the 1991 issue of Journal of Management marked the beginning of the growth phase of the resource-based view. Since then, a proliferation of the resource-based view is evidenced within strategic management and related disciplines. During this phase of the development, a few important studies are published which generated some interesting and controversial discussion. Based on the acknowledgement of Conner’s (1991) contribution, Mahoney and Pandian (1992) further delineated the resource-based view through relating it to distinctive competencies, organisational economics, and theory on industrial organisation. Kogut and Zander (1992) added to the understanding of resources by introducing the concept of combinative capabilities. Their emphasis on the importance of knowledge as a resource not only contributes to the development of the resource-based view, but also prepared the subsequent spin-off of the knowledge-based view, articulated by Grant (1996). It has been suggested that competitive advantage may be a product of the firm’s preferential access to its idiosyncratic resources, especially those that are tacit and knowledge-based (Dussauge et al., 2000).

In a similar vein, Hart (1995) introduced and developed another conceptual spin-off from the resource-based view, known as the natural-resource-based view of the firm. Amit and Schoemaker (1993), in comparison, made an attempt to distinguish resources from capabilities, which stimulates more conversation on the intangible aspect of resources. A cornerstone was reached for the development of the resource-based view when Peteraf (1993) presented a comprehensive discussion on conditions under which competitive advantage exists, and when Miller and Shamsie (1996) conducted robust tests of the relationship between resources and firm performance. They also pioneered the way for developing direct measurement of resources.
Moving into late 1990s, further attempts to develop the theory and link it to other theoretical perspectives continued (Barney et al., 2011). For example, Oliver (1997) theorised about how the resource-based view and institutional theory together can better explain sustained competitive advantage. Teece, Pisano, and Shuen are well known for their seminal work introducing the concept of dynamic capabilities (1997). They explicitly explained how competitive advantage arises from the confluence of assets, processes, and evolutionary paths, which enhances our understanding of the dynamic nature of developing and maintaining competitive advantage. Coff (1999) linked the resource-based view to the shareholder theory and proposed that excess profits derived from resources might be appropriated by various shareholders. Another important study that deserves much attention is Conner and Prahalad’s (1996) paper. They identified that the application of opportunism based arguments and knowledge-based arguments could lead to opposite predictions regarding the organisation of economic activity. Such recognition invites a dialectic application of the resource-based view and other related theoretical perspectives. Based on this understanding, Combs and Ketchen (1999) led the investigation of the choice of organisational form by applying the resource-based view and organisational economics.

Twenty years after the publication of the 1991 issue of Journal of Management, there are strong indications that the resource-based view has reached the maturity stage as a theory (Barney et al., 2011). Research into the resource-based view has reached to the point where retrospective assessments have been warranted, which generated debates on whether the resource-based view is a valuable theory for the strategic management field (Barney, 2001; Priem & Butler, 2001a, 2001b;), review of the theory (Barney et al., 2001), critiques of theory (Armstrong & Shimizu, 2007; Kraaijenbrink et al., 2010), and meta-analysis on the
explanation of how strategic resources contribute to the variance in performance across existing evidence (Crook, Ketchen, Combs, & Todd, 2008).

More recently, the discussion on resource acquisition and development processes draws significant attention from researchers, which aims to explain a central issue: where do resources come from? This stream of research elaborates on how heterogeneity of firm contexts influences the nature of resource development and acquisition processes. Through investigation into the creation of heterogeneous resource positions (Maritan & Peteraf, 2011), asymmetries in competition for new resources created by current resource stock (Wernerfelt, 2011), the role of managers’ actions in effectively structuring, bundling, and leveraging resources (Sirmon, Hitt, Ireland, & Gilbert, 2011), the importance of interaction between resource acquisition through strategic factor markets and resource building based on internal efforts is further appreciated (Maritan & Peteraf, 2011; Markman, Gianiodis, & Buchholtz, 2009).

The integration of the resource-based view with other theoretical perspective and applications of the resource-based view to other fields of studies also continue. Alvarez and Busenitz (2001) and Ireland, Hitt, and Sirmon (2003) integrated the resource-based view with the strategic entrepreneurship research and suggested further contributions that could be made. Wright, Dunford, and Snell (2001), on the other hand, explained the contributions the resource-based view makes to the human resource management field and articulated on the further contribution that could be made. While Makadok (2001) synthesised ideas on excess profits offered by the resource-based view and theory on dynamic capabilities, Foss and Foss (2005) built conceptual bridges between the resource-based view and property-rights theory.
In comparison to these studies that expanded the appreciation of the resource-based view “vertically”, other studies develop and apply the theory “horizontally”, which contributes to a more in-depth and fine-grained understanding of the theory (Barney et al., 2011). For example, Makadok and Barney (2001) build a specific theory about what information firms should emphasise as they attempt to purchase scarce resources. Lippman and Rumelt (2003) who have made tremendous contribution to the development of the resource-based view initiated further discussion of the micro-foundations of the theory by introducing a payments perspective. Winter (2003) introduced and explained the concept of higher order capabilities that helps to deepen the understanding of different forms of resource constructs. In a similar vein, Gavetti (2005) and Teece (2007) also looked further into the micro-foundations of capabilities. While Gavetti (2005) emphasised cognition and hierarchy, Teece (2007) approached the topic through specifying the relationship between capabilities and sustained superior firm performance in an open economy with rapid innovation and globally dispersed sources of invention, innovation, and manufacturing capability. Responding to some of the major challenges for the resource-based view, Sirmon, Hitt, and Ireland (2007) built a theory about the underexplored processes that lie between resources on the one hand and superior profitability on the other.

As mentioned in the previous section, the resource-based view has been applied to other major fields of studies beyond the strategic management discipline, which include: Human Resource Management, Economics and Finance, Entrepreneurship, Marketing, and International Business (Barney et al., 2001). Within the field of human resource management, the resource-based view has contributed significantly to the development of a fast growing area known as strategic human resource management (Wright et al., 2001). The increasing recognition of people as important strategic assets underpinning a firm’s success
has created the interaction and convergence of strategy and human resource management fields. However, extant research has yet to provide empirical evidence on whether human resource management practices are path-dependent, causally ambiguous, or imitable. Similarly, there is a lack of empirical studies that specifically test the relationship between human resource management practices and firm performance. Wright *et al.* (2001) provide a preliminary framework linking core competencies, dynamic capabilities, and knowledge with the process of attraction, development, motivation, and retention of people. This effort is seen as a step toward better integration of the strategic management and human resource management fields.

Although there has been a strong link between the disciplines of strategy and *economics* historically, it was observed that mainstream economists have not widely adopted the resource-based view (Barney *et al.*, 2001). As suggested by Lockett and Thompson (2001), the limited use of the resource-based view within the economics discipline may be explained by the perceived problems of causal ambiguity, tautology, and firm heterogeneity associated with the resource-based view. Potential areas for future research include the interaction of the resource-based view and agency theory (especially in relation to corporate governance), as well as advancing the resource-based view as a dynamic theory to explain radical change. As argued by Lockett and Thompson (2001), the resource-based view and agency theory can be both substitutes and complements for the investigation of corporate restructuring. Their arguments parallel Combs and Ketchen’s (1999) proposition that transaction costs economics and the positive theory of agency have important implications for the resource-based view.

Alvarez and Busenitz (2001) explained how the resource-based view could contribute to the advancement of *entrepreneurship* research. According to authors, entrepreneurial opportunities derive from some individuals’ abilities to identify and appreciate the value of
certain resources while others fail to recognise it. Entrepreneurial alertness, entrepreneurial knowledge, and the ability to coordinate resources can be viewed as certain forms of resources. They also add that causal ambiguity is inherent in entrepreneurship because sustained competitive advantage is often generated from an entrepreneur’s knowledge base and absorptive capacity that grows with their experience. With respect to social complexity, Alvarez and Busenitz (2001) argued that it is central to entrepreneurship as it may be essential to the exploitation of complex technologies and unique to certain types of entrepreneurs. From the point-of-view of firms, entrepreneurs are seen as playing a crucial role in value creation through applying their unique abilities and specialised knowledge to identify and capture opportunities. More recently, a study on University start-up formation and technology licensing with firms that go public was conducted through the lens of the resource-based view (Powers & McDougall, 2005). The findings strongly echoed Alvarez and Busenitz’s (2001) argument.

Srivastava, Fahey, and Christensen (2001) observed and challenged the lack of theoretical integration and co-development efforts between the marketing scholars and the resource-based view proponents. Specifically, linking the fundamental processes by which resources are transformed into something that is of value to customers with the resource-based view will contribute to a far more fine-grained and in-depth understanding of the resource-competitive advantage connection. Similarly, through integrating the resource-based view with marketing research, a better appreciation of the impacts changes in market-based assets and capabilities on customer value creation can be established. These authors suggest that future research can look into how particular market-based assets and capabilities contribute to the creation of sustained customer value. There is also a need for the resource-based view and
marketing to examine directly how marketplace (i.e. customer) changes affect the need for key resources adjustments.

Compared to the economics and marketing disciplines, the contribution the resource-based view has made to the international business research is evident (Peng, 2001). While understanding of multinational corporation behaviours and market entries is enriched by the application and integration of the resource-based view, development of four emerging areas of studies (International strategic human resource management, strategic alliances, international entrepreneurship, and emerging market strategies) have been propelled by the resource-based view (Peng, 2001). The resource-based view articulates the nature of resources required to overcome the liability of foreignness (Bartlett & Ghoshal, 1989; Collis, 1991; Moon & Lado, 2000; Tallman, 1991, 1992; Zaheer, 1995; Zaheer & Mosakowski, 1997). It has also been applied to investigate the relationship between resources and product and international diversification (Delios & Beamish, 1999; Hitt, Hoskisson, & Kim, 1997; Geringer, Tallman, & Olsen, 2000; Tallman & Li, 1996). With respect to knowledge development and transfer, it has been shown that investing in subsidiary capability building increases knowledge flows, which facilitates organisational learning within MNCs (Birkinshaw, Hood, & Jonsson, 1998). Significant international experience by top managers represents firm-specific tacit knowledge that is difficult to imitate (Peng, 2001).

The resource-based view has been applied to examine international market entry mode strategies (e.g. Ekeledo & Sivakumar, 2004; Sharma & Erramilli, 2004). It facilitates the advancement of research in this area by highlighting that such strategies are determined by both the resource capabilities of foreign firms and the firm-specific advantages possessed by MNCs (Shan & Song, 1997). More recent research from the resource-based view perspective challenged the stage theory of internationalisation by suggesting that successful earlier
internationalisation is achievable by young and small firms when they develop and possess certain resource advantages (Autio, Sapienza, & Almeida, 2000; Mitchell, Smith, Seawright, & Morse, 2000; Peng, Hill, & Wang, 2000; Peng & York, 2001). With respect to cross-border mergers and acquisitions, Peng (2001) argues that more attention should be given to the process of implementing related resources. Among studies looking into emerging markets, the resource-based view has been applied to explain how foreign alliances are utilised by local firms as mechanisms to acquire advantages over their domestic rivals (Glaister & Buckley, 1996; Hitt et al., 2000; Shenkar & Li, 1999). Network ties are identified as important intangible resources for entrepreneurial start-ups (Mitchell et al., 2000; Peng & Luo, 2000). It has also been adopted to establish an understanding of changing benefits from unrelated diversification as economic institutions develop (Chang & Hong, 2000; Guillen, 2000; Khanna & Palepu, 2000). As suggested by Peng (2001), future research can apply the resource-based view and look into problems in developing resource capabilities by state-owned enterprises and challenges in attracting more multinational corporations to invest in these countries in transition economies.

2.4.4 Empirical Aspects of the Resource-Based View

Given its increasing popularity, the extant research within the strategic management field has witnessed a growing number of empirical articles relating to the resource-based view. The accumulations of important methodological developments and empirical evidence are evident. It is suggested that the rigour of evaluating a theory rests in two critical criteria: falsifiability and utility (Bacharach, 1989). This means the measurement of variables needs to appropriately reflect constructs, and causal relationships should be adequately examined. The resource-based view is essentially developed to predict and explain the relationships between a firm’s resources and its competitive advantage reflected in performance outcome (Barney &
Arikan, 2001; Henderson & Cockburn, 1994; Rouse & Daellenbach, 1999). Applying Bacharach’s (1989) framework, a few issues are of great importance in determining the rigour of empirical studies applying the resource-based view. Firstly, the operationisation of the independent variables - resources; secondly, the operationalisation of the dependent variables – performance; and thirdly, isolating relationships between resources and performance.

In a review of the empirical research relating to the resource-based view of the firm, Armstrong and Shimizu (2007) looked at over 100 articles published within the top journals in the strategic management, international business and organisation behaviour field (Academy of Management Journal, Administrative Science Quarterly, Journal of International Business Studies, Journal of Management, Journal of Management Studies, Management Science, Organization Science, and Strategic Management Journal) due to their theoretical and methodological rigour. These authors are in agreement with other researcher on one of the key challenges for empirical testing of the resource-based view, which is the difficulty in measuring inimitability of resources (Godfrey & Hill, 1995; Zander & Kogut, 1995). This is because such resources are often intangible in nature and hard to observe.

With the recognition of the inherent difficulty in measuring resources, some researchers operationalise their constructs based on observed proxies (Armstrong & Shimizu, 2007; Barney & Arikan, 2001; Wernerfelt, 1995). The logic behind this approach is that “theories that contain unobservables should not be judged on the basis of their correspondence to reality, but instead on their instrumental value as tools for generating predictions about the behaviour of physical, natural, and social systems” (Bacharach, 1989; Godfrey & Hill, 1995, p.520). A sound operationalisation of the resources is based on the theoretical identification of “what the observable consequences of unobservable resources are likely to be” (Godfrey &
Hill, 1995, p.530). Given the difficulty of using one proxy to reflect unobservable resources, it is recommended that researchers adopt multiple variables to collectively represent latent constructs (Barney et al., 2001; Boyed, Grove, & Hitt, 2005).

However, it is observed that many studies rely on single indicators of resources, for which the validity of construct is undermined (Armstrong & Shimizu, 2007). In a similar vein, Mowery, Oxley and Silverman (1996, p.82) challenged the way observable proxies are selected by arguing that the focus on inputs to the creation of capabilities “indicates little if anything about resultant changes in capabilities”. Furthermore, a limitation of deploying simple and input-based proxies is that it overlooks heterogeneities across firms (Armstrong & Shimizu, 2007), which significantly contradicts the fundamental explanatory logic of the resource-based view (Anand & Khanna, 2000; Makadok, 1999). Based on this realisation, it is recommended that output results can be used as a proxy for resources. Adopting this approach, Miller and Shamsie (1996) measured knowledge-based resources of Hollywood film studios by counting the number of Academy Awards received. Mowery et al. (1996), on the other hand, used the number of patents as a proxy for R&D capabilities.

The importance of distinguishing “variables” from “constructs” for appropriate operationalisation of variables is also addressed. However the distinction is often quite challenging for the resource-based view research (Bacharach, 1989; Priem & Butler, 2001b) due to the “all-inclusive” way of defining resources (Denrell, Fang, & Winter, 2003; Priem & Butler, 2001a). As argued by Priem & Butler (2001b), there could potentially be three-levels of tests for the resource-based view: resources (“construct”), specific resources (“lower-level constructs”), and variables that reflect theorised resources. Among the studies under review, Armstrong and Shimizu (2007) observed that while many researchers use lower-level constructs in their hypotheses, others demonstrate a preference for more readily measurable
variables or combined constructs and directly measurable variables. Despite the legitimacy of these approaches, these authors argued that the use of readily measurable variables offered limited contributions toward understanding the real value of the resource-based view (Barney, 1991; Nelson, 1991; Zander & Kogut, 1995). For example, when the ideal outcome is to test the relationship between human capital and firm performance, but the researchers adopt the readily measurable variable “tenure of managers”, unarguably what is being tested is the relationship between management tenure and firm performance rather than human capital and firm performance.

Given the extent that key constructs of the resource-based view are inherently unobservable (Godfrey & Hill, 1995), creativity in developing appropriate measures and accumulating those measures is needed for the advancement of the resource-based view (Armstrong & Shimizu, 2007). Researchers should not be content with relying on readily available measures (Barney, 2001; Levitas & Chi, 2002). Furthermore, more recently, Molloy, Chadwick, Ployhart, and Golden (2011) conducted a content analysis of how researchers examined intangibles in recently published tests of the resource-based view. They criticise the general resource assessment and construct validation process as being mechanical, empirically driven, unidisciplinary and unilevel rather than being enacted as conceptual, multidisciplinary, multilevel, and theoretical.

In response to the criticism of theoretical disconnection between the resource-based view and the measurement of the independent variable that leaves central questions unaddressed (Armstrong & Shimizu, 2007), it is suggested that a qualitative approach can be incorporated. Field studies allow researchers to overcome the difficulty in identifying and distinguishing resources that are valuable and imperfectly imitable from other resources (Barney, 1991, 2001; Godfrey & Hill, 1995). Rouse and Daellenbach (1999) recommended that researchers
conduct inductive field interviews among high- and low-performing firms within the same industry. Godfrey and Hill (1995) also recommended that researchers consider clinical work since “the description of the firm found in the resource-based view is complex, deep, and historical.” Such recommendation addresses well the importance of understanding the richness of resources for the resource-based view (Henderson & Cockburn, 1994).

However, researchers adopting a qualitative method must understand that there are limitations and potential problems of field studies and interviews. Subjectivity and personal and positional biases, and triangulation of the information by accessing different informants and sources could hamper the effectiveness of these approaches (Huber & Power, 1985). Nevertheless, McEvily and Chakravarthy (2002) provided a good demonstration of the appropriateness of qualitative methodology. In their study of the adhesives formulation industry, in-depth interviews with scientists were conducted to facilitate their understanding of the scientific underlay of the technology used in this industry. The information collected was then validated with industry trade journals and experts on adhesive technology. A final step was to translate the data to quantitative measures, which is used to test how knowledge complexity, tacitness, and specificity impact on firm performance (McEvily & Chakravarthy, 2002). Generally speaking, survey methodology could provide researchers a good solution to measurement problems when attributes of resources are difficult to observe, because such a method is useful for obtaining direct assessments about particular resources (Chen, Farth, & MacMillan, 1993).

One caveat of using a survey approach is that since the resource-based view focuses on competitive advantages over competitors, theoretically, the assessment of inimitability and competitive advantage should be conducted by competitors or outsiders rather than managers from the focal firm (Armstrong & Shimizu, 2007). In fact, the risks of biases, overconfidence
and hubris among managers about their resources and capabilities are well identified and discussed within the literature (e.g. Hayward & Hambrick, 1997; Zajac & Bazerman, 1991), which will affect the quality and validity of measurements. Despite the theoretical importance, only a few studies used outsiders as survey targets: Bruton et al. (1994), Combs and Ketchen (1999), Silverman (1999) and Singh (1997). It is acknowledged that such limited utilisation of external survey respondents is largely due to the difficulty in asking competitors to assess and discuss the focal firm’s resources. One possible solution might be to rely more on communication with industry experts (Chen et al., 1993). Bourgeois and Eisenhardt (1988) further recommended that a qualitative approach can facilitate the understanding and appreciation of technological and competitive change in the so-called “high-velocity” environment as external information may be unavailable or obsolete in such environments.

Another related issue is the ongoing challenge of measuring intangibles (Molloy et al., 2011). More recently, Molloy et al. (2011) re-emphasised the persistently slow progression in this aspect of the resource-based view research. They highlighted that the assessment of intangible resources and construct validation tend to be mechanical, empirically driven, and unidimensional and unilevel rather than being a conceptual, multidisciplinary, multilevel, and theoretical process. Because of this, the confidence in empirical tests that brings more insightful understanding and support for the resource-based view has been constrained. To address this limitation, Molloy et al. (2011) integrate the complementary perspectives of economics and psychology and propose a context-specific theory of intangibles for empirical studies. Specifically, this theory-driven multidisciplinary approach contributes to the advancement of the resource-based view by investigating how and why a particular intangible contributes to the creation and capture of values for firms.
The second major aspect of empirical studies applying the resource-based view is the measurement of dependent variable (Armstrong & Shimizu, 2007). Since the central aim of the strategic management research is to illuminate sources of sustained competitive advantage (Meyer, 1991; Porter, 1980; Rumelt, 1984), which the resource-based view is specifically developed to address, sustainability is a critical issue to understand. However, limited empirical attempts have been made to prove the achievement of sustained competitive advantage (Armstrong & Shimizu, 2007). One possibility is that the lack of empirical evidence is a reflection of the reality that not many firms successfully achieve sustained competitive advantage under increasingly demanding and competitive environment (Armstrong & Shimizu, 2007). For example, in a longitudinal study conducted by Wiggins and Ruefli (2002), out of 6772 firms across 40 industries over a period of over 25 years, only four firms achieved 20 years or more of persistent superior financial performance based on Tobin’s Q metric, and only 32 firms achieved 20 years or more years of persistent superior financial performance based on the measurement of return on assets. Another potential explanation for such inattention relates to the previously discussed issue regarding difficulty in defining “sustainability” across different industry contexts.

However, there are a few studies that paved the way for future development in this aspect. For example, Pettus (2001) develops a resource-based prediction of firm growth. According to him, the development process of a firm’s resource base over time leads to sustainable growth. Schilling and Steensma (2002) articulate sustainability in terms of the degree to which technology differentiates the firm from competitors and the possibility for competitors to replicate the strategic benefits. In comparison, McEvily and Chakravarthy’s (2002) study is more specific on this matter. These authors explicitly state “the difference between a firm’s
development time and the speed with which competitors replicate its performance [which] allows the focal firm to sustain product performance” (2002, p.297).

There are also other studies that use measures such as ROAs over a few years as a dependent variable. The longitudinal nature of the data could be a rather fair reflection of sustainability (Armstrong & Shimizu, 2007). The limitation on such an approach though is that a single year of extraordinary performance could severely affect the entire data set (Wiggins & Ruefli, 2002). It is suggested that robust testing of sustainability requires the integration of the concept at both the hypotheses development and empirical design stages (Barney, 2001; McEvily & Chakravarthy, 2002; Pettus, 2001; Priem & Butler, 2001a). Sustainability-based dependent variables should be developed in close relation to the inimitability of resources (Dierickx & Cook, 1989). In terms of the research design, a greater proportion of extant studies have adopted a cross-sectional setting (Armstrong & Shimizu, 2007). However, a longitudinal setting should be preferred over a cross-sectional setting, as the former allows observation of dynamic relationships over time and how resources are developed or acquired due to changes in conditions and how this affects the strategic advantages of firms (Barney, 2001).

The final major issue in the empirical study applying the resource-based view is the need to control for confounding factors so that a more precise testing of the predicted causal relationship is enabled (Armstrong & Shimizu, 2007). It is suggested that the consistency of levels between independent and dependent variables is of critical importance (e.g. Hitt, Beamish, Jackson, & Mathieu, 2007; Klein, Dansereau, & Hall, 1994). Previous empirical research in the resource-based view has predominantly focused on the effect of firm-specific resources on firm performance (Barney & Arikan, 2001). However, as firm-level performance can be explained by an aggregation of different resources (Ray, Barney, &
Muhanna, 2004), the reported effects of resources might be impure and inaccurate. This risk is particularly worrisome when sample firms are more diversified. For these firms, it is difficult to disentangle the value of a particular resource or effects of certain resource from those of other resources (Henderson & Cockburn, 1994). It is observed that only a small proportion of studies examined dependent variables at levels lower than firm-level performance (Armstrong & Shimizu, 2007). For future research, using dependent variables at lower than firm-specific performance levels may generate more rigorous empirical contribution to the resource-based view (Henderson & Cockburn, 1994; Ray et al., 2004).

It is suggested “the value of a firm’s resources must be understood in the specific context within which a firm is operating” (Barney, 2001, p.52). The impact industry-level factors have on firms’ resource development is also recognised and discussed (Levinthal & Myatt, 1994; Van den Bosch, Volberda, & de Boer, 1999). It is therefore important to control industry effects for a better assessment of the value of a particular resource (Rouse & Daellenbach, 1999). An easy solution that has been adopted by many researchers is to constrain their focus on a single-industry. Among the studies that Armstrong and Shimizu (2007) reviewed, approximately 47% of empirical studies relating to the resource-based view are of single-industry settings. A caveat is that such an approach could lead to a major compromise on the generalisability of single-industry studies due to the resource idiosyncrasy nature of each industry (Barney, 2001; Priem & Butler, 2001a). This challenge may be resolved by accumulating the results of multiple single-industry studies (Jensen, 1983).

The definition of industries is largely based on the SIC codes. A question is also raised regarding using SIC codes as the definition of industries, as this industry classification theme may not sufficiently control for the uniqueness associated with a given industry (Barney, 2001; Robins & Wiersema, 1995; Rumelt, 1982). Proposed approaches to overcome such
limitation include: (1) categorise industries based on input (e.g. Farjoun, 1998; Coff, 2002); and (2) define industry boundaries based on managers’ cognition (Reger & Huff, 1993). In general, a sound industry definition should reflect heterogeneity within both input and output levels. In comparison to the single-industry setting, a multi-industry setting offers the advantages of greater sample size and better generalisability (Dess, Ireland, & Hitt, 1990; Hoskisson et al., 1999).

However, it is essential that researchers control the industry effects when a multi-industry sample is used. This requirement derives from (1) the impact industry level factors have on firm performance (Dess et al., 1990; Rumelt, 1982, 1991), and (2) the possibility that the relationship between resources and firm performance is moderated by the industry context (Barney, 2001). One way of controlling for industry effects is through adjusting the dependent variable (i.e. performance). To better control the idiosyncrasy of the relationship between performance and resources across industries, it is suggested that methods such as including industry dummy variables or stratifying the sample by industry characteristics should be adopted (Armstrong & Shimizu, 2007). It is encouraging to see that both approaches are deployed within the extant empirical research, with the second approach applied in more studies compared to the first approach (Armstrong & Shimizu, 2007).

There is also the need to control for parent effects in diversified firms, and this issue is closely related to the levels issue discussed previously (Armstrong & Shimizu, 2007). As firms expand in industries they operate in, they may develop valuable resources that can be transferred across multiple business lines, which serves as a unique source of competitive advantage. The importance of corporate parent effects has also been illustrated (Brish, Bromiley, & Hendrickx, 1999; McGahan & Porter, 1997; Rumelt, 1991). These authors reported that the corporate-parent effects account for 1-2%, 4%, and 5-15% of aggregate
variance on profitability. In this regard, among the studies that are reviewed by Armstrong and Shimizu (2007), approximately a third of them examined single-business firms within a single-industry, 5 out of 125 studies looked into single-business firms in multiple industries, 6 out of 125 studies looked at diversified firms within a single industry, 4 out 125 studies examined single businesses of diversified firms in multiple industries, and 18 out of 125 studies investigated diversified firms. This statistic indicates that under half of the studies being reviewed may not have controlled for other businesses or parent effects. It is suggested that more attention should be paid to this aspect in future research into the resource-based view.

Finally, controlling for overall firm effects in a comprehensive manner is needed, which means instead of focusing on the focal resources alone, the resource-based view research should also control for unobserved heterogeneity embedded in each firm that could bias the model estimation (Levitas & Chi, 2002). Given that non-substitutability is a key attribute underpinning a sustained competitive advantage and this attribute is difficult to determine, it is possible that firms may employ a very different yet strategically equivalent resource as a substitute for a focal resource (Barney, 1991). It is of critical importance to control for this possibility. The control for unobserved heterogeneity is achieved through incorporating firm dummy variables (Anand & Khanna, 2000; Henderson & Cockburn, 1994), which requires panel data even in a single-industry setting (Anand & Khanna, 2000). There is limited research that has paid particular attention to this aspect. Only a few studies have specifically incorporated firm-level dummy variables to control for systematic unobserved heterogeneity across firms (e.g. Henderson & Cockburn, 1994; Makadok, 1999; Park et al., 2002). Therefore, this is an area that calls for greater future effort.
The resource-based view is recognised and applied as an influential theoretical perspective within the strategic management field (Powell, 2001; Rouse & Daellenbach, 2002). Given that all theories must undergo repeated attempts at empirical falsification before they can be accepted as “true” (Godfrey & Hill, 1995), there have been numerous studies that empirically test the resource-based view. In an assessment of 166 empirical studies that test the resource-based view, Barney and Arikan (2001) reported that only four studies (2%) presented results that were partially in contradiction with the resource-based view. However, in a more recent attempt to review the empirical testing of the resource-based view, Newbert (2007) put forward a challenge on the results of Barney and Arikan (2001). He argued that the seemingly encouraging results might suffer from inaccurate interpretation of research findings and selection bias of sample articles.

Differing from Barney and Arikan’s (2001) approach, Newbert (2007) conducted his review by following David and Han’s (2004) method of assessing the empirical support of the *transaction cost economics*. He found that despite wide acceptance and application of the resource-based view, it has only received marginal support (53% of the tests assessed in the study were empirically supported). However, such a seemingly less-than-ideal level of support is highly comparable to the extent of support received by other theories of strategic management (e.g. 47% of tests were supported in the review of *transaction costs economics* by David & Han (2004); with similar insignificant support reported by Campbell-Hunt (2000), Dalton, Daily, Ellstrand, & Johnson (1998), and Ketchen, Combs, Russell, Shook, Dean, Runge, Lohrke, Naumann, Haptonstahl, Baker, Beckstein, Handler, Honig, & Lamoureux (1997)). Given that a large proportion of empirical studies fail to support for all hypothesised effects, the relatively low level of empirical support for the resource-based view observed in the review is not unacceptable.
There are four approaches adopted in the empirical testing of the resource-based view, namely the “resource heterogeneity approach”, the “organizing approach”, the “conceptual approach” and the “dynamic capabilities approach” (Newbert, 2007). Researchers who employ the “resource heterogeneity approach” place great emphasis on testing the relationship between the value, rareness, inimitability, and non-substitutability of a resource, a capability, or a core competence with competitive advantage and performance outcome (Newbert, 2007). Based on the review of these empirical studies, greater supports are reported for the predicted relationship between a specific capability and competitive advantage and the relationship between a specific core competency and competitive advantage, but not so for the relationship between a specific resource and competitive advantage (Newbert, 2007). This general finding echoes the notion that it is the way resources are deployed not the possession of resources that contributes to the sustained competitive advantage. Many contemporary studies into the resource-based view aim to provide more precise explanations for such process (Amit & Schoemaker, 1993; Barney, 1997; Barney & Mackey, 2005; Barney & Wright, 1998; Eisenhardt & Martin, 2000; Foil, 1991; Henderson & Cockburn, 1994; Kogut & Zander, 1992; Lado, Boyd, & Wright, 1992; Leonard-Barton, 1992; Mahoney & Pandain, 1992; Peteraf, 1993; Prahalad & Hamel, 1990; Reed & DeFillippi, 1990; Russo & Fouts, 1997; Teece et al., 1997).

Compared to the first approach, the “organizing approach” refers to the examination of how specific organisation contexts and conditions enable the effective exploitation of resources and capabilities (Newbert, 2007). This is done by operationalising the independent variable as the interaction term of a resource (capability) and the organising context. According to the review, greater supports are received for the tests relating to resource exploitation than those relating to capabilities exploitation (Newbert, 2007). There are two possible explanations for
such outcome. First of all, compared to resources, capabilities are of a greater ambiguous nature. A firm itself may not be fully aware of what its capabilities are therefore be ineffective in exploiting those capabilities. Secondly, most of the studies adopting such an approach are published after the year 2000 (Newbert, 2007). This indicates that empirical enquiry into the capability area is still in its infancy stage of development. It has also been suggested that compared to resources, capabilities are more difficult to quantify and assess. Its operationalisation requires a lot more primary data (e.g. Deniz-Deniz & De Saá Peréz, 2003; De Saá Peréz & Falcon, 2004; Hatch & Dyer, 2004; Wang, Lo, & Yang, 2004). The difficulty of obtaining sufficient primary data is likely to affect the quality and quantity of data for empirical testing, which in turn impacts on the research findings. Therefore, it may be too early to draw definite conclusions from this line of work.

The “conceptual approach” refers to the approach testing the effect of the four fundamental attributes of a resource underpinning sustained competitive advantage prescribed by Barney (1991) (Newbert, 2007). The fundamental difference between this approach and the “resource heterogeneity approach” is that this approach is more direct and does not attempt to identify the actual resources, capabilities or core competencies that confer an advantage to a firm (Newbert, 2007). Empirical evidence generated by studies adopting this approach is generally affirmative (Newbert, 2007), which defends the prescribed effect value, rareness, and inimitability of resources on a firm’s potential to gain sustained competitive advantage. While non-substitutability is rarely tested, this can be justified by the increasing argument that compared to the other three tenets, non-substitutability is merely a form of inimitability (e.g. Barney, 1997). Thus the lack of empirical test for it is less concerning.

As indicated in the name, scholars apply the “dynamic capabilities approach” to examine the process of deploying the resources and its contribution to competitive advantage and
performance outcome. Therefore, a typical operationalisation of such an approach is to include the interaction term of a specific resource and a specific capability as the independent variable. Among all the approaches under review, this is the least employed one. Similar to the “organizing approach”, the “dynamic capabilities approach” also generates relatively low empirical support (Newbert, 2007). As with the “organizing approach”, this stream of studies is relatively new, and the difficulty in quantifying and assessing capabilities may contribute to the rather inconclusive results to date.

Beside approaches adopted by researchers to empirically test the resource-based view, another important issue is how independent variables have been operationalized (Newbert, 2007). As mentioned in previous discussion, value, rareness and inimitability have been well tested compared to non-substitutability. Based on the studies under review by Newbert (2007), 11 dimensions of inimitability have been developed and tested. Newbert (2007) report that King and Zeithaml (2001) operationalise inimitability relying on causal ambiguity, de Carolis (2003) operationalises inimitability in terms of time compression economies, Irwin, Hoffman, and Lamont (1998) operationalise inimitability in terms of interconnectedness of asset stocks, Hatch and Dyer (2004) operationalize inimitability based on learning costs, McEvily & Chakravarthy (2002) operationalise inimitability according to social complexity and tacitness, and both Hatch and Dyer (2004) and McEvily & Chakravarthy (2002) operationalise inimitability in terms of asset specialisation. The majority of these studies received empirical support, which largely confirms the notion that inimitability is the most important attribute in the resource-based view (Barney, 2001; Godfrey & Hill, 1995; King & Zeithaml, 2001). Given the low level of investigation into inimitability through other dimensions such as path dependence (Dierickx & Cool, 1989; Eisenhardt & Martin, 2000) and switching costs (Rumelt, 1984, 1987), future researchers
might look into adopting these operationalisations and draw conclusions for the importance of inimitability (Newbert, 2007).

Like inimitability, the results of the tests for value and rareness also received significant empirical support (Newbert, 2007). With respect to value, it seems that a substantial challenge complicates the measurement of this construct. Newbert (2007) reports that Irwin et al. (1998) have followed Barney (1991) and measured value as the degree to which the resource can increase customer, occupancy, and reputation and then measure the dependent variable in terms of return on assets, total margin, and occupancy. Given that each of these constructs includes a similar dimension (occupancy), there is a potential for response bias (Podsakoff & Organ, 1986). Despite Irwin et al.’s (1998) effort to include multiple items to measure this construct, a technique that has been found to minimise such bias (Harrison, Mclaughlin, & Coalter, 1996), operationalisation is still under a strong scrutiny that it is inherently tautological.

With respect to rareness, Newbert (2007) suggested that although the test of this specific construct received support, it focused on one interpretation of this construct (i.e. Barney, 1991). However, Newbert (2007) also observed that much additional theoretical work has been conducted regarding this attribute. For example, as Christmann (2000), Penrose (1959), and Teece (1986) suggest, it is sometimes difficult to isolate rare resources from other resources as they are bundled up within organisations. More recently, Peteraf and Bergen (2003) assert that the amount of resources possessed by competitors is not a perfect indicator of resource rareness. Substitutability in terms of function must be taken into consideration. In other words, if two different resources can be exploited in the same way and serve similar purposes, the substitutability largely undermines the rareness for each other.
2.4.5 Critiques and Challenges of the Resource-Based View

Along with its development and wide acceptance, the resource-based view has also been extensively challenged and criticized (Kraaijenbrink et al., 2010). In general, the resource-based view is criticised on the following grounds: (1) it is tautological and fails to qualify as a theory (Priem & Butler, 2001a, 2001b); (2) it has little managerial implications (Conner, 2002; Miller, 2003); (3) it implies infinite regress (Collis, 1994; Priem & Butler, 2001a); (4) sustainable competitive advantage proposed by the resource-based view is not achievable (Fiol, 2001); (5) it is not a theory of the firm (Foss, 1996a, 1996b; Mahoney, 2001; Priem & Butler, 2001a); (6) valuable, rare, imitable and non-substitutable are neither necessary nor sufficient for sustained competitive advantage (Becerra, 2008; Foss & Knudsen, 2003; Makadok, 2001; Peteraf & Barney, 2003); and (7) the definition of resource is unworkable (Priem & Butler, 2001a).

In regards to the first critique, many of the challenges are towards Barney’s (1991) paper. Priem & Butler’s (2001a) argument is that “valuable” and “competitive advantage” are defined in the same terms. If “valuable resources” are those ones that contribute to increasing efficiency and effectiveness, and “competitive advantage” is measured as improved efficiency and effectiveness, the primary assertions are true by definition and thus, not subject to empirical test (Williamson, 1999). In response to Priem & Butler’s (2001a) challenge of the resource-based view being tautological, Barney (2001) suggested some ways of parameterizations for the resource-based concepts of value, rarity, and imitability. He argued “the critical issue is not whether a theory can be restated in such a way as to make it tautological – since this can always be done – but whether at least some of the elements of that theory have been parameterised in a way that makes it possible to generate testable empirical assertions” (p.42). But Priem and Butler (2001b) accuse such defense as
“addressing a logical issue empirically is not an effective response to the initial critique”.

Despite the continued debate, Priem & Butler (2001a, 2001b) and Barney (2001) shared agreement on a few areas that could provide a basis for improved understanding of the resource-based view. First of all, “many of the attributes that make a resource a possible source of sustained advantage are not amendable to managerial manipulation” (Barney, 2001, p.42); secondly, “some RBV research is clearly tautological” (Barney, 2001, p.51); thirdly, implementation deserves more attention, and fourthly, a dynamic approach for the study of resources may be particularly beneficial.

By “little managerial implications” provided by the resource-based view, researchers are referring to the lack of specific instructions on how managers develop and obtain resources that are valuable, rare, inimitable and non-substitutable (Conner, 2002; Miller, 2003). As argued by McGuinness and Morgan (2000), managerial control and abilities to accurately assess future value of resources are exaggerated by the resource-based view. The tension between descriptive and prescriptive theorising leads to scrutiny of the value of the resource-based view (Lado, Boyd, Wright, & Kroll, 2006). However, advocates of the resource-based view argue that the resource-based view should not be a lone theoretical perspective subject to this scrutiny. Many other theories developed and applied in the strategic management research field reveal the same tension (Van de Ven, 2007). Furthermore, the resource-based view is developed to explain the relationship between resource attributes and sustainable competitive advantage. It never intends to provide managerial prescriptions (Barney, 2005). But any explanation the resource-based view might provide is still of value to managers (Kraaijenbrink et al., 2010). Instead of criticising the resource-based view for its lack of managerial implications, future research should focus more on the possibilities of how it could impact on management practice (Ghoshal, 2005; Ghoshal & Moran, 1996).
The third critique of the resource-based view is proposed by Collis (1994) and Priem & Butler (2001a) regarding infinite regress (as cited in Kraaijenbrink et al., 2010). As highlighted by Collis, it is suggested “[a] firm that has the superior capability to develop structures that better innovate products will, in due course, surpass the firm that has the best product innovation capability today” (p.148). Since the capability of “developing structures that facilitate future innovation activities” is more valuable than that of “product innovation capability possessed by the firm today”, firms will be inspired to develop the former capability according to the resource-based view. The critique is that this step can be extended *ad infinitum*, leading firms to an endless search for ever higher order capabilities. A counter argument for this criticism is that since competition is never static, infinite regress for resources and capabilities that create greater value is not much a problem but rather a necessity for firms’ long-term survival. On a related note, it can be argued that higher order capabilities and lower order capabilities are interdependent and mutually supporting, firms need to do both to achieve increasing efficiency and effectiveness (March, 1991).

A major contribution of the resource-based view is to explain the achievement of sustained competitive advantage. However, whether sustained competitive advantage is achievable raises some intensive debate. While one version of the critiques adopts the Marshallian quasi-monopoly and equilibrium argument and proposes that every competitive advantage must eventually be competed away, the other version of the critique emphasised the dynamic nature of external environment (Kraaijenbrink et al., 2010). For example, Fiol (2001) stated that “[b]oth the skills/resources, and the way organizations use them must constantly change, leading to the creation of continuously changing temporary advantage.” (p.692). His notion echoes Eisenhardt and Martin (2000) and D’Aveni (1994) who suggest that a competitive advantage can be sustained only at the dynamic level through advantageous “dynamic
capabilities” or “organisational learning” that allows the firm to adapt faster than its competitors. Barney (2002) also indicates there is an important limit to the applicability of the resource-based view: the “rules of the game” in an industry must remain relatively unchanged for the logic of the resource-based view to hold. On the other hand, values of existing resources will be significantly affected by the emergence of new technologies and/or new markets. That is when explanation for sustainable competitive advantage may go beyond the bound of the resource-based view.

Although it is generally accepted that no competitive advantage “lasts forever”, the very concept of sustained competitive advantage still holds profound meaning for the management. Driven by the desires to develop a competitive advantage that endures, managers will become proactive in seeking for practical ways to survive in dynamic markets. These include acceleration in innovation or effective deterrence and prevention of competitors’ imitation attempts (Kraaijenbrink et al., 2010). While some defense has been developed to support the achievability of sustained competitive advantage, to what degree the resource-based view contributes to the understanding of sources of sustained competitive advantage is still under scrutiny.

According to the resource-based view, asymmetric information regarding the future value of the available resources provides an \textit{ex ante} source of sustained competitive advantage. However, entrepreneurs’ abilities to repeatedly initiate superior resource acquisition, development, and allocation decisions have been overlooked by this proposition (Kraaijenbrink et al., 2010). On the other hand, while it is difficult for firms to derive sustained competitive advantage from a static set of resources within a dynamic environment, with the inclusion of the dynamic capabilities, the resource-based view can account for \textit{ex post} sources of sustained competitive advantage (Makadok, 2001). Therefore, it is not the
possibility of achieving sustained competitive advantage that is worth the worry, more attention should be paid to develop and apply the resource-based view that more accurately explains sources of such advantage.

Conner (1991) first put forward the proposition that the resource-based view is the closest theory of the firm, and such proposition received support from Kogut and Zander (1992). With expanding interest in knowledge as a strategic resource, the question on whether the resource-based view is really a theory of the firm stimulates some intellectual dialogue among researchers. Kraaijenbrink et al. (2010) report that in 1996, two top-tier academic journals (Organization Science and Strategic Management Journal) devoted specific issues to provide a platform for discussion. In an important commentary, Foss (1996a, 1996b) concluded that the resource-based view does not qualify as a theory of the firm. According to Foss, the resource-based view focuses on firm heterogeneity and how a firm is able to create better rent generation than others. But it fails to explain the existence of firms, firm boundaries and internal organisation, and why firms are more effective mechanisms for rent creation than markets. Such comment is agreed by some authors (e.g. Mahoney, 2001; Priem & Butler, 2001a). With the acknowledgement that the resource-based view is never developed to explain the above-mentioned questions (Barney, 2005; Barney & Clark, 2007), it is suggested that instead of claiming the resource-based view as a theory of the firm, it may be more appropriate to see it as being complementary to those theories of the firm (e.g. the Transaction Cost theory) (Barney, 1999; Gibbons, 2005).

Another critique of the resource-based view focuses on the fundamental tenet that sustained competitive advantage can be achieved by developing and deploying resources that are valuable, rare, inimitable and non-substitutable when there is an appropriate organisation in place (Kraaijenbrink et al., 2010). Some researchers quoted the seemingly modest empirical
support to challenge the value and theoretical soundness of the resource-based view (Newbert, 2007). Beyond the methodological aspect, it has been noted repeatedly that the possession of resources is not a sufficient condition for competitive advantage to develop. It is firms’ abilities to deploy the resources in an optimal manner that sustained competitive advantage can be achieved (Makadok, 2001; Peteraf & Barney, 2003). However, the resource-based view lacks the explanation for capability development and deployment (Kraaijenbrink et al., 2010). In a similar vain, it has been argued that compared to development of an individual resource, the synergistic combination or bundle of resources created by the firm is more critical for the generation of competitive advantage. The focus on component level, especially on the individual resource level limits the explanatory power of the resource-based view.

Beyond sufficiency concerns, there are other studies that impose challenges on the four attributes as necessary criteria for sustained competitive advantage. For example, Foss and Knudsen (2003) argued that uncertainty and immobility are truly fundamental conditions for a sustained competitive advantage to arise, but the other criteria are merely additional to these. Becerra (2008), on the other hand, proposed that value uncertainty, resource specificity, and firm-level innovation are conditions under which profits can emerge in the resource-based view. Compared to some of the other critiques, the challenge on the explanatory power of the four criteria tends to be a difficult one to defend (Kraaijenbrink et al., 2010).

The final yet critical critique of the resource-based view is that the definitions of resources in the resource-based view are overly inclusive (Priem & Butler, 2001a). Although Barney (2001) suggests that inclusiveness is part of the resource-based view’s strength, it can be interpreted as a source of weakness at the same time. The first problem of inclusiveness is
that it fails to sufficiently distinguish those resources that are inputs to the firm and the capabilities that enable the firm to select, deploy and organise such inputs. Although some attempts have been made by Amit and Schoemaker (1993), Peteraf (1993), Barney et al., (2001) and Makadok (2001b) to distinguish capabilities from resources, these two concepts are still loosely and interchangeably used in a major way. This sometimes leads to confusion about the resource-based view’s core concept. Another problem associated with the inclusive definition is that there is no clear distinction of fundamental differences among different types of resources. However, it is these differences that largely contribute to heterogeneities among competitors and the creation of sustained competitive advantage. More specifically, although the resource-based view recognises different types of resources, such as physical capital, human capital and organisational capital (Barney, 1991), it treats them all in the same way. It is suggested that the resource-based view could improve substantially if its basic logic were refined in a way that differences among types of resources and types of resource ownership can be explicitly recognised and discussed (Kraaijenbrink et al., 2010).

In conclusion, a few critiques of the resource-based view are developed over time. While some of those can be dismissed without much difficulty, others do reveal limitations on the value of the resource-based view thus deserve greater attention for future development. The key concern lies in three areas: (1) the tautological tendency of the resource-based view; (2) the overemphasis on the individual resource and insufficient discussion on the importance of bundling resources and human involvement in assessing and creating value; and (3) the ambiguous distinction between resources and capabilities and the over-generalisation of typologies.
2.4.6 Future Direction

Obviously, all of the aforementioned critiques and challenges need to be well addressed in future research to advance the development and application of the resource-based view. However, a good starting point might be to develop clearer distinctions between what are and what are not resources and demarcations among various types of resources (Kraaijenbrink et al., 2010). This is in line with the emergence of efforts to establish a sound micro-foundation of the resource-based view, which emphasises the need for analysis within firm boundaries of the internal process of managing resources (Kraaijenbrink et al., 2010). It is suggested that despite the existing attempt to distinguish resources from capabilities, there is a limitation of the capabilities approach. That is, even the processes of resource development and deployment are conceptualised as capabilities, they tend to be analysed and interpreted in terms of possession instead of integration and application (Kraaijenbrink et al., 2010). A better-determined concept of resources and capabilities might be to explicitly distinguish them from action (or process). Resources and capabilities should both be conceived as capacities that enable a firm’s actions (Hodgson, 2008) but at the same time constrain those same things (Kraaijenbrink et al., 2010). It is also of great importance to investigate the processes of deploying resources and capabilities, so that a more practical resource-based view can be developed.

To further enhance the resource-based view, future studies should also develop a better understanding of different types of resources and how they contribute to a firm’s sustained competitive advantage in different ways (Kraaijenbrink et al., 2010). It has been recognised that there is no single, universal way of categorising resources (Mahoney, 1995; Penrose, 1959/1995). However, an in-depth discussion on differentiating knowledge from other types of resources may generate some valuable insights. This is because a main characteristic
associated with knowledge is the nonrivalrousness, which is also known as fungibility. These concepts refer to the nature that the deployment of a particular resource by one firm, or for one purpose, does not prevent it from being redeployed by the same or another firm, or for another purpose. Deploying knowledge may also increase nonrivalrousness or fungibility (Winter & Szulanski, 2001). By distinguishing rivalrous resources from those that are nonrivalrous, the resource-based view can be advanced with a modification on the assumption that resources are scarce and firms must compete to obtain the best. This improvement has profound implications as it helps to explain the phenomenon known as co-optetion in which many firms cooperate intensively while still competing (Kraaijenbrink et al., 2010).

Moreover, the process of managing and deploying nonrivalrous (fungible) resources differ greatly from that of rivalrous (nonfungible) resources. When the deployment of a resource within one company or for one purpose limits its deployment potentials for other companies or purposes, managers need to focus more on the efficient use of such resource while seeking as many productive opportunities as possible (Penrose, 1959/1995). In contrast, if a resource is nonrivalrous (fungible) in nature and such attribute increases with its deployment, managers should use this resource as intensively as possible; the wide and frequent deployment could enhance the value of such a resource (Kraaijenbrink et al., 2010). It can be expected that future theorising and application of the resource-based view along these dimensions can generate profound implications in many areas, including the understanding of learning-by-doing, leaning-curve phenomenon, and strategic actions that allow for better leverage of existing resources for value creation.
2.4.7 Summary of the Resource-based View Literature

This study traces back to the very origin of the development of the resource-based view. It paints a complete picture of what the theory is about and provides a thorough review of major studies that marked the shifts from introduction to the growth and to the maturity stages of theory development. As suggested by Barney, et al. (2011), twenty years after the 1991 issue, there are strong indications that RBT has reached maturity as a theory. Along with its development and wide acceptance, the resource-based view has been extensively challenged and criticized. Among those critiques highlighted and discussed above, the call for a more “fine-grained” development and application of the resource-based view largely stimulates the research motivation of this study. Specifically, this study distinguishes technological knowledge-based resources from physical property-based resources and analyses key differences between these two types of resources. It is proposed that variations in firms’ preferences for alliances and acquisitions are largely explained by the differences in their resource characteristics.

2.5 Resource Types, Alliances and Acquisitions

The resource-based view posits that a firm’s competitive advantage lies primarily in the application of the bundle of valuable intangible and/or tangible resources at the firm's disposal. As proposed by Miller and Shamise (1996), a good typology of classifying resources should grasp the notion of key resource characteristics underpinning sustainable competitive advantage. Based on such a premise, they classified resources into two broad categories, namely knowledge-based resources and property-based resources. According to Miller and Shamise (1996), knowledge-based resources and property-based resources both demonstrate certain degrees of imperfect mobility, imperfect imitability, and imperfect
substitutability. However, they also differ in some major aspects such as effectiveness of protection and appropriability. Specifically, technological knowledge-based resources are characterised by greater tacitness and uncertainty in performance outcome. These resources are also more expensive to develop, revealing a higher level of path dependency. In comparison, physical property-based resources are characterised by scale and scope economies, which are often more valuable and deployable in the same or related sectors (Das & Teng, 2000). Given these differences in resource characteristics, it is expected that firms with different resource focus will develop varying needs and desire to utilise alliances and acquisitions for resource access. Their preferences for alliances or acquisitions are likely to be formed upon assessing respective advantages and disadvantages of these strategies against their own resource characteristics. Since Miller and Shamise’s (1996) way of classifying resources places great emphasis on resource characters and how they contribute to competitive advantage, the adoption of their typology establishes a sound theoretical underpinning for theoretical development of this study.

2.5.1 Knowledge-Based Resources

Knowledge-based resources allow organisations to succeed not through market power enhancement or through pre-emption of competition, but through the skills to adapt to fast changing product markets and varying customer needs (Miller & Shamsie, 1996). Knowledge-based resources often take the form of particular skills, such as technical, creative, and collaborative skills (Miller & Shamsie, 1996). With respect to the key resource attributes proposed by the resource-based view, knowledge-based resources are perceived as of particular importance for providing firms with sustained competitive advantage, because they are inherently difficult to imitate, thus facilitating sustainable differentiation (McEvily & Chakravarthy, 2002). The imperfect imitability of knowledge-based resources largely derives
Among the different sub-categories of knowledge-based resources, technological knowledge plays a central role in a firm’s strategy formulation and strategic behaviour. This is because the external environment has become increasingly competitive, complex, dynamic and highly interconnected. Firms must rapidly and continuously adapt to the changing market by keeping pace with shorter product life cycles and incorporating multiple technologies into the design of new products, co-creating products and services with customers and partners, and leveraging the growth of scientific and technical knowledge in many sectors (Fjeldstad, Snow, Miles, & Lettl, 2012). Development and possession of technological knowledge allow firms to assess and exploit emerging opportunities in the market place (Wiklund & Shepherd, 2003), which sometimes lead to technological breakthroughs and innovations that have great commercial potential.

Since alliances provide flexibility and inter-organisational learning opportunities (Dussauge et al., 2000; Inkpen & Dinur, 1998; Khanna et al., 1998; Nagarajan & Mitchell, 1998; Powell et al., 1996; Teece & Pisano, 1994), they facilitate technological knowledge-intensive firms to enhance their resource base and better exploit existing resources for value creation. But at the same time, the costs of developing such resources can also constrain their acquisition activities, as acquisitions are expensive to conduct and are also highly irreversible. As suggested by Hitt et al. (1991), although acquisitions can be financed in various ways, firms are still subject to higher resource constraints when intensive acquisition activities are conducted. This often leads to reduced commitment in research and development activities. Irreversibility of acquisitions and distraction from prioritised activities contribute to significant opportunity costs for firms that are technological knowledge-based resource intensive. Therefore, technological knowledge-based resources are of particular relevance in
the context of investigating alliance and acquisition activities, which is the focus of this study.

Prior empirical evidence has suggested that the value of proprietary assets depreciates quickly through obsolescence and imitation (Zander & Kogut, 1995). Many valuable resources are actually protected from imitation by knowledge barriers. Although the protection of knowledge barriers is not perfect, such that it may be possible for competitors to develop similar knowledge and talent, competitors’ imitation efforts normally take time. By the time competitors manage to replicate the focal firm’s existing knowledge-based resources, the firm may have developed newer skills or learned to use existing and new resources in different ways (Lado & Wilson, 1994). Therefore, according to Grant (1996), the key to sustained competitive advantage is not proprietary knowledge itself, but the technological capabilities that drive the generation of new knowledge.

Through investigation into how firms develop and accumulate technological knowledge, a strong causal relationship between a firm’s R&D intensity and its possession of valuable technological resources or capabilities has been observed (Chan, Faff, Gharghori, & Ho 2007). It has also been acknowledged that firms gain efficiency and effectiveness in innovative capabilities as they invest more into R&D activities (Deeds, 2001). This is largely explained by the increasing absorptive capacities through greater R&D commitment. Absorptive capacities are defined as a firm’s ability to identify, assimilate and leverage its externally sourced resources/capabilities to successfully commercialise them (Cohen & Levinthal, 1990). Furthermore, technological knowledge-based resources can be separated into explicit and implicit types. While explicit technological knowledge-based resources can be easily codified, implicit technological knowledge-based resources such as a more accurate appreciation of the value of a new technology (e.g. application of the technology, potential
for commercialization, etc.) or ability to achieve continuous innovations cannot. They are
developed and accumulated overtime through greater commitment into R&D activities.
Therefore, compared to explicit technological resources that could be more easily obtained
through open markets, implicit knowledge is more difficult to imitate and substitute.

2.5.2 Property-Based Resources

When a firm has exclusive ownership of a valuable resource that cannot be legally imitated
by other firms, it controls that resource and its appropriability (Miller & Shamsie, 1996).
Property-based resources are of a “difficult to obtain” nature because they are protected by
legal rights such as patents, contracts and deeds of ownership (Miller & Shamsie, 1996).
Different property-based resources exhibit different resource characteristics. It is suggested
that human resources reveal a high level of immobility as trading an entire workforce of a
company through the open market is difficult. Intellectual property, on the other hand, is an
intangible resource that is under legal protection from imitation. Physical resources include
machinery and equipment, raw material productions, and distribution channels, which reveal
several dominant characteristics: imperfect substitutability, firm-specific and imperfect
mobility. There are more avenues for firms to obtain financial resources, which include the
stock market, bond market and lending institutions (Das & Teng, 2000).

Systems and their interwoven components constitute a major form of property-based
resources. By systems and interwoven components, they refer to physical facilities or
equipment (Miller & Schamsie, 1996). Although most physical facilities by themselves can
be imitated, synergy and value creation achieved via integrating resources within a
comprehensive system is hard to duplicate (Barney, 1991; Black & Boal, 1994). Therefore,
for this type of resources, adding up more and more individual resources is of little value. It is
the addition of assets that enhance the range and comprehensiveness of a pre-existing system that matters the most. In other words, to achieve greater value and inimitability, resources are added not to substitute for existing assets, but rather, to strengthen a system or competence that is already in place (Miller & Shamsie, 1996).

While the perfect protection of these resources eliminates potential hazards of resource appropriation, it affects firms’ potential gains from collaborative relationships when they contribute such resources. This is because partner firms are often less motivated to engage in in-depth relationships that limit opportunities for the focal firm to learn and get access to valuable resources. The characteristics of physical property-based resources such as being firm specific and fixed, as well as the scale and scope economies nature (discussed in the next section) will have an impact on alliance and acquisition activities initiated by firms that have a greater focus on these resources. Furthermore, within the manufacturing industry context that this study looks into, physical property-based resources are of great relevance as they constitute a critical part of manufacturing firms’ property-based resources as they are often deployed in the production processes. Therefore, this study looks into firms’ focus on physical property-based resources.

2.5.3 Comparison of Knowledge-Based Resources vis-à-vis Property-Based Resources

Beside the major attributes described before, technological knowledge-based resources are of fungible and often non-rivalrous in nature. This means the resource can be applied in many ways and the use of the resource will not depreciate its value regardless of the number of users (Lavie, 2006). On the other hand, technology itself is path dependent and cumulative in nature (Dosi, 1988). Current technological knowledge is often a direct function of past
operations (Helfat & Raubitschek, 2000). From this perspective, firms with a greater focus on
developing technological knowledge-based resources are likely to experience some inertial
forces when trying to navigate into new directions of resource development. It has also been
recognised that technological knowledge-based resources are embedded with relatively high
levels of tacitness, which are uncertain in characteristics and performance outcome at the
same time (Mowery, 1983; Pisano, 1990).

Physical property-based resources are also path dependence in nature. Compared to
knowledge-based resources, these resources demonstrate much stronger characteristics of
being fixed, rigid and firm specific. Their deployment is more relevant within the same or
related sectors (Chatterjee & Wernerfelt, 1991) and the level of control of it by focal firms is
the major source of value for property-based resources (Miller & Shamsie, 1996). Because of
these features, firms that are more focused on developing these resources experience much
greater organisational inertia compared to counterparts with greater focus on technological
knowledge-based resource development. Physical property-based resources are also of
greater explicit nature compared to technological knowledge-based resources. It is suggested
that most firms have the ability to recognise the deployment potential of such resources
(Miller & Shamise, 1996). However, a caveat here is that recognition of the functionality of
these resources is different from the ability to accurately assess the real value of these
resources. Further, based on the previous discussion that physical property-based resources
are composed of comprehensive and interwoven components and systems, the capabilities of
developing, managing and deploying these resources cannot be created overnight.

Adopting knowledge from the microeconomic field, a major advantage of holding large stock
of physical and systemic property-based resources is achievement of economies of scale and
scope. Since physical property-based resources can serve multiple productions before they
are fully occupied (Chen & Chen, 2003), in the long run, reduction in unit cost and achievement of greater efficiency can be obtained as the size of a facility and the usage levels of other inputs increase (Sullivan & Sheffrin, 2003). And when utilisation of an individual physical asset increases, product diversification can be made more efficient (Panzer & Willig, 1981). The concept of economies of scale and the significant capital expenses incurred by establishing large scale physical production resources are linked to the explanation of competitive advantage by Industrial Organization researchers (Caves, Khalilzadeh-Shirazi, & Porter, 1975; Caves & Porter, 1977; Porter, 1979, 1980, 1998).

2.5.4 Focus on Knowledge-Based Resources and Alliances

One of the most widely cited motives for firms to form alliances is the access of new technical skills or technological capabilities from partner firms (Bayona et al., 2001; Hagedoorn & Duysters, 2002; Hagedoorn & Wang, 2012; Hamel, 1991; Hamel et al., 1989; Mariti & Smiley, 1983; Mody, 1993; Mowery et al., 1996, 1998; Powell & Brantley, 1992). Because of the tacit nature and higher level of uncertainty concerning the characteristics and performance of technological knowledge-based resources, assessment of their value and drafting simple contracts governing the sale or licensing of these resources are difficult (Mowery, 1983; Pisano, 1990). This makes contracts and market transactions suboptimal mechanisms for firms to get access to these resources. Since alliances combine some of the incentive structures of markets with monitoring capabilities and administrative controls while remaining flexible and reversible (Mowery et al., 1996), they provide firms superior means to gain access to the technological knowledge-based resources without incurring unnecessary commitment or hierarchies. In relation to the uncertain nature of technological knowledge-based resources, previous literature has also suggested that new technologies often do not lead to obvious opportunities (Danneels, 2007; Shane, 2001). Firms may need to go through
trial and error to establish a better understanding of application and market potentials for these resources. Alliances are much easier to reverse if the resource from other firms is less valuable than originally expected.

Further, it is suggested that many industrial firms possess a technological knowledge base of relatively high degrees of diversity, which means they have technological knowledge from different fields outside their core areas (Lichtenthaler & Ernst, 2012). This is because the trend toward technology fusion often requires that many distinct technological components be built in a new product (Kogut & Zander, 1992). As developing and maintaining these technological knowledge-based resources demand ongoing commitment and significant financial resources, alliances are advantageous to firms that have a greater focus on knowledge-based resources as they allow these firms to gain access to partner firms’ resources without bearing additional financial costs.

Beside simple access, acquisition of technological knowledge-based resources is still one of the most important goals to be achieved through alliances (Mowery et al., 1996). To successfully absorb external technological information, a firm must have relevant in-house technological skills (Mowery et al., 1998). In line with the absorptive capacity arguments, Bastos (2001) explains the importance of a firm’s ability to assimilate information from joint alliance activities. Since more knowledge-based resources focused firms are likely to have developed greater absorptive capacities, they can better understand and internalise the knowledge coming from their partners, thus benefit more from alliances.

From the perspective of resource utilisation and leverage, firms that are more knowledge-based resource focused will benefit greatly from forming more alliances. Because of the fungible and non-rivalrous nature, in many cases, the increase of applications or adoptions of
a certain piece of technology may generate positive externalities, which contributes to the establishment of a dominant position of the focal technology in the market place. Therefore, firms that are more technological knowledge-based resource focused will ally more with others to identify resource deployment opportunities while sharing risks with others. Alliances also increase their opportunities to enjoy positive externalities without incurring huge costs.

Although the less perfect protection for knowledge-based resources and relative mobility of some explicit resources may raise concerns over resource appropriation and partner opportunistic behaviours associated with alliances, firms are still in control of what resources to share with partner firms to a certain extent. They can fence off critical resources that underpin their competitive advantage and collaborate with others in selective areas. Moreover, the threat is not evenly distributed among firms. Firms that are more focused on developing technological knowledge-based resources are likely to possess greater absorptive capacities, which enable them to better integrate and absorb the resource from partner firms. In other words, these firms are better positioned to win the learning race. They can take advantage of the leniency of alliances in terms of early termination or renegotiation once their resource access and acquisition needs are satisfied. Finally, when a firm possesses knowledge-based resources that are more of an implicit nature, it will have less concern over resource appropriation and partner opportunistic behaviour as such resources are difficult to imitate and appropriate. As reported by Mowery et al. (1996), there are limits to the acquisition of implicit resources such as capabilities from partner firms through alliances. Together, these factors increase the needs and desires of more knowledge-based resource focused firms to ally with others.
The opposite effects hold for firms that are less knowledge-based resources focused, as these firms are likely to suffer from poor absorptive capacities (Cohen & Levinthal, 1990) due to lower commitment into activities that generate such capacities. This limits their ability to understand and apply those resources from partner firms. Since they are also more dependent on their partners for resource access, their bargaining power will be low within a collaborative relationship. These firms are therefore subject to greater constraints in terms of what their partners are willing to share with them, as well as higher partner opportunistic behaviours. They are more likely to be the victims of losing the learning race and early termination. Thus, for firms that are less focused on technological knowledge-based resource development, the less their commitments into these activities, the less benefits they can reap from using alliances for resource access. The advantages of flexibility and less resource commitment provided by alliances will be exceeded by all the disadvantages described above. Therefore,

**H1(a):** *There is a positive relationship between a firm’s focus on technological knowledge-based resources and the number of alliances it forms.*

### 2.5.5 Focus on Knowledge-Based Resources and Acquisitions

One major benefit of conducting acquisitions is that it allows firms to obtain imperfectly mobile resources from the target firm with majority or full control (Capron *et al.*, 1998). However, as discussed previously, value assessment is difficult for technological knowledge-based resources (Mowery, 1983; Pisano, 1990). Together with the high demand in resource commitment and irreversibility, acquisitions are riskier than alliances as suboptimal mechanisms for resource access. Acquiring the “wrong” business can incur significant opportunity costs for the focal firm. Full control is not even necessary when simple resource access is needed. Inflexibility and irreversibility associated with acquisitions are not good
matches for firms’ needs to test out application and market potentials for external technological resources, especially for those emerging ones. When a technological knowledge-based resource is proven to be less valuable than expected, firms engaging in acquisitions will find it hard to reverse the investment.

Referring to the previous discussion regarding resource constraints, activities that generate technological knowledge-based resources (i.e. R&D activities) and acquisitions both demand significant resource commitments. Firms have ongoing commitments into research and development activities are therefore constrained to do internal development and resource acquisitions simultaneously and intensively. When firms are already significantly focused on internal development of technological knowledge-based resources, acquisitions are too costly to be the optimal option for these firms to achieve resource access or acquisition. Although the discussion is not directly related to a firm’s knowledge-based resources, findings from studies that investigate the relationship between a firm’s R&D intensity and its acquisition activities still have some important implications in this regard. Since research and development activities are costly, risky and uncertain in outcome (Graves & Langowitz, 1993; Hitt et al., 1991), they demand significant commitment and managerial attention. The tedious target identification, selection, and negotiation processes of acquisitions are major sources of distractions of important managerial attention and commitment. Therefore, firms with greater focus on technological knowledge-based resources will deem it prudent to restrain themselves from acquisition activities that could distract them from their prioritised activities.

With respect to value creation through utilising and leveraging existing resources, firms that focus more on technological knowledge-based resources have greater chance to benefit from acquisitions through increasing applications of their resources. However, acquisitions in
general do not allow them to test out all the possible ways of applying these resources through exchanging ideas and information with many other firms as what alliances enable them to. These firms not only have to bear the entire risks and costs during experiments, they must also deal with increasing organisational complexity, hierarchies and inertia, as well as coordination costs arising from acquisitions. Furthermore, any attempt to establish an industry technological standard through acquisitions is too costly.

Although acquisitions allow firms to avoid resource appropriation by other firms, this advantage becomes less important as firms become more focused on technological knowledge-based resource development. Their commitment into research and development activities will generate greater absorptive capacities and contribute to an enlarged implicit knowledge base, which is more valuable and difficult for other firms to appropriate and imitate. Basically, the same explanations on decreasing threat of partner opportunistic behaviours and resource appropriation for more knowledge-based resource focused firms delineate the diminishing importance of control provided by acquisitions. It can be argued that firms that are more focused on internal technological knowledge-based resource development have greater opportunities to benefit from absorptive capacities and fully absorb resources obtained from acquisitions. However, this advantage can be achieved from both alliances and acquisitions. Given the high demand in resource commitment, inflexibility, irreversibility and added organisational complexity, hierarchies and inertia associated with acquisitions, firms will prefer alliances to a much larger extent than acquisitions.

In comparison, firms that are less focused on internal technological knowledge-based resource development have greater needs and motivations to acquire (Heeley et al., 2006; Hoskisson & Busenitz 2002). This is because valuable technological knowledge-based resources, especially implicit technological knowledge, cannot be developed internally within
a short period of time. Past studies on technological resource development and acquisition activities also conclude that although acquisitions are subjected to large resource commitment, the outcome is more predictable than the outcome of internal developments (Graves & Langowitz, 1993; Hitt et al., 1991). These firms need to acquire such resources from external sources in order to keep up with other competitors.

Further, acquisitions also enable them to avoid the negative outcomes that may arise from problematic collaboration relationships (Pfeffer & Novak, 1976). Since acquisitions provide acquiring firms with complete ownership of target firms’ resources and capabilities, it eliminates the problems of partner-dependence and learning asymmetry within collaborative relationships. This means that firms that have been less focused on internal resource development in the past have better chance of catching up with competitors and fully exploiting the acquired resources and capabilities to generate new competencies. This may improve their competitive positions and increase their abilities to ally in the future. Therefore, although firms that are less focused on technological knowledge development may suffer from low absorptive capacities and experience some challenges on post-acquisition resource integration and deployment (Cohen & Levinthal, 1990; King et al., 2008), these firms are constrained by available options. The aforementioned disadvantages of engaging in alliances for these firms make acquisitions the optimal choice for them. Therefore,

**H1(b): There is a negative relationship between a firm’s focus on technological knowledge-based resources and the number of acquisitions it conducts.**

### 2.5.6 Focus on Property-Based Resources and Alliances

Firms have a greater focus on developing physical property-based resources form alliances for reasons of resource access and exploiting purposes. According to Reed and DeFillippi
(1990), physical resources alone do not help a firm in building sustainable competitive
advantage. Therefore, there is a need for firms that have been more focused on physical
property-based resources to reach out to other firms that have resources complementary to
their own (Das & Teng, 1998). Through getting access to complementary resources, these
firms can achieve better combinations of productive resources, which leads to better product
development and idea generation for system improvement. Since property-based resources
are under perfect legal protection and are firm specific and fixed in nature, these firms have
little concern over resource appropriation associated with alliances.

Physical property-based resources are largely deployed in production processes. From the
perspective of utilising and leveraging existing resources for value creation, two or more
firms can pool similar assets together to achieve efficiency gains. Because of the extent of
scale economies and experience effects in production, firms that are more focused on
developing physical property-based resources will place a greater emphasis on seeking
opportunities to enjoy scale economies. They can form alliances with others that contribute
similar resources in order to achieve efficient size or reduce excess capacity (Hennart, 1988;
Mitchell, Dussauge, & Garrette, 2002). Furthermore, as alliances can contribute to firms’
expansion in product types and presence in related markets, they allow for more intensive use
of physical property-based resources. Firms focusing more on physical property-based
resources will enjoy economies of scope when they ally with others.

At the opposite end of the spectrum, firms that are less focused on physical property-based
resources have various options to achieve resource access. Although it is not specifically
tested in this study, previous literature suggests that contract-based arrangements such as
outsourcing are often adopted by firms seeking production resources. This is because these
options allow for low engagement, which overcomes resource appropriation risks associated
with alliances (Das & Teng, 2000). Further, since scale and scope economies achieved through intensive use of physical property-based resources are less relevant for firms with lower focus on physical property-based resources, they will not conduct alliances for such purposes. To summarise, for firms that are more focused on physical property-based resources, forming alliances is of greater importance as it provides them an efficient and effective avenue to get access to complementary resources. It is the combination of physical property-based resources with complementary resources that contribute to the creation of a competitive advantage. Scale and scope economies are also important motivators for them to ally with others. In comparison, firms with a lower focus on physical property-based resources may have relatively less need to form alliances. Therefore,

**H2(a): There is a positive relationship between a firm’s focus on physical property-based resources and the number of alliances it forms.**

### 2.5.7 Focus on Property-Based Resources and Acquisitions

The same arguments apply to the case of acquisitions. For firms that have a greater focus on developing property-based resources, they must recombine complementary resources with physical property-based resources in a way that enhances the range and comprehensiveness of a pre-existing system to achieve competitive advantage (Miller & Shamsie, 1996). Compared to alliances, acquisitions provide these firms with majority or full ownership of the acquired businesses (Yin & Shanley, 2008), which allows them to initiate fuller and much more in-depth resource-recombination and reconfiguration. This increases the chance of these firms achieving the ultimate resource recombination. Successful calibration of newly obtained resources with existing systems will create synergy and further enhance the value of a firm’s property-based resources. Moreover, since acquisitions contribute to expansion in operational scale and scope while providing firms with majority or full ownership, these
firms will reap the entire benefit of economies of scale and scope without sharing with other firms. These benefits together can exceed increasing hierarchies, organisational complexity and coordination costs arising from acquisitions. Firms that are more focused on physical property-based resources hence have more need and incentive to acquire.

On the other hand, although acquisitions enable firms to obtain resources in a timely manner, the fixed and rigid nature of physical property-based resources means that systems and interwoven components that have been developed by another firm may not be the best match for a firm’s own use. Firms that are less focused on developing physical property-based resources may also lack the skill and knowledge to effectively manage and deploy physical property-based resources obtained from external sources. If both internal development and acquisition of property-based resources demand significant cost, it is a better choice to develop such resources on their own so that a synergistic system can be created to serve as a source of competitive advantage. Finally, as discussed previously, firms that are less focused on developing property-based resources place less emphasis on pursuing economies of scale and scope through intensive use of physical assets. They may be held back in acquisition activities due to concerns over increasing organisational inertia, complexity and coordination costs associated with acquisitions. Therefore,

**H2(b):** There is a positive relationship between a firm’s focus on physical property-based resources and the number of acquisitions it conducts.

### 2.6 Industry Growth

Work in the field of industrial organization economics marked the beginning of investigation of industry growth and its impact on firm strategy. This theoretical underpinning is built upon
Mason’s (1939) argument for association between market structure and average firm performance. Industry growth is one of the important variables included as part of the market structure (Bass, Cattin, & Wittink, 1978). Although some researchers establish a strong linkage between industry growth and incumbents’ profitability and argue that rapid growth ensures existing players enjoy strong financial performance even in the presence of market share gains from new entrants (e.g. Porter, 1980), others propose that in theory the relationship between growth and profitability can go both ways (e.g. Hay & Morris, 1991). On the one hand, high growth could increase profit margins as long as the increase in supply capacity expansion does not exceed market demand (Scherer & Ross, 1990). Conversely, profitability could be reduced because oligopolistic discipline will be harder to maintain in a situation of high growth (Bain, 1959). Furthermore, as high industry growth makes it more difficult for incumbent firms to sustain their market share by preempting demand whereas new entries are much easier, profit margins could deteriorate (Hay & Morris, 1991).

However, despite these theoretical arguments on both sides, empirical evidence tends to lend support to a positive association. While some researchers only found a positive relationship between industry growth and profitability in markets that are categorised by the researchers as highly differentiated (e.g. Vlachvei & Oustapassidis, 1998; Oustapassidis & Vlachvei, 1999), it has been observed that over 75 percent of all empirical studies conducted by industrial organization economics researchers reported a positive relationship between industry growth and profitability (Hay & Morris, 1991). Discounted cash flow analysis has also lent support to the positive association by suggesting that the expected payoff of any investment risk is higher in high growth industries (Brealey & Myers, 1991).

In a related vein, earlier research has also used industry growth as a key indicator of the
attractiveness of the industry (Henderson, 1979; Hofer & Schendel, 1978; Porter, 1980). Integrating growth rate with the five competitive forces, Porter demonstrates how growth rate significantly affects rivalry, which subsequently shapes industry attractiveness and firms’ strategies. Specifically, when industry growth is slow, fierce fights for market share is precipitated. Entry barriers are also affected by industry growth in terms of expected retaliation perspective: potential entrants may reconsider entry when industry growth is slow as under such environments, the major viable way to gain volume and establish presence is through taking market share from the incumbents, which is expected to trigger fierce retaliation (Porter, 1980, 2008). Since the goal of competitive strategy for a firm is to position itself in a position in an industry where the competitive forces do it the most good or the least harm, the aforementioned association between industry growth and rivalry would ultimately affect an industry’s perceived attractiveness in both the eyes of incumbents and potential entrants.

In addition to *industrial organization economics* studies, in the strategic management literature, high industry growth is also associated with environmental munificence (Lumpkin & Dess, 1996). It is suggested that high growth of an industry signifies an environment with ample resources and opportunities for incumbent firms. Environmental munificence is generally considered to exert a positive influence on firm profitability (e.g. Dess & Beard, 1984; Kotha & Nair, 1995), which in turn affects perceived attractiveness of the industry.

Growth rate of an industry also represents the level of environmental stress and instability of the market place (Dess & Beard, 1984; Moulton, Thomas, & Pruett, 1996), which derives from overall levels of competitive variation (Anderson & Zeithaml, 1984; Datta, Guthrie, & Wright, 2005; Hambrick & Lei, 1985). As suggested by Hambrick and Finkelstein (1987),
high industry growth results in expanded options for firms, reducing the tendency of organisational inertia. As entries are much easier in a high growth industry, a greater number of new comers are expected to enter the market (Sutton, 1991), motivated to establish better competitive positions through innovation and development of new competitive paths. In general, industry growth also accelerates the maturation of a technology, which rapidly and significantly reduces the risk inherent in investing in a long-lived technology at its emergent point (Russo & Fouts, 1997). Coupled with enlarged market opportunities, firms are further stimulated to engage in innovations and explorative activities alike. All of these aforementioned factors together contribute to increasing instability of a high growth industry and the opposite effects generally hold for low growth industries.

Observing environmental changes associated with industry growth, some researchers look specifically into how these changes affect managerial behaviours. It is found that the increasing instability or unpredictability in high growth industries often leads to unprogrammed decision-making and poorly understood means-ends linkages (Hambrick & Abrahamson, 1995), which could sabotage firms’ performance outcomes. Constant expansion in opportunities fueled by increasing market demand and creations of new product niches in high growth industries, on the other hand, affect managerial behaviour through altering managers’ confidence in assessing future market and profit potential (Delvin & Bleackley, 1988). It is expected that an optimistic perception regarding future potential will have a profound impact on strategy formulation and initiation of strategic actions.

2.6.1 Importance of Industry Growth

Following the previous discussion, industry growth represents the external environmental variable that is associated with change and greater levels of instability. The differing levels of
change and instability in industries with different growth rates are important as these factors, to a large extent, set the pace of an incumbent firm’s internal operations (Nadkarni & Narayanan, 2007). As misfit between a firm’s strategy and resources with external environments could lead to poor performance (Sirmon et al., 2007), firms are motivated to adopt various mechanisms to facilitate the adjustment. While in low growth industries, firms may be able to initiate incremental adjustments due to subtle changes occurring in the external environment (Miller, Lant, Milliken, & Korn, 1996), as the market becomes less stable, firms face greater changes in both production and technological conditions (Sirmon et al., 2007). Since higher frequency or magnitude of changes contributes to increasing difficulty for firms to align their internal strategies and resources with the external environment, firms in such environments are under more significant pressure to adjust and adapt quickly. What appears to be an optimal option for a firm to adopt is determined by its effectiveness to address its immediate needs.

Further, given the subtle change occurring in low growth industries, the value and exploitative potentials of the existing resources and capabilities are largely preserved. Firms operating in these industries thus are likely to prioritise on building and protecting their existing competitive advantage by ensuring that imitations are difficult to achieve (Garg, Walters, & Priem, 2003). In comparison, since greater instability may hamper a firm’s existing competitive advantage (Eisenhardt & Martin, 2000) and lead to rapid deterioration of the value of existing resources and capabilities, firms in high growth industries may perceive more need in accessing external resources for maintenance or improvement of competitive positions. These differences in strategic needs will impact on firms’ choice of mechanisms and strategies.

The need for flexibility and risk sharing also differ in industries with different growth rates.
While mechanisms that allow for greater flexibility and risk sharing are highly preferred in unstable markets (Wang & Li, 2008), these advantages may not be valued to the same extent in low growth industries where market conditions are rather stable. However, as discussed previously, it is expected that when managers become more optimistic about future prospects, their attitude towards risks is altered. This in turn, affects the weighing of advantages against disadvantages of each strategic option. In high growth industries where great demand and opportunities are promised, mechanisms that allow firms to better take advantage of emerging opportunities will be preferred, which may give room for tolerance of some of their inherent disadvantages.

2.6.2 Industry Growth, Alliances and Acquisitions

It has been proposed that alliance activities are driven by the opportunities and threats associated with a firm’s position in its environment. Market structure and changes play an important role in influencing firms’ engagement in alliance formations, especially with competitors (Burgers et al., 1993). Researchers from the strategy field place greater emphasis on resource munificence. They perceive alliances as mechanisms to exploit market opportunities, which would be formed more frequently in growing markets (Harrigan, 1988b). It is suggested in a growing market, firms should be expected to become more active in alliance activities in order to invest in specific assets to enhance production, meet increasing demand, and exploit existing resources and opportunities (Kogut, 1988a). As growing demand may contribute to the creation of new niche markets that can be filled with new products or technologies, firms have ample reason to form alliances to capture emerging opportunities. Furthermore, given rising volatility during growth, competitors might endeavor to minimise market unpredictability and achieve dependability through strategic alliances (Oliver, 1990).
On the other hand, resource-dependence theory suggests that when industry growth is slow, resources developed within and attracted to the industries become scarce and the inexorable market conditions increase organisational dependence on key resources (Pfeffer & Salancik, 1978). Firms are motivated to gain access to the resources needed through alliances in such environments (Burgers et al., 1993; Oliver, 1990). This is because alliances allow firms to access or acquire external resources in a more efficient manner compared to internal development (Park et al., 2002). Managers’ pessimistic perceptions regarding future potential associated with slow industry growth further stimulates their preference for collaborative relationships that allow for parsimonious access of needed resources. Further, empirical evidence has indicated that when market resources decline, firms often cooperate with key customers, technology providers, and major competitors to secure customer demand, seek new opportunities, or reduce rivalry (Kogut, 1988a). Since competitor behaviours are easier to predict in a slow growing industry, partner opportunistic behaviour is easier to monitor. Therefore, the need and desire to ally with others increase significantly as firms are entrenched in an industry that is characterised by environmental stress and increasing organisational dependency on key resources.

In general, the opposite effects hold for high growth industries. When industry is growing fast, firms’ motivations to form alliances generally decline. This is because high growth industries often attract more resources and more efforts are committed to resource development. The benevolence of high growth markets reduces organisational dependence on key resources (Pfeffer & Salancik, 1978). As firms become more confident about future growth and profitability potential, a parsimonious approach of resource access is no longer of great importance. Firms’ reliance on alliances to address resource discrepancies thus decreases. Firms’ needs to use alliances as mechanisms to secure customer demand, seek out
opportunities, or mitigate rivalry are also hugely reduced in high growth industries. Therefore, the needs and desire to ally with others decrease significantly as firms are entrenched in an industry that is characterised by great environmental opportunities and decreasing organizational dependency on key resources.

With respect to acquisitions, earlier research proposed that managerial motivations were higher in slower growing industries, because direct entry into a low growth industry was less likely to allow for acceptable expansion rates, and there were more acquisition candidates available in such environments (Yip, 1982). Subsequent studies however, generally confirmed a positive relationship between industry growth and firms’ acquisition activities (Audretsch, 1989; Christensen & Montgomery, 1981; Schoenberg & Reeves, 1999). From a resource constraint perspective, firms stretch themselves to survive in low growth industries. They are thus constrained and less willing to undertake aggressive and costly actions. The high demand on resource commitments thus makes acquisitions less optimal options for firms to achieve resource access. The pessimism and uncertainty in assessing future growth and profit potential further depress the preference of acquisitions given their irreversibility. As firms are under growth pressure within low growth industries, attempts to acquire competitors or players along the value chain could trigger strong retaliations from other firms, exacerbate rivalry and push up acquisition premiums.

In comparison, firms in high growth industries are less likely to stretch themselves for survival. The rapid growing markets and increase in demand stimulate their desire to grow. Since managers also hold greater certainty about future growth and profit potential, they are less wary about the costs and irreversibility of acquisitions. Since acquisitions provide firms with immediate and full possession of external resources, they facilitate their expansion and resource recombination process. Acquisitions also help firms to avoid risks of partner
opportunistic behaviours associated with alliances when competitor behaviours become more
difficult to predict in growing industries.

2.6.3 Focus on Resource Types, Industry Growth and Alliances and
Acquisitions

Various properties of industries with different growth rates have the potential to impact on
relationships between firms’ focuses on certain resource type and their alliance and
acquisition activities. It has been argued that a firm’s focus on technological knowledge-
based resources and physical property-based resources impact on alliances and acquisitions
differently. Firms with a lower focus on technological knowledge-based resources are
constrained in alliance formations, while counterparts with a greater focus on such resources
have greater needs and desires to ally with others. In comparison, while firms with a lower
focus on technological knowledge-based resources are forced to conduct more acquisitions,
others with a greater focus on these resources will undertake less acquisition activities to
avoid resource constraints and better take advantages of benefits derived from the flexibility
of alliances. With respect to physical property-based resources, a positive relationship is
predicted for both alliances and acquisitions – as firms’ focuses on physical property-based
resources increase, they will conduct more of both alliances and acquisitions. The increasing
alliances and acquisitions are largely driven by scale and scope efficiencies. The different key
characteristics of industries with different growth rates can amplify or weaken these effects,
which imply moderating effects on the relationship between firms’ focus on resource types
and their alliance and acquisition activities.
2.6.3.1 Moderating Effect of Industry Growth on the Relationship between Knowledge-Based Resource Focus on Alliances

Alliance activities conducted by firms with different levels of focus on technological knowledge-based resources are moderated by industry growth. As high industry growth permits multiple pathways for competition, it introduces higher levels of instability in the marketplace. Firms in such environments need to rapidly improve their technological knowledge-based resources to succeed while remaining flexible. The uncertain nature of technological knowledge-based resources in terms of performance outcome contributes to a higher need for mechanisms that allow for greater flexibility. As firms can achieve quick resource access through alliances and the benevolence of alliances provides them great flexibility, the popularity of alliances increases significantly for firms at every level of focus on technological knowledge-based resources in high growth industries.

High industry growth is often associated with expanding market opportunities. Firms in these industries are highly motivated to engage in alliances in order to capture window opportunities of market expansion. While high growth of the market encourages explorative activities, the instability of the market and uncertain nature of technological knowledge-based resources contribute to a greater need for flexibility. This further increases firms’ preferences for alliances at every given level of focus on technological knowledge-based resources. As firms commit more to activities that generate technological knowledge-based resources, they become better positioned to exploit increasing market opportunities through alliances. This is because resources they develop are fungible in nature, which could be applied in different ways and in many areas. The likelihood of higher absorptive capacities developed through greater commitment into knowledge-based resource generation also indicates that firms that are more focused on technological knowledge-based resources will benefit more from alliances.
On the other hand, more new comers are attracted to these industries bringing in new technological knowledge-based resources. They have great incentive to introduce innovations as these help to enhance their competitive positions. Increasing competitive pathways and higher market potentials may stimulate technological knowledge development. Together, these factors contribute to an increase in both available external technological knowledge-based resources and diversity in technological knowledge-based resources. It has been argued that technological knowledge-based resources are path-dependent and cumulative in nature (Dosi, 1988). Firms that are more focused on technological knowledge-based resources may have some difficulty changing direction of development of such resources due to various inertial forces (Hill & Rothaermel, 2003). Therefore, they will benefit greatly from allying with others to access and learn about emerging resources that are different from their existing ones. Even for firms that are less focused on technological resources, they have greater opportunities and desires to engage in alliances for resource access.

The opposite effects hold in low growth industries. These industries are often stable, which reduces firms’ needs to seek mechanisms that allow for great flexibility. More importantly, there are fewer market opportunities for firms to explore. These factors hugely reduce the attractiveness of alliances. The general contraction in availability and diversity of external technological knowledge-based resources is the result of fewer new entrants bringing in new technologies and decelerating commitment by incumbent firms. Such conditions preserve the value of existing technological knowledge-based resources, which in turn reduces the need for firms that are more focused on technological knowledge-based resources to ally with others. This is because these firms face few threats from competing and substituting resources. Engaging in alliances may lead to leakage of their valuable technological knowledge-based resources, which could have devastating consequences in these markets.
Although competitor behaviours are easier to monitor in a stable environment, any potential benefits of alliances could be offset by the costs and risks involved in setting up and managing alliances with competitors as firms experience more fierce rivalry in industries with slow or depressing growth rates (Park & Russo, 1996). Firms that are less focused on technological resources will find themselves much more constrained to find alliance opportunities compared to counterparts operating in high growth industries.

To summarise, the above discussions suggest that at every given level of focus on technological knowledge-based resources, firms’ propensities to form alliances increase exponentially in high growth industries compared to firms operating in low growth industries. This implies a change of the slope of the relationship between firms’ focus on technological knowledge-based resources and their alliance activities, such that the slope is steeper in high growth industries than that in low growth industries. This means while high industry growth amplifies the relationship between a firm’s focus on technological knowledge-based resources and its alliance activities, low industry growth weakens it. Therefore,

**H3(a):** *Industry growth moderates the relationship between a firm’s focus on technological knowledge-based resource and the number of alliances it forms, such that the positive relationship is stronger in high growth industries in comparison to low growth industries.*

### 2.6.3.2 Moderating Effect of Industry Growth on the Relationship between Knowledge-Based Resource Focus and Acquisitions

Acquisition activities conducted by firms with different levels of focus on technological knowledge-based resources are also moderated by industry growth, but in an opposite way to how alliance activities are affected. As market demand grows slowly, firms generally
experience greater resource constraints. This significantly intensifies the tension between firms’ commitment into internal development of technological knowledge-based resources and acquisitions for resource access. The higher the commitment a firm devotes into internal technological knowledge-based resources development, the more they are discouraged from conducting acquisitions at the same time in low growth industries. For firms with less focus on technological knowledge-based resources, as discussed previously, it is likely that they are further deprived from alliance activities in low growth industries. This makes acquisitions even more dominant mechanisms for them to gain access to needed resources.

Further, low growth industries often reveal rather stable market conditions, which makes reversing the investment more difficult. The disadvantages of acquisitions are thus magnified as they contribute to compounding opportunity costs to the acquirer. Given the sluggish market condition, maintaining the status quo is of great importance in slow growth industries. Firms with greater focus on technological knowledge-based resources are likely to enjoy a more sustainable competitive advantage, they are more wary of conducting acquisitions due to the high risk involved. For them, making sub-optimal acquisitions is a high-risk investment that is not favoured.

In comparison, although firms that are more committed to technological knowledge-based resources are still stretched for resources when engaging in acquisition activities, rapidly increasing market demand and profitability in high growth industries contribute to a relief of such tension to a certain extent. Managers’ increasing confidence in future potential and their abilities to fully exploit resources through acquisitions may lead to more aggressive actions. From a transaction costs perspective, as instability may increase with industry growth, more information processing is needed among decision makers as uncertainty increases with limited control, making alliances more costly to manage. Together, these factors make
acquisitions more possible and less risky for these firms. In comparison, firms that are less focused on technological knowledge-based resources are constrained to a lesser degree for choosing other options for resource access, which makes acquisitions less dominant mechanisms for them to adopt.

To summarise, the above discussions suggest that at every given level of focus on technological knowledge-based resources, firms’ propensities to conduct acquisitions decrease significantly in low growth industries compared to firms operating in high growth industries. This implies a change of the slope of the relationship between firms’ focus on technological knowledge-based resources and their acquisition activities, such that the slope is steeper in low growth industries than that in high growth industries. This means while low industry growth amplifies the relationship between a firm’s focus on technological knowledge-based resources and its acquisition activities, high industry growth weakens it. Therefore,

**H3(b): Industry growth moderates the relationship between a firm’s focus on technological knowledge-based resources and the number of acquisitions it conducts, such that the negative relationship is stronger in low growth industries in comparison to high growth industries.**

2.6.3.3 Moderating Effect of Industry Growth on the Relationship between Property-Based Resource Focus and Alliances

Alliance activities conducted by firms with different levels of focus on physical property-based resources are moderated by industry growth. In low growth industries, the ability to achieve greater efficiency plays an important role in low growth industries. Alliances allow firms with greater focus on physical property-based resources to pool resources with others
and achieve economies of scale and scope without incurring significant costs. Firms that are less focused on developing physical property-based resources will further constrain themselves from committing to build these resources in low growth industries due to pessimistic assessment regarding future potentials. Compared to counterparts with a similar level of focus on physical property-based resources, their propensities to use alliances as mechanisms to achieve resource access is much higher. Because of their reliance on alliances for resource access, firms that are more focused on physical property-based resources who contribute these resources in the collaborative relationships will enjoy stronger bargaining power. As interdependencies among firms increase for resource access in low growth industries, partners are less likely to behave opportunistically. Together, these factors contribute to greater preferences for alliances by firms with greater focus on physical property-based resources, because alliances provide them higher gains and are less costly to manage.

In contrast, although high growth industries are likely to reveal greater degrees of changes in customer demand, which increases the need for firms with greater focus on physical property-based resources to seek complementary resources to create value and capture window opportunities, these firms may find their needs less well satisfied by engaging in alliances. This is because firms in high growth industries generally hold optimistic perceptions regarding future market and profit potential. This may lead to increasing commitment to developing their own physical property-based resources or acquisitions, which reduces the utilisation of alliances as dominant mechanisms for resource access. These reduce the bargaining power of firms with a higher focus on physical property-based resources. Further, since the market is rather unstable, other firms may only be interested in light engagement with them. They are also exposed to higher partner opportunistic behaviours. These factors
hamper the gains firms that are more focused on physical property-based resources can achieve, which reduce their enthusiasm in alliances compared to firms with similar focus on these resources operating in low growth industries.

To summarise, the above discussions suggest that at every given level of focus on physical property-based resources, firms’ propensities to form alliances increase more in low growth industries compared to those of firms operating in high growth industries. This implies a change of the slope of the relationship between firms’ focus on physical property-based resources and their alliance activities, such that the slope is steeper in low growth industries than that in high growth industries. This means while low industry growth amplifies the relationship between a firm’s focus on physical property-based resources and its alliance activities, high industry growth weakens it. Therefore,

**H4(a): Industry growth moderates the relationship between a firm’s focus on physical property-based resources and the number of alliances it forms, such that the positive relationship is stronger in low growth industries in comparison to high growth industries.**

### 2.6.3.4 Moderating Effect of Industry Growth on the Relationship between Property-Based Resource Focus and Acquisitions

Acquisition activities conducted by firms with different levels of focus on physical property-based resources are also moderated by industry growth. In a stable environment, the assessment of resource value is easier and more accurate than that in an unpredictable environment. Building on the same rationale that low industry growth is often associated with relatively high stability, firms with greater focus on physical property-based resources are subject to little challenge in accurately assessing the value of these resources. This makes acquisitions less risky for them. Further, firms in low growth industries are under greater
growth pressure. Since physical property-based resources produce superior financial performance in predictable environments (Miller & Shamsie, 1996), the more confident and experienced a firm is in its ability to recombine and deploy these resources, the more aggressive they are in acquisition activities. In industries where demand increases slowly and opportunities to exploit resources are limited, acquisitions help the firm that have greater focus on developing physical property-based resources to gain market share and get into related markets quickly, which allows for higher chances of value creation.

With respect to efficiency gains, since fewer changes in customer demand are expected in a stable environment, the relevance and usefulness of existing systems and production facilities are largely preserved. Given that property-based resources are characterised by scale and scope economies, the more a firm has devoted into building such resources, the stronger its motivation and need to take advantage of acquisitions for the achievement of these benefits in low growth industries. Acquisitions allow them to quickly enlarge the width and breadth of their product lines and reap the entire benefits of economies of scale and scope without sharing these with other firms.

In high growth industries, the higher instability makes it harder for firms to accurately appreciate the value of new resources to acquire. Compared to knowledge-based resources, property-based resources demonstrate a greater path-dependence nature hence contributing to a high degree of organisational inertia. The more a firm commits to building such resources, the greater organisational inertia it may have accumulated. Since acquisitions are less reversible and often impose integration problems, they may compound the organisational inertia of firms with greater focus on physical property-based resources. In markets that are unstable and require greater flexibility, firms will try to minimise unnecessary inflexibility. It has also been suggested in the literature that physical property-based resources do not
contribute to better financial performance in unstable environments (Miller & Shamise, 1996). Firms at every level of focus on such resources therefore may become more wary about obtaining the resource through acquisitions. It is expected that compared to firms with a higher focus on physical property-based resources and operating in low growth industries, counterparts with similar level of physical property-resource focus who are operating in high growth industries are likely to be more cautious about engaging in acquisitions.

For firms with low focus on physical property-based resources, the less commitment they devote into developing physical property-based resources, the lower their capabilities to accurately assess the value of these resources. This is especially the case in unstable environments. These firms may also lack the capabilities to effectively manage and recombine these resources with others for value creation. Therefore, although acquisitions enable them to obtain these resources in a timely manner, their lack of capabilities to evaluate and manipulate the resource makes acquisitions more risky for them. Since acquisitions are irreversible and increase organisational inertia, in an environment where every firms tries to remain flexible, these firms’ propensities to acquire would be lower than those of counterparts operating in low growth industries.

To summarise, the above discussions suggest that at every given level of focus on physical property-based resources, firms’ propensities to conduct acquisitions increase significantly in low growth industries compared to firms operating in high growth industries. This implies a change of the slope of the relationship between firms’ focus on physical property-based resources and their acquisition activities, such that the slope is steeper in low growth industries than that in high growth industries. This means while low industry growth amplifies the relationship between a firm’s focus on physical property-based resources and its acquisition activities, high industry growth weakens it. Therefore,
H4(b): Industry growth moderates the relationship between a firm’s focus on physical property-based resources and the number of acquisitions it conducts, such that the positive relationship is stronger in low growth industries than in high growth industries.

2.7 Performance Outcome from Alliances and Acquisitions

2.7.1 Performance Outcome from Alliances and Acquisitions for Firms with Greater Knowledge-Based Resource Focus

Knowledge-based resources are well recognised as the cornerstones for sustained competitive advantage. However, they reveal higher degrees of mobility and appropriateness compared to property-based resources, which is likely to entice a partner’s opportunistic behaviour. It is therefore important for firms that have greater focus on such resources to protect their valuable resources while actively searching for new resources and capabilities. Compared to alliances, acquisitions allow firms more effective prevention of resources and capabilities leakage. Firms committed greatly to developing technological knowledge-based resources are likely to have greater absorptive capacities and capabilities to exploit acquired resources. Acquisitions provide these firms greater opportunities to fully integrate and recombine existing resources for value creation. They can also benefit from fully exploiting the fungibility of knowledge-based resources through enlarged resource bases that are fully owned by them.

The fungibility of these resources may impose some problems for collaborative relationships. Since greater values are created when resources are appropriately internalised and recombined, it requires in-depth engagement by both parties. When a firm partners with other firms with relatively similar focus on technological knowledge development, such
engagement may create stronger competitors for itself in the future. Despite the difficulty for other firms to appropriate focal firms’ implicit technological knowledge, some of their important explicit technological knowledge is still subject to imperfect protection. Since the resource can be used in many ways, in-depth collaborations with other firms allow those firms to establish a better appreciation and understanding of the resource, which they could apply in the same or related fields. Therefore while risks and costs associated with experimenting and resource exploration are reduced through alliances, immediate or more long-term competitive risks may arise from collaborations. Acquisitions allow firms with a greater focus on technological knowledge-based resources to avoid this problem. Because of this major advantage provided by acquisitions, although greater focus on technological knowledge-based resources often leads to less acquisition activities, firms with greater focus on these resources will perform better from acquisitions more than from alliances despite their lower propensities to acquire. Therefore,

**H5 (a):** Firms with a greater focus on technological knowledge-based resources achieve better perform outcome from acquisitions than from alliances.

### 2.7.2 Performance Outcome from Alliances and Acquisitions for Firms with Greater Property-Based Resource Focus

As discussed previously, property-based resources are more firm specific and inflexible in nature. Given that such resource characteristics will make resource appropriation less possible, it often leads to light engagement from other firms (Das & Teng, 2000). The need to use alliances as mechanisms to gain access to complementary resources for value creation may not be well satisfied for firms with a greater focus on physical property-based resources. Acquisitions on the other hand, provide these firms with instant possession of complementary resources, which can be fully integrated with their physical property-based resources to create
synergy. Compared to alliances, acquisitions also allow them to fully and independently reap the benefits of economies of scale and scope, which contributes to significant efficiency improvement.

With respect to value creation through resource management, deployment and recombination, it is argued that property-based resources derive their supremacy from specific management and utilisation styles. Therefore they should remain in their original organisation. Attempts to transfer them to a new organisation may jeopardise their productivity and effectiveness (Chen & Chen, 2003). This makes alliances less effective for both partner firms to create value. On the other hand, since firms with a greater focus on physical property-based resources are likely to have developed and accumulated capabilities to manage and recombine externally acquired resources with their existing systems, full integration enabled by acquisitions will contribute to better performance outcomes as the resources can be more fully exploited. Therefore,

**H5 (b): Firms with a greater focus on physical property-based resources achieve better performance outcome from acquisitions than from alliances.**
3 DATA AND METHODOLOGY

This chapter provides a very detailed technical account of data and appropriate Econometric models used in the design of this study. The first section introduces the data collection process and final sample composition, which is followed by an explanation of variables used in this study. In addition to industry growth, some other industry-level control variables are included in this study to demonstrate the important impact external factors have on firms’ alliance and acquisition behaviours. In contrast to majority of alliance and acquisition studies using US data, this study deploys UK data, which contributes to the literature by allowing the empirical testing of these strategies to be carried out in a different context. More importantly, the available industry-level data in UK makes it a perfect sample to empirically test the interaction effect resource focus and industry growth has on firms’ alliance and acquisition behaviours. The dataset for empirical testing is constructed from diverse sources. The large size of sample spanning multiple industries ensures the results are highly generalizable. The last section of the chapter describes the analytical method employed to test the hypotheses. It provides an in-depth discussion on the pros and cons of various methological alternatives and explains in great details why random effect negative binomial and multiple linear regression models are adopted in this study. The sound choice and application of Econometric models ensures a rigorous empirical testing of hypotheses in this study.

3.1 Sample and Data Collection Process

The hypotheses are tested with firms operating in the United Kingdom (UK) manufacturing sector. United Kingdom data is used mainly because of the availability of industry-level information. Such information allows for the measurement of one of the key variables for this study: industry growth. Since investigations within the strategic management field
predominantly focus on United States firms, using UK data allows for the testing of alliances and acquisitions in a different context. The UK economic development can be divided into two phases during the period 1995 – 2007. In the first phase, from 1995 to 2000, the economy grew at a rapid pace – about 3.5% a year on average - notwithstanding a firm monetary policy and, for most years, a tight fiscal policy. In the second phase of from 2001 to 2007, the economy grew at a slightly subdued 2.5% a year, notwithstanding low interest rates and there was a shift towards expansionary fiscal policy. Overall, this long pre-recession period demonstrates low inflation and steady economic expansion (Martin, 2010; OECD statistics). Such stability in a relatively long period provides a perfect testing ground for our hypotheses without introducing much turbulence emerging from the macro economy. Similarly to the US, UK hosts thousands of industry participants, embodies great variations in resource focus among firms, and has experienced significant alliance and acquisition activities.

The sample collection process starts from selecting all firms listed on the London Stock Exchange in the manufacturing sector between 1995 and 2007. Sample firms are identified and generated from the Standard and Poor’s Compustat Global database, which has been widely used in strategic management studies. Compustat Global provides comprehensive, up-to-date financial information on publicly listed firms on a global scale. This database classifies firms into the United States of America Standard Industrial Classification (USSIC) code based on their major business. The manufacturing sector comprises industry codes ranging from USSIC 2000 to USSIC 3999. The query to the database for the period 1995 to 2007 results in a list of 6718 unique observations, where every observation represents a firm in a given year (firm-year observation).

The subsequent step of data collection begins with removing observations where data on R&D expenditures and industry growth are not available. R&D expenditure figures are
obtained from Compustat Global, which are of critical importance because these are used to calculate R&D intensity, which represents a firm’s commitment into research and development and innovation activities. These activities contribute to the firms’ generation and accumulation of knowledge-based resources. Industry growth, on the other hand, is the moderator variable in this study. Its measurement requires industry level sales data at t-2 and at the focal year of observation. Such information is obtained from the Annual Business Inquiry (ABI) that is undertaken by the United Kingdom Office for National Statistics (ONS). The ONS publishes industry sales data and number of firms operating in an industry based on the United Kingdom Standard Industrial Classification (UKSIC). In order to determine industry growth, the UKSIC needs to be converted to the USSIC. Since there is no readily available concordance, the codes are converted manually. Supporting documents are sought and used to ensure a parsimonious conversion procedure. The procedure is carried out as below:

- The UKSIC and the Statistical Classification of Economic Activities in the European Communities (NACE) published by the Statistics Division of the European Commission (Eurostat) are identical to the four digit level (United Kingdom Office for National Statistics, 2007). Therefore the NACE is utilised as the “bridging document”. It is converted into the North American Industry Classification System (NAICS) using the concordance published by the United States of America Census Bureau.

- The same institution publishes a concordance between the NAICS and the USSIC system that is used to map the NAICS onto the USSIC. In case the UKSIC corresponds to two or more USSIC codes, the industry descriptions for both codes are consulted and the data is mapped into the USSIC code that best matches the UKSIC. Using this manual conversion procedure, the UKSIC industry data is mapped to the USSIC code.
The sample is then further reduced following a manual search for each individual firm’s annual report. *Mergent Online* and manually searched and found corporate web sites of the firms are the major sources of information. All publicly available annual reports for the period are downloaded. Obtaining the annual reports is necessary for the sample selection, because sales by business lines for each firm are needed to calculate diversification. Despite the fact that diversification is not an independent or dependent variable for this study, prior research has suggested that more diversified firms will face greater levels of internal constraints for external growth strategies due to higher managerial costs associated with controlling and coordinating different business units (Cyert & March, 1992; Wiersema & Bowen, 2008). This has an important implication on firms’ alliances and acquisitions behaviour. Diversification is therefore included as one of the important control variables. Whenever a corporate web page and the annual reports are not found, a search for the reason is undertaken. The non-availability of annual reports is mainly due to the following reasons: the firm had been acquired, liquidated or had gone into receivership. Observations for which no annual reports are available are excluded. Furthermore, a large proportion of firms do not have annual reports dating back to 1995 publicly available on either *Mergent Online* or on their web sites. Firms that are either no longer active or independent and the years for which no annual reports are available are also removed from the sample. For the remaining firms, sales data by business segment is manually taken from the annual reports.

Data on the dependent variable firm performance, on the independent variables, on the moderating variable, and on the control variables are obtained from *Compustat Global*, annual reports, *ABI* and *Datastream*. *Compustat Global* provides data for firm performance, R&D expenditures, Property, Plant and Equipment – Total (Net) (this data is used to calculate property-intensity, which reflects firms’ commitment and propensities to build physical
property-based resources in this study), total liabilities and total assets. Annual reports provide data for sales by business lines. *ABI* provides data for industry capital intensity and industry growth. *Datastream* provides data for firms’ market capitalisation, which is used to determine Tobin’s Q ratio for a firm. It is frequently adopted as a financial market-based measurement of firms’ performance and growth potential. Not all data sources provide complete and usable data for all firm-year observations. Observations with missing data are eliminated from the sample. Elimination of missing observation has resulted in a total of 1003 firm-year observations.

The other dependent variables are number of alliances and acquisitions firms conduct. For the purpose of this study, which tests the effect of resource focus on a firm’s alliance and acquisition decisions, only alliances and acquisitions that are conducted within the same or related industries are included. It is because similarity in business activities facilitates effective transfer of resources, which increases value creation opportunities in post acquisition integration and performance (King *et al.*, 2004). Focusing on alliances and acquisitions that occur in the same or related industries also ensures that the degree of congruence and familiarity between the focal firm and its partner/target is controlled, which might affect a firm’s willingness to conduct alliances and acquisitions. When firms conduct alliances and/or acquisitions in unrelated industries, they may be driven by other motivations rather than exploiting current resources. It has been recognised that firms’ willingness to conduct acquisitions decreases as they become less familiar with an industry due to an increasing level of uncertainty. The focus on horizontal and related alliances and acquisitions therefore allows for a better reflection of how focuses on certain resource types affect firms’ alliance and acquisition behaviour. Alliances and acquisitions are classified as being horizontal when the focal firm and the partner firm and target firm are in the same industry.
In this study, firms that have the same four-digit USSIC codes are defined as operating in the same industry. Alliances and acquisitions are classified as being related, on the other hand, when the activities of the focal firm and partner firm(s) and target firm are in the same two-digit USSIC industries.

Alliances and acquisitions data is collected from Security Data Corporation (SDC) Platinum database. The total number of alliances deals recorded in SDC Platinum database during 1995 to 2007 is 2713. Among these deals, alliances formed between two or more UK firms are duplicated to ensure that all UK firms are treated as a focal firm and that no observation is left out. The main explanation for this duplication process is to compensate for the lack of tangible ways to determine which participating UK firm is the focal firm in an alliance relationship. The total number of alliances is 3117 after the duplication process. The next step is to record each individual partner’s original holdings. The total number of acquisitions conducted by UK manufacturing firms that are recorded in SDC Platinum from 1990-2007 is 7893. Acquisitions are classified as horizontal, related, and unrelated. The comparison is made between the acquiring and acquired firms’ SIC codes. As a result, there are 4412 unrelated, 1718 related and 1752 horizontal acquisitions. The number of alliances and the number of acquisitions are then matched to the respective firm’s financial information.

3.2 Variables

This section describes how dependent, independent, moderating and control variables are operationalised in this study.
3.2.1 Dependent Variables

The dependent variables are horizontal and related alliances and acquisitions, and firm performance. A firm’s alliances and acquisition behaviour is hypothesised to be affected by its focus on a certain resource type. Firm performance is hypothesised to be affected by the firm’s alliance and acquisition behaviours.

3.2.1.1 Horizontal and Related Alliances

This is a count variable. An alliance is counted when the focal firm announces the completion of the deal. The total number of horizontal and related alliances carried out by each individual firm is summed. This is done for each firm-year observation.

3.2.1.2 Horizontal and Related Acquisitions

Following the same measures for alliances, this is also a count variable. An acquisition is counted when the focal firm announces the completion of the deal. The total number of horizontal and related acquisitions is added for each firm, which is done for each firm-year.

3.2.1.3 Firm Performance

Firm performance is the second dependent variable of this study. Since strategy implementation and performance outcomes do not occur concurrently (Tanriverdi & Lee, 2008), this variable is measured at t+2 to allow for sufficient lag time to observe the effect of strategic actions. In strategic management studies, performance has mostly been measured as firm profitability, sales growth, and cash flow (Datta, Rajagopalan, & Rasheed, 1991). In terms of firm profitability, accounting-based measures such as return on capital, return on investment, return on equity, and return on assets (ROA) have been used most widely (Chatterjee & Wernerfelt, 1991). Following other research that examines the alliance,
acquisition-performance linkage (Wang & Zajac, 2007), this study adopts ROA as the firm performance measure. ROA is highly correlated with other indicators of financial performance such as returns on sales and returns on equity (Keats & Hitt, 1988; Lim Das, & Das, 2009). ROA at time $t+2$ is measured by:

$$\text{ROA}_{t+2} = \frac{\text{EBITDA}_{j,t+2}}{\text{Total Assets}_{j,t+2}}$$

where $\text{EBITDA}_{j,t+2}$ are the earnings before interest, taxes, depreciation and amortisation of firm $j$ at time $t+2$ and $\text{Total Assets}_{j,t+2}$ are the total assets of firm $j$ at time $t+2$.

### 3.2.2 Independent and Moderating Variables

This study investigates how a firm’s focus on a certain resource type affects its alliance and acquisition behaviour. Furthermore, it proposes that the relationships between the focus on the resource type and alliance and acquisition behaviours are moderated by industry growth. Therefore, the independent variable is a firm’s focus on a certain resource type and the moderating variable is industry growth.

#### 3.2.2.1 Focus on Resource Type

Following Miller and Shamise (1996), resources can be classified into two broad categories based on the notion of barriers to imitability, namely property-based resources and knowledge-based resources. According to these authors, property-based resources are legal properties owned by firms, which encompass financial capital, physical resources, human resources, etc. Knowledge-based resources, on the other hand, refer to a firm’s intangible know-how and skills.
3.2.2.1.1 Focus on Technological Knowledge-Based Resources

In subsequent studies, knowledge-based resources are defined as the ways in which firms combine and transform tangible input resources (Galunic & Rodan, 1998). In comparison to declarative knowledge that is factual information stored in memory and known to be static in nature (Lesgold, 1988), the discussion of knowledge-based resources in extant literature relates largely to procedural knowledge. Procedural knowledge refers to knowing the procedures for how to do things and arises from experience with similar situations (Lesgold, 1988). It meets some critical resource-based view requirements such as rare and inimitable. This type of knowledge is difficult to formalise, articulate, and transfer between organisational contexts (Nonaka & Takeuchi, 1995). Knowledge about technology is a major strand of procedural knowledge that impacts upon firms’ strategic behaviours and performance outcomes as it provides firms the ability to assess and exploit opportunities (Wiklund & Shepherd, 2003). Sometimes such knowledge can lead to technological breakthroughs that represent great market application potential (Abernathy & Utterbacck, 1978). Moreover, technological knowledge is also seen as enhancing a firm’s ability to effectively exploit an opportunity by determining a product’s optimal design, functionality, costs, and reliability (Rosenberg, 1994), product introduction, and ultimately the economic impact of exploiting the opportunity (McEvily & Chakravarty, 2002). As firms increase their commitment into activities that generate technological knowledge, they are more likely to development both explicit and implicit technological knowledge-based resources. This will increase the firm’s ability to rapidly exploit opportunities or to respond quickly when competitors make advancements (Cohen & Levinthal, 1990), hence affecting its alliance and acquisition strategies. As discussed in the previous chapter, this study looks specifically into a firm’s focus on technological knowledge-based resources.
Despite the discussion on knowledge-based resources and competitive advantage derived from them, measurement of knowledge-based resources is largely reliant on survey-based primary data (Haynie, Shepherd, & McMullen, 2009; Wiklund & Shepherd, 2003). In the study of the link between resources and types of diversification, Chatterjee and Wernerfelt (1991) defined innovative skills as a major type of intangible resources, which was measured by absolute levels of R&D spending intensity. Their definition of innovational skills and intangible resources and the way knowledge of technology and knowledge-based resources are conceptualised in this study share great commonality. In subsequent studies, R&D intensity is frequently proposed as a measure of technological development effort and input (Brouwer and Kleinknecht, 1999; Deeds, 2001; Wagner, 2011). It is argued that to achieve a desired level of or change in a strategic asset stock there needs to be a consistent pattern of resource flows — R&D spending (Deeds, 2001). Firms with high R&D intensity are more likely to develop and possess valuable resources or capabilities (Chan, Faff, Gharghori & Ho, 2007). Extant research has also contended that R&D investments indicate the strategic importance of innovation for a firm (Branch, 1974; Hill and Snell, 1988) and constitute an important input for the development of intangible asset (Chauvin and Hirschey, 1993; David, Hitt, and Gimeno, 2001; Mosakowski, 1993). As pointed out by Trajtenberg (1990), there is a strong relationship between R&D and patents. Such relationship indicates that “consistent flow” significantly contribute to the development and accumulation of “stock”.

A key characteristics of the longitudinal data of this study is that R&D intensity of most firms are largely consistent across years (i.e. firms’ R&D intensity does not vary significantly over time, firms that are highly committed to R&D activities have always demonstrated higher R&D intensity and vice versa). Such consistency over time provides evidence that for most firms (at least within the sample of this study), their focus on technological knowledge-based
resources is not a short-term activity but more often a long-term phenomenon. Therefore, this study adopts R&D intensity as a proxy for a firm’s focus on technological knowledge-based resources. Most studies define R&D intensity by the total R&D expenditures divided by the total sales (Hitt et al., 1991), which is followed by this study. R&D intensity is weighted by total sales to minimise the effect of firm size as larger organizations’ absolute R&D spending is generally greater than that of smaller firms.

3.2.2.1.2 Focus on Physical Property-Based Resources

Property-based resources are generally defined as tangible input resources (Wiklund & Shepherd, 2003). Miller and Shamise (1996) specifically classify property-based resources into human resources, intellectual property, and physical resources. Within manufacturing industries, physical resources such as plants, equipment and machinery play a critical role in everyday operation and production. As suggested in prior research, idiosyncratic physical resources significantly contribute to firm heterogeneity (Mahoney & Pandian, 1992; Williamson, 1985). Firm-specific valuable physical resources (e.g. superior and advanced equipment and machinery) allow a company to better differentiate their product and improve product quality (Clark & Fijimoto, 1991; Nishiguchi, 1994). Competitive advantage can derive from a firm’s physical assets based on use of modern and advanced equipment, availability of production capacity, and the scale of production and operation (Kaleka, 2002). Together, the key characteristics elaborated on in the previous chapter and the value creation potential derived from developing and possessing physical property-based resources will affect a firm’s needs and perceived advantages/disadvantages of engaging in alliances and acquisitions. Therefore, this study looks specifically into physical resources. Since a firm’s focus on building physical property-based resources is largely reflected in their investment of physical property, equipment and plants. This study therefore adopts physical property
intensity as a proxy for a firm’s focus on property-based resources. Physical resource-intensity is measured as a firm’s net total amount of property, equipment and machinery divided by its total assets. Physical resource-intensity is weighted by total assets to minimise the effect of firm size as larger organizations’ absolute property, equipment and machinery are generally greater in quantity than those of smaller firms.

3.2.2.2 Industry Growth

Environmental factors play an important role in shaping firms’ strategic behaviour, including alliance formation and acquisition activities (Schoenberg & Reeves, 1999; Stuart, 1998; Yin & Shanley, 2008). Industry growth has long been perceived and accepted as an indicator of environmental attractiveness (Hambrick & D’Aveni, 1988; Harrigan, 1982; Henderson, 1979; Keats & Hitt, 1988; Wernerfelt & Montgomery, 1986; Yasai-Ardekani, 1989). It reflects degrees of external change and market opportunities/stress (Park et al., 2002), which also affect managerial confidence regarding the future. Given the differences in resource characteristics, this study proposes that firms with a different focus on resource types would differ in needs and desires, and benefits gained, in conducting alliances in industries with different growth rates.

Prior studies have adopted various ways of measuring industry growth, among which the key difference rests in the length of time growth is calculated upon. Some studies adopt a longer period of time and use the measurement of average annual increase in sales for 4 or 5 years preceding the focal year of observation (Datta et al., 2005; Dess & Beard, 1984; Hambrick & Abrahamson, 1995; Rajagopalan & Datta, 1996; Russo & Fouts, 1997; Yip, 1982). Other studies tend to focus on a shorter time span: average annual growth rate in value of shipments in the 3 years preceding the year of observation (Data & Rajagopalan, 1998), or change of
industry sales over the previous year (Lenox, Rockart, & Lewin, 2010; Park et al., 2002; Singh & Mitchell, 2005). Based on the consideration that a two-year period of sales growth or decline is sufficient for firms to sense the change in the environment, as well as the availability of data, in this study, *industry growth* is measured as:

\[
Industry \text{ Growth} = \frac{\left( Sales \text{ in industry } j \text{ at } t + 2 \right) - \left( Sales \text{ in industry } j \text{ at } t \right)}{Sales \text{ in industry } j \text{ at } t + 2}
\]

### 3.2.3 Control Variables

This study controls for different firm-level and industry-level variables that have an impact on firms’ alliance and acquisition behaviour and firm performance. Specifically, this study controls for the firm’s past performance, unrelated alliances and acquisitions conducted in the year of observation, and diversification. Industry-level control variables include capital intensity and industry-wide alliance and acquisition trends.

#### 3.2.3.1 Firm Past Performance

Prior research indicates that a firm’s motivation and ability to conduct alliances and acquisitions are affected by its previous performance. It has been observed that a firm typically does not have a strong motivation to acquire when its primary business is performing well (Iyer & Miller, 2008; Halebian *et al.*, 2009). A well-performing firm that faces a low level of survival threat is in little need to collaborate with others despite its attractiveness as an alliance partner (Ang, 2008). On the other hand, a firm that does not perform well may increase its risk-taking propensity (Bromiley, 1991). Given their lack of opportunity to collaborate with others due to its perceived unattractiveness, acquisition might
be the only option for such firm. Nonetheless, it is also possible that poor performance can constrain a firm’s ability to acquire (Haleblian, Ki, & Rajagopalan, 2006). Therefore, past performance needs to be controlled for its impact on a firm’s alliance and acquisition behaviour.

Instead of looking into accounting-based performance measurements only, this study adopts Tobin’s Q at t-1 as a measurement for a firm’s past performance. Such a decision is based on three reasons: (1) Tobin’s Q is a market-based measurement of performance. It better reflects a firm’s ability to create efficiency and strategic performance (Chakravarthy, 1986); (2) this study looks into the entire UK manufacturing sector. Some firms are relatively small and young compared with giant players in other well-established industries. For example, a young specialty pharmaceutical firm is very likely to generate negative ROAs. In these cases, Tobin’s Q as a performance measurement can more accurately capture the ability of these firms to create value; (3) More importantly, Tobin’s Q is also used as an indicator for a firm’s long-term profitability and market perception on a firm’s growth potential (Richard, Murthi, & Ismail, 2007). Prior research has reported relationships between a firm’s Q ratio and its alliance/acquisition behaviour. While some observed that firms with a high Tobin’s Q were more likely to undertake both merger and non-merger investment (Andrade & Stafford, 2004), others found that firms with a low expected growth rate are more likely to acquire others (Danzon, Epstein, & Nicholson, 2007).

Extant strategic management research has adopted various ways of measuring Tobin’s Q, which include: $Q = \frac{\text{MKTVAL} + \text{PSVAL} + \text{DEBT}}{\text{TA}}$ where MKTVAL represents the market value, PSVAL is the liquidating value of the outstanding preferred stock, DEBT is the long-term debt plus the difference between the value of the firm’s short-term liabilities and its short-term assets, and TA is the book value of the total assets of the firm (Lee & Tompkins,
1999; Richard et al., 2007); the ratio of the sum of the market value of common equity and the book values of preferred equity and long-term debt to book value of assets (Iyengar & Zampelli, 2009); the ratio of market value of assets to book value of assets (Balasubramanian & Lieberman, 2010); the ratio of long-term debt plus the market value of equity (offer price multiplied by total number of shares outstanding after the IPO) to total book assets (Hasan, Kobeissi, & Wang, 2011); and the total year-end market value of a firm’s stock divided by the book value of its assets (Henderson, Raynor, & Ahmed, 2012); In this study, Tobin’ Q is measured as:

\[
Tobin's\ Q_{t-1} = \frac{(Market\ value\ of\ equity_{t-1} + Total\ liabilities_{t-1})}{Book\ value\ of\ assets_{t-1}}
\]

### 3.2.3.2 Diversification

Degree of diversification represents scope of firms’ business operation and breadth of product line. Firms with greater operational scope and broader product lines may enjoy more opportunities to collaborate with other firms to enjoy better resource exploitation and market exploration. They will also be able to enjoy economies of scale and scope through acquisitions. On the other hand, more diversified firms will face greater levels of internal constraints for external growth strategies as increases in diversification incur greater managerial costs to control and coordinate different business units (Cyert & March, 1992; Wiersema & Bowen, 2008). These constraints ultimately affect the level of resources available for firms to undertake alliances or acquisitions. In order to control for this effect, diversification is one of the control variables in this study.

Most early studies of diversification draw on the **USSIC** system that categorises firms into...
industries based on their primary business activity (Berry, 1975; Gort, 1962). A variety of
_USSIC_ based measurements exist, starting from simple number counts of _USSIC_ codes to
continuous measurements that include average weightings and thus reflect different
involvements by firms (Montgomery, 1982). Most recent studies use either an entropy index
or a concentric index of diversification; both measures are _product count_ or continuous
measures of diversification (Robins & Wiersema, 2003). Rumelt (1974) has introduced a
subjective categorical classification of diversification based on the specialisation ratio that is
composed of the revenues that firms obtain from activities in their core business over
revenues from activities which are less related to their core business. Montgomery (1982)
compares Rumelt’s (1974) product count measures of diversification and finds a high
correlation. Additionally, both measurements have high construct validity (Hoskisson, Hitt,
Johnson, & Moesel, 1993). Even though the correlation is high, both measures should not be
combined in the same study (Hall & St John, 1994).

The concentric measure of diversification is based on the percentage of sales of a focal firm
in a focal industry. The sales are weighted differently if the sales are in the same three-digit
_USSIC_ category, in the same two-digit _USSIC_ group but different three-digit _USSIC_
categories, and in different two-digit _USSIC_ groups (Montgomery & Hariharan, 1991).
However, this measurement exhibits sensitivity towards pure diversification and firm focus
(Robins & Wiersema, 2003) and will therefore not be considered. The entropy measure is
based on the Jacquemin-Berry entropy or on a modified Berry-Herfindahl index. The
Jacquemin-Berry entropy measure calculates total diversity based on the proportion of
business activity (e.g. sales) in different _USSIC_ codes (Jacquemin & Berry, 1979). This
measurement can distinguish between related and unrelated diversification. Unrelated
diversification is based on the proportion of a firm’s business activity in different two-digit
USSIC codes (Palepu, 1985). Related diversification is obtained by subtracting the unrelated diversification from the total diversification. This study does not distinguish between related and unrelated diversification, thus this measurement is not necessary.

The Berry-Herfindahl index is derived from a measure of industry concentration (Jacquemin & Berry, 1979). The original measure of industry concentration measures the share of industry sales that can be traced back to a given firm. This measure has been modified to reflect firm-level concentration based on the contribution of different business segments to the whole firm (e.g. in terms of sales) (Acar & Sankaran, 1999). Following from the Herfindahl index, diversification is calculated as:

\[
\text{Diversification} = 1 - \sum_{i=1}^{N} (S_i^2)
\]

where \(S_i\) is the share of a firm’s total sales in a four-digit USSIC industry, \(i\) and \(N\) are the number of four-digit USSIC industries in which the firm operates.

3.2.3.3 Unrelated Alliances and Acquisitions

Alliances and acquisitions that are conducted by the focal firm outside its core business area or in close areas that value chain activities occur are defined as unrelated alliances and acquisitions. One of the reasons these deals are controlled for is that they take up resources hence may limit the ability of the focal firm to conduct horizontal and related alliances and acquisitions. It is also possible that a bigger proportion of these activities reflect the firm’s propensity to diversify into other unrelated industry sectors, which may be driven by other strategic rationales rather than resource access and exploitation motives.
Compared to unrelated alliances, extant research tends to focus more on unrelated acquisitions. It suggests that value creation in related acquisitions largely stems from operational synergies (i.e. scale or scope economies) and/or enhanced market power (Baumol, 1982; Scherer & Ross, 1990; Teece, 1980), whereas in unrelated acquisitions it depends on the realisation of managerial or financial synergies (e.g. the diversification of earnings risk) (Jensen, 1986; Levy & Sarnat, 1970; Lewellen, 1971; Seth, 1990a, 1990b). Such differences mean that the abilities required to recognise and evaluate sources of value and subsequently to make effective acquisition decisions are likely to differ. Compared to unrelated acquisitions, related acquisitions may require a greater degree of integration to realise their value, which demands increased attention to such issues as cultural compatibility during the decision process (Datta & Grant, 1990; Graebner, 2004; Haspeslagh & Jemison, 1991; Jemison & Sitkin, 1986). Given similarities in strategic purposes acquisitions and alliances share, and the amount of managerial skills and capabilities expected, these arguments may still apply to alliance activities.

Recognising the above-mentioned differences, this study argues that firms may still learn from unrelated alliances and acquisition activities, and accumulate general experience and knowledge of how to manage alliances and acquisitions of all kinds. This may lead to increasing confidence in conducting horizontal and related alliances and acquisitions. Additionally, unrelated alliances and acquisitions should be controlled for their impact on a firm’s financial performance. Extant research provides sufficient reference in terms of measuring unrelated alliances and acquisitions. Often, any alliance or acquisition that the primary two-digit SIC code of the focal firm does not match with that for the other party is classified as a unrelated alliance or acquisition (Palepu, 1985), and such measurements are commonly used in the strategic management field (Bergh, 1997). Following this method, this
study classifies deals as unrelated alliances and acquisitions if the focal firm and partner firm(s) or target firm differ at the four-digit USSIC code level.

### 3.2.3.4 Industry Alliance and Acquisition Trends

Mimetic behaviour has been well documented and discussed in the extant literature (e.g. DiMaggio & Powell, 1983; Galaskiewicz & Wasserman, 1989; Haunschild, 1993; Haveman, 1993). Prior studies suggest that a firm’s alliance and acquisition decisions are not strictly firm-level behaviour but rather are highly influenced by the waves of alliances or acquisitions in the particular industry over several years (Vanhaverbeke et al., 2002). Therefore, it is expected that there is a greater likelihood for a firm to form alliances when other firms in the focal industry are conducting alliances. Similarly, firms may carry out acquisitions because other firms in the same industry are opting for acquisitions (Vanhaverbeke et al., 2002; Wang & Zajac, 2007). Thus, alliance and acquisition choices made by firms can be of mimetic nature and may not reflect how the resource types may affect such decisions. Following Wang and Zajac (2007), who also looked at alliances and acquisitions choices, controlling for the effect of industry-level popularity in alliances and acquisitions on an individual firm’s choice, this study measures industry alliance and acquisition trends by counting the total number of horizontal and related alliances/acquisitions in a year for each of the focal firm’s industry.

### 3.2.3.5 Industry Capital Intensity

Market structural variables have a significant impact on alliance and acquisition behaviours (Yin & Shanley, 2008). Based on the industrial organisation perspective and the structure-conduct-performance paradigm, it has been argued that industry structural variables such as entry and exit barriers impact firm conduct and subsequent performance (Porter, 1980).
Porter (1980) explains that in capital-intensive industries, scale economies in production exist and resource commitments necessary to establish these economies of scale are substantial, thus firms are subject to mobility barriers. As Yin and Shanley (2008) note, in highly capital-intensive markets, the benefit gained from the effects of scale and scope becomes significantly more valuable than it does in the less capital-intensive markets. Additionally, in such industries firms require larger amounts of long-term investments, which fosters persistence (Dess & Beard, 1984). Hence in capital-intensive industries, the strategic choice tends to lean towards full integration mechanisms. Prior research reported the methods of measuring industry capital intensity: three year average ratio of fixed assets to sales for firms in industries defined at the three-digit SIC level (Chang & Singh, 1999; Datta et al., 2005); the ratio of total assets to the total number of employees (Blomström & Persson, 1983); and capital stock to employment ratio (Balasubramanian & Lieberman, 2010). Given available data, and the understanding that capital intensity is a concept derived from the Economic discipline that refers to the amount of fixed or real capital required to produce a good or service, in this study, *industry capital intensity* is measured as the ratio of industry net capital expenditures to industry sales.

### 3.3 Analytical Methods

In this study, dependent variables for the first, second, third and fourth sets of hypotheses are count variables: the count of total horizontal and related alliances and acquisitions. The most popular distribution for modeling count variables is the Poisson distribution and Poisson regression. In probability theory and statistics, the Poisson distribution is used to express the probability of a given number of events occurring in a fixed interval of time, space, distance, area and/or volume if these events occur with a known average rate and independently of the
time since the last event. Such distribution models information on counts in situations where there is no natural “denominator”, and thus no upper bound or limit on how large an observation count can be. If the expected number of occurrences in a given interval is \( \lambda \), the probability of exact \( y \) occurrences (\( y \) being a non-negative integer, \( y = 0, 1, 2, ... \)) is equal to

\[
P_r(Y = y) = \frac{\lambda^y e^{-\lambda}}{y!}
\]

where

- \( e \) is the base of the natural logarithm (\( e = 2.71828... \))
- \( y \) is the number of occurrences of an event — the probability of which is given by the function
- \( y! \) is the factorial of \( y \)
- \( \lambda \) is a positive real number, equal to the expected number of occurrences during the given interval.

However, a Poisson distribution cannot model all count data. For count data to be suitably modeled by a Poisson distribution, the maximum likelihood procedure needs to be adopted. This procedure makes a strong (and testable) assumption that every subject within a covariate group (a population that has all the same values for \( x_1, x_2, ..., x_p \)) has the same underlying rate of the outcome. This also implies that the variability of counts within a covariate group is equal to the mean, or:

\[
var\left( Y(x_1, x_2, ..., x_p) \right) = \exp(\alpha + b_1x_1 + b_2x_2 + \cdots + b_px_p)
\]

If this condition fails to hold, the standard errors can be biased despite the fact that the estimates of the coefficients can still be consistent using Poisson regression. Typically, it
would not be expected that every variable that contributes to the rates of events has been measured, so there will always be residual variation in the rates of events among observations that all have the same covariate values. In situations such as the above-mentioned one, where Poisson distribution has a poor fit, Negative Binomial regression can be used because it can account for greater than Poisson variation and is based on the negative binomial distribution.

In probability theory and statistics, the Negative Binomial distribution is known as a discrete probability distribution of the number of successes in a sequence of Bernoulli trials (an experiment whose outcome is random and can be either of two possible outcomes, “success” and “failure”) before a specified (non-random) number of failures (denoted \( r \)) occur. Specifically, let the random variable \( X \) denote the trial at which the \( r \)th success occurs, where \( r \) is a fixed integer. Then

\[
P(X = x| r, p) = \binom{x - 1}{r - 1} p^r (1 - p)^{x - r}, x = r, r + 1, ..., \tag{1}
\]

and it is said that \( X \) has a negative binomial \((r, p)\) distribution (Cameron & Trivedi, 1998; Haight, 1967; Hillbe, 2007).

The Negative Binomial distribution is sometimes defined in terms of the random variable \( Y = \) number of failures before \( r \)th success. This formulation is statistically equivalent to the one given above in terms of \( X = \) trial at which the \( r \)th success occurs, since \( Y = X - r \). The alternative form of the Negative Binomial distribution is

\[
P(Y = y) = \binom{r + y - 1}{y} p^r (1 - p)^y, y = 0, 1, ....
\]

The Negative Binomial distribution gets its name from the relationship
\[
\binom{r+y-1}{y} = (-1)^y \left( \frac{-r}{y} \right) = (-1)^y \frac{(-r)(-r-1) \cdots (-r-y+1)}{(y)(y-1) \cdots (2)(1)}.
\] (2)

which is the defining equation for binomial coefficient with negative integers. Along with (2), it derives

\[
\sum_y P \left( Y = y \right) = 1
\]

from the Negative Binomial expansion which states that

\[
(1 + t)^{-r} = \sum_k \binom{-r}{k} t^k
\]

\[
= \sum_k (-1)^k \binom{r + k - 1}{k} t^k
\]

\[
EY = \sum_{y=0}^{\infty} y \binom{r+y-1}{y} p^r (1 - p)^y
\]

\[
= \sum_{y=1}^{\infty} \frac{(r+y-1)!}{(y-1)! (r-1)!} p^r (1 - p)^y
\]

\[
= \sum_{y=1}^{\infty} \frac{r(1-p)}{p} \binom{r+y-1}{y-1} p^{r+1} (1 - p)^{y-1}
\]

\[
= \frac{r(1-p)}{p} \sum_{z=0}^{\infty} \binom{r+1+z-1}{z} p^{r+1} (1 - p)^z
\]

\[
= r \frac{1 - p}{p}
\]

A similar calculation will show
Based on this understanding, this study employs Negative Binomial regression analysis to test hypotheses 1(a), 1(b), 2(a), 2(b), 3(a), 3(b), 4(a), and 4(b) as there are substantial observations without values, i.e. zero where in a particular year the focal firm has no observable alliance or acquisition (Cameron & Trivedi, 1998; Hillbe, 2007).

The empirical testing for this study is based on panel data, which is also known as longitudinal or cross-sectional time-series data. It is a dataset that allows for the control for variables that can’t be observed or measured in business practices across companies; or variables that change over time but not across entities. That is, it accounts for individual heterogeneity. There are two commonly applied techniques to analyse panel data: fixed effects and random effects (Allison, 2005; Torres-Reyna, 2011). Fixed-effects are often used whenever the focus is on analysing the impact of variables that vary over time, whereas random-effects are used when the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. When using fixed-effects, a relationship between predictor and outcome variables within an individual entity is explored. It is assumed that something within the individual entity may affect or bias the predictor or outcome variables. These influences need to be controlled for. Therefore, there is an important assumption that there is a certain level of correlation between an entity’s error term and predictor variables. Fixed-effects remove the effect of those time-invariant characteristics from the predictor variables so that the predictors’ net effect can be assessed. Another important assumption of the fixed-effects model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity’s error term and the constant
(which captures individual characteristics) should not be correlated with the others. If the error terms are correlated then fixed-effects is not suitable since inferences may not be correct (Allison, 2005; Torres-Reyna, 2011). This is the main rationale for the Hausman test (Cameron & Trivedi, 2005; Nerlove, 2005; Wooldridge, 2009), which will be discussed next. Random effects, on the other hand, assume that the entity’s error term is not correlated with the predictors that allows for time-invariant variables to play a role as explanatory variables. It is suggested that if differences across entities are believed to have some influence on the dependent variable, then random-effects should be used (Torres-Reyna, 2011).

Running a Hausman test can help to determine whether fixed-effects or random-effects should be used, where the null hypothesis is that the preferred model is random-effects vs. the alternative the fixed-effects (Green, 2008, chapter 9). It basically tests whether the unique errors ($\mu_i$) are correlated with the regressors. The null hypothesis is that they are not. When the result is significant, fixed-effects should be used as it supports the null hypothesis. After running the Hausman test, random-effects are adopted as results are insignificant ($p>0.10$), which rejects the null hypothesis and indicates the existence of error term correlations. Overall, two random-effects Negative Binomial models are conducted. One calculates the predictive value of horizontal and related alliances and the other calculates the predictive value of horizontal and related acquisitions.

A different regression model is employed to test for Hypotheses 5(a) and 5(b). In Hypotheses 5(a) and 5(b) the dependent variables are no longer of discrete nature, but are continuous measurements – returns on assets. Hence, random-effects multiple linear regression analysis is used for the analysis. Similar to the Negative Binomial models, the analysis for horizontal and related alliances and horizontal and related acquisitions are conducted separately. In order to run the analysis for testing Hypothesis 5, a two-stage model is used. In the first stage,
the horizontal and related alliances/acquisitions variable is regressed against the Xs to obtain a predicted value. The residual value from this regression then substitutes the actual value of horizontal and related alliances/acquisitions. Subsequently, in the regression model that tests the effect horizontal and related alliances/acquisitions (affected by the interaction effect of resource types and industry growth) on firm performance, the standardised residuals of the predicted value are regressed together with the resource types, industry growth, the interaction terms of resource types and industry growth (standardised resource types x standardised industry growth) and the control variables.

In all of these regressions, firms’ technological knowledge-based resource focus and physical property-based resource focus are tested in separate models. This is because these two variables are theoretically correlated. To begin with, the correlation between technological knowledge-based resources and physical property-based resources is strong, which is endowed in the way these resources are classified: physical property-based resources typically refer to tangible input resources, whereas knowledge-based resources are the ways in which firms combine and transform these tangible input resources (Galunic & Rodan, 1998; Teece et al., 1997). This suggests that physical property-based resources provide the foundation for the development of technological knowledge-based resources. Furthermore, instead of working in separation, it is the resource combination that creates some of the most important values for firms (Galunic & Rodan, 1998). Knowledge-based resources are often further integrated and organised within the firm along with input resources such as property-based resources to perform productive tasks (Grant, 1996), which explains why firms are often defined as “clusters” of resources including both inputs and physical resources, and knowledge-based resources. Therefore, a firm’s commitment to developing physical
property-based resources facilitates the generation of technological knowledge-based resources.

The correlation between technological knowledge-based resources and physical property-based resources is particularly strong within the manufacturing sector. As suggested by Das and Teng (2003), technological knowledge-based resources (e.g. ability to conduct R&D) and physical property-based resources (e.g. machinery) are sometimes inseparable. In order to contribute to technological resources, it becomes unavoidable to commit the physical resources also. Baldwin and Clark (1992, p.68) also observed “investments in capabilities do not stand alone, but are intertwined with other investments”. To facilitate development of technological resources through R&D activities, some capital investments in tangible resources such as equipment are expected. On the other hand, when some firms devote greatly to developing technological knowledge-based resources, they demonstrate a lower level of commitment to developing physical resources. Such negative correlation is evident in many biotechnological firms. Since firms’ focuses on technological knowledge-based or physical property-based resources reflect their intension to develop and possess these resources, the underlying correlation between these two types of resources is largely equivalent to the correlation between a knowledge-based resource focus and a property-based resource focus. However, the aim of this study is to assess the impact a firm’s primary resource type focus (either knowledge-based or property-based) has on its alliance and acquisition decisions. Therefore, the empirical tests for the impact of these variables are kept separately for better rigour.
CHAPTER 4
RESULTS
4 RESULTS

This chapter provides a report of the results from empirical testing. It consists of two sections. The first section contains the correlation matrix and descriptive statistics, which gives an overview of the characteristics of the sample. It is observed that alliance and acquisition activities vary significantly across industries within the manufacturing sector. The differential between industries with the highest ROAs and those with the highest Tobin’s Qs reflects the possibility that current profitability of an industry may not always correlate to future growth potential. Some other interesting observations are also highlighted and discussed within this section. The second section reports the results of the hypotheses testing. This study has generated very good results overall – empirical support was found for seven out the ten hypotheses tested. This is an indication that the theoretical development of this study is sound and it has rigorous selection and application of empirical models. The section is completed by a report of effects control variables have on alliance and acquisition activities. Interestingly, while the finding on some control variables lends support to the effect proposed in previous studies, some results provide evidence to an opposite effect or non-existence of the effect. Possible explanations are given in these instances and the discussion generally provides greater insights into the alliance and acquisition literature.

4.1 Correlation Matrix

The means, standard deviations and correlations for all the variables used in this study are presented in Table 2. The correlation matrix shows the unlikely problem of multicollinearity as the highest correlation is 0.61.
4.2 Descriptive Statistics

The sample contains firms from 17 different industries as shown in Table 3. The bulk of the sample comes from three major industries – “Chemicals and Allied products” (201), “Electronic and Other Electrical Equipment and Components, except Computer Equipment” (201), and “Measuring, Analysing, and Controlling Instruments; Photographic Medical and Optical Goods; Watches and Clocks” (156). There are three industries that have less than 10 observations, namely “Tobacco Products” (5), “Textile Mill Products” (6) and “Lumber and Wood, Except Furniture Manufacture, Paper and Allied Products” (1).

Not all the industries within the manufacturing sector have observable alliances or acquisitions, and the mean for the total number of horizontal and related acquisitions is greater than the mean of total number of horizontal and related alliances ($\bar{x}$Total Acquisitions = 0.24, with a s.d. of 0.649, $\bar{x}$Total Alliances = 0.04, with a s.d. of 0.250). The same pattern holds for the industry alliance and acquisition trends ($\bar{x}$Industry Acquisitions = 16.97, with a s.d. of 12.634, $\bar{x}$Industry Alliances = 1.08, with a s.d of 2.113). The overall mean for unrelated acquisitions is also larger than the mean of unrelated alliances ($\bar{x}$Unrelated Acquisitions = 0.30, with a s.d. of 0.789, $\bar{x}$Unrelated Alliances = 0.24, with a s.d. of 0.981) with only two industries as exceptions (Printing, Publishing and Allied industries; Chemicals and Allied Products). This reflects the fact that even for deals within unrelated sectors, more acquisitions are conducted on average than alliances. Overall, the standard deviations are larger against the means for alliances of all sorts in comparison to acquisitions of all sorts, which indicates that firms’ alliance activities vary across industries as well as across different firms to a greater extent than acquisition activities.
It is noted that the four largest means of ROA at t+2 are from “Food and Kindred Products”, “Tobacco Products”, “Chemicals and Allied Products” and “Transportation Equipment” industries. Although this may indicate that firms within these four industries enjoy greater performance on average compared to firms operating in other industries, when looking into variations in firm performance within these four industries, differences are obvious. The “Transportation Equipment” industry demonstrates the smallest degree of performance variations among firms, which is reflected by the small standard deviation against the mean (\(\bar{x}\) is 112.621\% with a s.d. = 114.628\%). For the “Tobacco Products” industry, the standard deviation is also very small against the mean: (\(\bar{x}\) is 842.311\%, with a s.d.=173.676\%). The extremely high mean of ROA and small dispersion of observations are explained by the composition of the sample: instead of comprising multiple companies in the industry, there is only one firm included for the “Tobacco Products” industry – British American Tobacco PLC. Since British American Tobacco PLC is the second largest Tobacco company in the world by sales volume and hold market-leading position in more than 50 countries, it is no surprise that we observe ROA at such a level. The “Food and Kindred Products” industry, (\(\bar{x}\) is 487.041\% with a s.d. = 556.691\%) and the “Chemicals and Allied Products” industry (\(\bar{x}\) is 188.012\% with a s.d. = 537.228\%), in comparison, reveal much more velocity in firm performance variations. These differences may indicate that although some industries show greater profit potential in general, an individual firm’s performance is determined by many other firm-level factors such as capabilities in resource development, exploration and exploitation and competitive advantage derives from capabilities alike.

This study chooses to include a market-based measurement of past performance as one of the control variables – Tobin’s Q. As explained previously, such measurement not only reflects a firm’s strategic performance, it also represents future growth potential of the firm. It can be
seen that the top four industries that have the biggest means of this measure do not correspond to the industries that have the highest means of ROAs, except the “Chemicals and Allied Products” industry. For past performance, the “Electronic and Other Electrical Equipment” industry presents the highest mean (\( \bar{x} = 3.292 \), with a s.d. of 10.448), it is followed by the “Chemicals and Allied Products” industry (\( \bar{x} = 2.543 \), with a s.d. of 6.999). The “Measuring, Analysing, and Controlling Instruments; Photographic Medical and Optical Goods; Watches and Clocks” industry has the third largest mean (\( \bar{x} = 1.985 \), with a s.d. of 1.572), and the industry that has the fourth largest mean of Tobin’s Q is the “Primary Metal Products” (\( \bar{x} = 1.897 \), with a s.d. of 4.515). The difference in composition of the top four industries with the highest means between ROAs and Tobin’s Q may indicate that past performance is not always an accurate indication for further performance. Another possible explanation is that future growth potential (represented by Tobin’s Q) and profitability (represented by ROAs) are not always strongly correlated. Among the four industries that have the highest mean for Tobin’s Q, three demonstrate great variations in observations with only the “Primary Metals Products” industry being the exception. While the “Electronic and Electrical Equipment” industry has the biggest mean, it also reveals the greatest level of dispersion in observations.

The physical property-based resource focus demonstrates an overall low level of dispersion of observations across all industries (\( \bar{x} = 0.215 \), and a s.d. = 0.143). No particular industry reveals a much higher or lower standard deviation against the mean. In contrast to a physical property-based resource focus, there is greater dispersion of observations in the technological knowledge-based resource focus across all industries (\( \bar{x} = 1.080 \), and a s.d. = 5.964). The high standard deviation against the mean for R&D intensity indicates that firms’ commitments to R&D activities vary greatly across industries, which reflects the fact that industries differ in
technology intensity. Compared to other industries, the “Chemicals and Allied Products” industry ($\bar{x} = 3.415$ and a s.d.= 10.357), the “Electronic and Other Electrical Equipment and Components, except Computer Equipment” industry ($\bar{x} = 0.911$ and a s.d.= 4.940), the “Transportation Equipment” industry ($\bar{x} = 2.329$ and a s.d.= 8.622), and the “Measuring, Analysing, and Controlling Instruments; Photographic Medical and Optical Goods; Watches and Clocks” industry ($\bar{x} = 0.603$ and a s.d.= 4.508) demonstrate much greater dispersion of R&D intensity.

The descriptive statistics on industry capital intensity and diversification indicate no recognisable pattern between the means and standard deviations across industries. For industry growth, it can be observed that firms within industries with negative growth rates are experiencing relatively lower ROAs at t+2 compared to other industries (i.e. “Textile Mill Product”, “Paper and Allied Products”, “Leather and Leather Products”, “Primary Metal”, “Industrial and Commercial Machinery and Computer Equipment”, and “Electronic and Other Electrical Equipment and Components, except Computer Equipment”). Moreover, firms in many of these industries conduct less total alliances and/or acquisition activities than firms in other industries. These associations are consistent with the notion that low/declining growth rates represent higher environmental stress, contraction in market opportunities and lower industry-level profitability. These conditions have a negative impact on firms’ alliance and acquisition activities.

### 4.3 Hypotheses Testing

Firms’ resource focus and alliance and acquisition behaviour

The results of the hypotheses testing are reported in this section. Tables 4 and 5 show the random-effects Negative Binomial regression results for the tests of a firm’s technological
knowledge-based resource focus and its alliances (H1a) and acquisition (H1b) behaviours. They also present the results of the interaction effects of the firm’s technological knowledge-based resource focus and industry growth on its alliance (H3a) and acquisition (H3b) behaviours. Tables 6 and 7 show the random-effects Negative Binomial regression results for the tests of a firm’s physical property-based resource focus and its alliances (H2a) and acquisition (H2b) behaviours. They also present the interaction effects of a firm’s physical property-based resource focus and industry growth has on its alliance (H4a) and acquisition (H4b) behaviours.

Hypothesis 1(a) states that a firm’s technological knowledge-based resource focus has a positive relationship with the number of alliances it conducts, and hypothesis 1(b) states that a firm’s technological knowledge-based resource focus has a negative relationship with the number of acquisitions it conducts. The tests on alliances and acquisitions are presented in Tables 4 and 5 respectively. Model 1 in both tables presents the baseline model, which contains only control variables. Model 2 introduces the independent variable technological knowledge-based resource focus. The coefficient for technological knowledge-based resource focus is positive and significant (b=0.636, p<0.05) in the case of alliances. The improvement over the base model is also significant (Δ Log likelihood=2.282, p<0.05). These suggest that a technological knowledge-based resource focus contributes significantly to elucidating the pattern of horizontal and related alliances conducted, which supports hypothesis 1(a). The coefficient is negative and significant (b=−0.431, p<0.01) in the case of acquisitions, and the improvement of power over the baseline model is also significant (Δ Log Likelihood=5.117, p<0.01). This suggests that a firm’s technological knowledge-based resource focus has a negative and significant impact on its acquisition activities, providing findings to support Hypothesis 1(b).
Hypothesis 2(a) states that a firm’s physical property-based resource focus has a positive relationship with the number of alliances it conducts, and hypothesis 2(b) states that a firm’s physical property-based resource focus also has a positive relationship with the number of acquisitions it conducts. Similar to the testing of Hypothesis 1(a) and 1(b), results on alliances and acquisitions are presented in Tables 6 and 7 respectively. Model 1 in both tables presents the baseline model, which contains only control variables. Model 2 introduces the independent variable physical property-based resource focus. The coefficient for physical property-based resource focus is positive but insignificant ($b=0.501, p>0.10$) in Table 6. The improvement over the base model is also insignificant ($\Delta \text{Log likelihood}=0.041, p>0.10$). These suggest that the physical property-based resource focus does not contribute to the explanation of the pattern of horizontal and related alliances formation. Hypothesis 2(a) thus is not supported. The coefficient is positive and significant ($b=1.363, p<0.05$) in the case of acquisitions, and the improvement of power over the baseline model is also significant ($\Delta \text{Log Likelihood}=1.926, p<0.05$). These suggest that the physical property-based resource focus has a positive and significant impact on affecting a firm’s acquisition activities. These findings support Hypothesis 2(b).

**Moderating effect of industry growth**

Hypothesis 3(a) proposes that industry growth has a moderating effect on the relationship between a firm’s technological knowledge-based resource focus and the number of alliances it conducts, such that the relationship is stronger in high growth industries in comparison to low growth industries. Hypothesis 3(b) states that industry growth also has a moderating effect on the relationship between a firm’s technological knowledge-based resource focus and the number of acquisitions it conducts, such that the negative relationship is stronger in low growth industries in comparison to high growth industries. The test results on alliances and acquisitions support these hypotheses.
acquisitions are presented in Tables 4 and 5 respectively. Model 4 in both tables introduces the interaction term of technological knowledge-based resource focus and industry growth. The coefficient is negative and insignificant ($b=-0.035$, $p>0.10$) in Table 4 for alliances, which does not indicate any moderating effect. The improvement over the previous model is also insignificant ($\Delta \text{Log Likelihood}=0.007$, $p>0.10$), which suggests that adding the interaction effect does not contribute to the explanatory power of the model. Hypothesis 3(a) thus is not supported. The coefficient of the independent variable technological knowledge-based resource focus is negative and significant ($b=-0.497$, $p<0.001$) in Table 5 for acquisitions, of the moderating variable industry growth is positive but insignificant ($b=0.556$, $p>0.1$) in Table 5, and of the interaction term is positive and significant ($b=0.265$, $p<0.05$) in Table 5, which indicate the existence of a moderating effect. As the effect of technological knowledge-based resource focus on acquisitions is changed to an opposite direction by industry growth, it supports the argument that the negative relationship is stronger when industry growth is low. The improvement of power over the previous model is also significant ($\Delta \text{Log Likelihood}=2.243$, $p<0.001$). These results support Hypothesis 3(b).

Hypothesis 4(a) proposes that industry growth has a moderating effect on the relationship between a firm’s physical property-based resource focus and the number of alliances it conducts, such that the relationship is stronger in low growth industries in comparison to high growth industries. Hypothesis 4(b) states that industry growth also has a moderating effect on the relationship between a firm’s physical property-based resource focus and the number of acquisitions it conducts, such that the relationship is stronger in low growth industries in comparison to high growth industries. Test results on alliances and acquisitions are presented in Tables 6 and 7 respectively. Model 4 in both tables introduces the interaction term of physical property-based resource focus and industry growth. The coefficient is negative and
The coefficient of the independent variable physical property-based resource focus is positive and significant (b=1.477, p<0.05) in Table 7, of the moderating variable industry growth is positive but insignificant (b=0.483, p>0.10) in Table 7, and of the interaction term is negative and significant (b=-0.218, p<0.05) in Table 7, which support the predicted moderating effect. The improvement of power over the previous model is also significant (Δ Log Likelihood=2.117, p<0.05). These results support Hypothesis 4(b).

Performance outcome

Tables 8 and 9 present the results for the linear regression testing of Hypotheses 5(a) and 5(b) respectively. Hypothesis 5(a) states that firms that are more technological knowledge-based resource focused achieve greater performance outcome from acquisitions than from alliances. Models 1 and 3 in Table 8 are the base-line models, whereas models 2 and 4 are the full models. Model 2 in Table 8 is the model testing for the impact of total alliances conducted by firms that are more technological knowledge-based resource focused on firm performance. The coefficient of total alliances is negative and insignificant (b=-13.327, p>0.10), which indicates no impact from total alliances formed by firms that are more technological knowledge-based resource focused on firm performance. The improvement of power over the previous model is also insignificant (ΔR²=0.000, p>0.10). This means there is no improvement in explaining firm performance through adding total alliances to the model. Model 4 in Table 8 is the model testing for the impact total acquisitions conducted by firms that are more technological knowledge-based resource focused on firm performance. The
coefficient of total acquisitions is positive and significant ($b=50.796$, $p<0.001$). This indicates that there is a positive impact of total acquisitions conducted by firms that are more technological knowledge-based resource focused on firm performance. The improvement of power over the previous model is also significant ($\Delta R^2=0.143$, $p>0.001$), which suggests that adding total acquisitions to the model contributes to the explanation of firm performance. While the insignificant result in Model 2 indicates that firms with greater focus on technological knowledge-based resources do not necessarily perform better from forming alliances, the positive and significant result in Model 4 shows the positive performance outcome these firms generate from acquisition activities. These results therefore confirm that firms that focus more on technological knowledge-based resources perform better from acquisitions than from alliances. Hypothesis 5(a) is thus supported.

Hypothesis 5(b) proposes that firms that are more physical property-based resource focused achieve better performance outcome from acquisitions than from alliances. Models 1 and 3 in Table 9 are the base-line models, whereas models 2 and 4 are the full models. Model 2 in Table 9 is the model testing for the impact of total alliances conducted by firms that are more physical property-based resource focused on firm performance. The coefficient of total alliances is negative and insignificant ($b=-13.731$, $p>0.10$), which indicates no impact from total alliances formed by firms that are more physical property-based resource focused on firm performance. The improvement of power over the previous model is also insignificant ($\Delta R^2=-0.001$, $p>0.10$). This means there is no improvement in explaining firm performance through adding total alliances to the model. Model 4 in Table 9 is the model testing for the impact of total acquisitions conducted by firms that are more physical property-based resource focused on firm performance. The coefficient of total acquisitions is positive and significant ($b=51.442$, $p<0.001$). This indicates that there is a positive impact from total
acquisitions conducted by firms that are more physical property-based resource focused on firm performance. The improvement of power over the previous model is also significant ($\Delta R^2=0.143$, $p>0.001$), which suggests that adding total acquisitions to the model contributes to the explanation of firm performance. While the insignificant result in Model 2 provides no evidence that firms with greater focus on physical property-based resources perform better from forming alliances, the positive and significant result in Model 4 confirms that these firms do benefit from acquisition activities. This indicates that firms with greater focus on physical property-based resources generate better performance outcomes from acquisitions than from alliances. Hypothesis 5(b) is thus supported.

Please see below the table providing a summary of hypotheses testing results

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1(a)</td>
<td>There is a positive relationship between a firm’s focus on technological knowledge-based resources and the number of alliances it forms.</td>
<td>Supported</td>
</tr>
<tr>
<td>H1(b)</td>
<td>There is a negative relationship between a firm’s focus on technological knowledge-based resources and the number of acquisitions it conducts.</td>
<td>Supported</td>
</tr>
<tr>
<td>H2(a)</td>
<td>There is a positive relationship between a firm’s focus on physical property-based resources and the number of alliances it forms.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H2(b)</td>
<td>There is a positive relationship between a firm’s focus on physical property-based resources and the number of acquisitions it conducts.</td>
<td>Supported</td>
</tr>
<tr>
<td>H3(a)</td>
<td>Industry growth moderates the relationship between a firm’s focus on technological knowledge-based resource and the number of alliances it forms, such that the positive relationship is stronger in high growth industries in comparison to low growth industries.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H3(b)</td>
<td>Industry growth moderates the relationship between a firm’s focus on technological knowledge-based resources and the number of acquisitions it conducts, such that the negative relationship is stronger in low growth industries in comparison to high growth industries.</td>
<td>Supported</td>
</tr>
<tr>
<td>H4(a)</td>
<td>Industry growth moderates the relationship between a firm’s focus on physical property-based resources and the number of alliances it forms, such that the positive relationship is stronger in low growth industries in comparison to high growth industries.</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>
**H4(b):** Industry growth moderates the relationship between a firm’s focus on physical property-based resources and the number of acquisitions it conducts, such that the positive relationship is stronger in low growth industries than in high growth industries.  

| **H5(a):** Firms with a greater focus on technological knowledge-based resources achieve better perform outcome from acquisitions than from alliances. |
| **H5(b):** Firms with a greater focus on physical property-based resources achieve better perform outcome from acquisitions than from alliances. |

**Supported**

**4.4 Control Variable Effects in the Alliances and Acquisitions Models**

Past performance is positively related to alliances and acquisitions in all the models. This supports that firms performing well in the past appear to be more attractive potential partners by other firms, therefore enjoying greater opportunities to collaborate with others (Ang, 2008). Good performance in the past also increases managerial confidence in acquiring others, and it may also result in easy access to acquisition financing, enabling firms to make more acquisitions (Haunschild, 1993).

The results of the unrelated alliances and acquisitions are also positive and significant across all the models in all the tables. These results do not lend support to the argument that firms’ unrelated alliances and acquisitions are driven by diversification rationale rather than resource exploitation and exploration, which have limited association with horizontal and related acquisitions. Instead, the results seem to suggest that firms do learn from unrelated alliances/acquisitions. Through these experiences firms build general capabilities and knowledge that boost their confidence in conducting more alliances and acquisitions of all sorts.
Diversification is positively and significantly related to the number of horizontal and related alliances and acquisitions across all the models in all tables. These results suggest that the increase in diversification leads to more horizontal and related alliances and horizontal acquisitions. This is interesting as it contradicts the argument that highly diversified firms face greater resource restrictions to pursue acquisition strategies (Cyert & March, 1992). Resources and transaction costs views suggest that corporate growth depends not only on firm resources but also on the applicability of resources across industries and on the potential for economies of scope offered by different resource combinations (Salter and Weinhold, 1978; Villalonga and McGahan, 2005). The greater the level of prior and existing level of diversification, the greater the likelihood of commonalities with the activities of the transaction, and thus the greater the likelihood of integrating the activities (Villalonga and McGahan, 2005). The greater degree of integration allowed by acquisitions explains, to a large extent, why diversification is positively related to acquisition activities according to the empirical test in this study. With respect to alliances, in many industries, economic globalisation has led to an increase of the critical size required. Many companies develop activities that are vertically related to their primary business activities and competence (Mayrhofer, 2004). Firms diversify into other business areas prefer to share risks with partner firms rather than to commit resources definitively (Mayrhofer, 2004), which provides some explanations to the observed positive relationship between diversification and alliance activities.

As presented in Tables 4, 5, 6 and 7, the coefficients of industry alliances and acquisitions trends across all the models in all the tables are positive and significant. These results suggest that both horizontal and related alliance/acquisition decisions are positively related to the total number of alliances/acquisitions in the industry, hence lending support to the argument
for mimetic behaviour (Abrahamson & Rosenkopf, 1993; DiMaggio & Powell, 1983; Haunschild, 1993; Kogut, 1988a). When other firms in the industry favour certain types of alliances/acquisitions, the focal firms may be under competitive pressure to follow suit and be more inclined to initiate similar strategies to their competitors.

Although suggested in the literature that industry capital intensity plays a role in influencing firms’ alliance and acquisition behaviours (Schoenberg & Reeves, 1999; Yin & Shanley, 2008), the empirical testing of this study reports insignificant results for industry capital intensity across all the models in all the tables. However, it is still interesting to examine the impact of industry capital intensity on the number of horizontal and related alliances against that on horizontal and related acquisitions. As shown in Tables 4 and 6, in which results of the testing of relationships between predictor variables and alliances are reported, the coefficients of industry capital intensity are positive across all the models. In comparison, the coefficients of industry capital intensity recorded in Tables 5 and 7, in which results of the testing of relationships between predictor variables and acquisitions are reported, are negative across all the models. These results indicate that firms are more likely to form alliances than acquisitions when facing greater industry capital intensity. This is interesting as it contradicts what Yin and Shanley (2008) proposed in their conceptual paper on industry-level determinants of alliance and mergers decisions. According to these authors, firms in capital intensive industries will incur much higher fixed costs therefore require greater economies of scale and scope to succeed. Acquisitions allow for better control and full integration to facilitate firms taking advantage of economies of scale and scope. However, other researchers have posited that industries at the growth stage of their lifecycle tend to exhibit lower capital intensity than industries at the maturity stage (Schoenberg & Reeves, 1999). Data from the PIMS research programme has also demonstrated that high capital intensity can exert a
negative influence on profitability (Audretsch, 1989; Buzzell & Gale, 1987). Based on this understanding, it may be expected that greater acquisition activities will take place in low capital intensity industries where growth rate and profitability may be superior.
5 DISCUSSION AND CONCLUSION

This chapter rounds off the study and it is presented in four sections. Firstly, the findings of the hypotheses testing are discussed. Although the high level of empirical support received implies that the theoretical development of this study is rigorous, those hypotheses that fail to receive support are of equal importance to review. According to the finding, there is a significant association between firms’ resource focus and their acquisition behaviours, but the relationship between firms’ physical property-based resource focus and alliance behaviours is less clear. Similarly, compared to the impact on acquisitions, relationships between firms’ resource focus and alliance activities do not demonstrate a strong pattern across industries with different growth rates. Possible explanations for these results are discussed, which provide some very interesting insights into the alliance and acquisition literature. Secondly, the research implications and managerial implications are discussed in great details, emphasising major theoretical contributions this study has made and putting forward important suggestions to alliance and acquisition managers. This is followed by a discussion on limitations and suggestions for future research. Finally, concluding remarks are presented, which outline answers to all the research questions this study aims to address and confirm the accomplishment of research objectives.

5.1 Discussion

Although alliances and acquisitions are frequently discussed as strategic alternatives, they do differ in some major aspects and demonstrate different advantages and disadvantages respectively. While alliances allow firms greater degrees of flexibility by retaining the capacity to alter the terms of agreement or to terminate as partners see fit (Hagedoorn & Duysters, 2002; Kogut, 1991), acquisitions provide firms with much more control and
discretion of use over the acquired firm’s resources despite being less flexible (Hitt, Hoskisson, & Ireland, 1990; Yin & Shanley, 2008). Differences in degree of control also separate these strategies from each other. This study investigates how firms with different resource focus differ in their alliance and acquisition behaviours. It also considers how the relationships between resource focus and alliance and acquisition behaviours are moderated by industry growth. Specifically, this study argues that technological knowledge-based resources are characterised by greater tacitness and uncertainty in performance outcome. These resources are also more expensive to develop, revealing a higher level of path dependency. In comparison, physical property-based resources are characterised by scale and scope economies, which are often more valuable and deployable in the same or related sectors (Chatterjee & Wernerfelt, 1991). It is expected that these differences in resource characteristics lead to variations in firms’ perceptions of relative advantages and disadvantages of alliances and acquisitions, which in turn, impact on their needs and preferences of alliances and acquisitions.

Industries with different growth rates present different levels of emerging opportunities and unpredictability, which largely shape managers’ perception regarding future profit potential and attitude towards certain strategies. Overall, flexibility and low requirement on resource commitment are major advantages of alliances valued by many firms in an unpredictable environment. In comparison, when an industry experiences low growth rate and industry participants are generally under growth pressure, acquisitions allow firms to obtain instant market share and achieve economies of scale and scope. Efficiency based advantages can be of critical importance under such industry condition. Since firms with different resource focus develop different internal strengths, weaknesses and resource needs, their alliance and acquisition activities are likely to be carried out upon assessing their internal situation and
relative advantages and disadvantages of these strategies against the industry environment. This study therefore also investigates how the relationship between firms’ resource focus and alliance and acquisition activities are moderated by industry growth.

The first set of hypotheses predicts a positive relationship between a firm’s technological knowledge-based resource focus and alliance activities, and a negative relationship between a firm’s technological knowledge-based resource focus and its acquisition activities. Both hypotheses are supported. The second set of hypotheses predicts positive relationships between a firm’s physical property-based resource focus with both alliance and acquisition activities. While the hypothesis predicting a positive relationship of such resource focus and alliance activities fails to receive support, the predicted positive relationship between a firm’s physical property-based resource focus and acquisitions activities receives full statistical support. These findings generally confirm the impact firms’ resource focus has on its alliance and acquisition activities. However, compared to the significant association between firms’ resource focus and their acquisition behaviours, the relationship between firms’ physical property-based resource focus and alliance behaviours is less clear. One possible explanation is that while firms with greater focus on physical property-based resources have strong incentives to ally with others to obtain complementary resources, other firms may prefer to pursue alternative options to get access to such resources, e.g., outsourcing or pure contract-based arrangements. There therefore is a lack of opportunity for these firms to form meaningful alliances as they desire to. On the other hand, in certain industries, strategic alliances are formed between firms operating in related industries. For example, in the pharmaceutical industry, alliances between bio-technology firms that focus on mainly upstream R&D activities and well established traditional pharmaceutical companies that own significant amount of physical property-based resources becomes increasingly popular. The
partnerships simply allow the firms to become more familiar with each other, which may lead to subsequent mergers or acquisitions. The co-existence of the above mentioned phenomena might cancel the effects out and leave the relationship between firms’ focus on physical property-based resources and alliance activities less clear to identify.

The third and fourth sets of hypotheses concern the moderating effect industry growth has on the relationships between resource focus and alliance and acquisition activities. While hypotheses predicting the moderating effect industry growth has on relationships between resource focus and acquisitions activities are supported (H3b and H4b), those predicting the moderating effect industry growth has on relationships between resource focus and alliance activities fail to find support (H3a and H4a). These results indicate that compared to the impact resource focus and industry growth has on acquisition activities, it is less clear how alliance decisions are affected by the interaction of firms’ resource focus and industry growth. This may be explained first of all by the ambiguous effect industry growth has on alliance activities directly. Alliances are known for their reversibility. This is of critical importance in high growth industries, in which the environment is less stable and firms are under pressure to remain flexible. However, partner opportunistic behaviours can be difficult to monitor and control in an unstable environment, which increases the coordination and managerial costs of alliances. Similarly, although firms are more aware of the importance of preserving the value of their existing resources and try to avoid resource appropriation by other firms in a low growth industry, acquisitions may still be considered as a highly risky option as the opportunity costs of conducting sub-optimal acquisition can be high in such industry environment. Since both effects can take place simultaneously, the direct impact industry growth has on alliances becomes inconclusive. It is unlikely that such ambiguous effect will diminish significantly even when taking firms’ resource focus into consideration.
More insightful discussion on this aspect is provided in the subsequent section of this chapter. The last set of hypotheses regarding performance outcomes from alliance and acquisition activities also received full support. The results suggest that firms with greater focus on technological knowledge-based resources perform better from undertaking acquisitions than forming alliances, the same effect holds for firms with greater focus on physical property-based resources. The following sections provide a detailed discussion of this.

**5.1.1 Resource Type Focus**

The results support the predictions that (1) a firm’s technological knowledge-based resource focus is positively related to the number of alliances it conducts; (2) a firm’s technological knowledge-based resource focus is negatively related to the number of acquisitions it conducts; and (3) a firm’s physical property-based resource focus is positively related to the number of acquisitions it conducts. These findings, to a large extent, imply that firms’ alliance and acquisition decisions are contingent upon their resource focus. Needs for resource access or acquisition as well as achieving resource exploration and exploitation through alliances and acquisitions have received extensive research attention in the strategic management literature (Barney, 1988; Belderbos, 2003; Chi, 1994; Collis & Montgomery, 1995; Das & Teng, 2000; Eisenhardt & Schoonhoven, 1996; Gordon & Barney, 1990; Grant, 1996; Gulati, 1998; Haspeslagh & Jemison, 1991; Heeley et al., 2006; Mowery et al., 1996; Powell et al., 1996; Stalk, Evans, & Shulman, 1992; Teece & Pisano, 1994). However, these studies tend to discuss resources in a generalised manner or focus on one specific type (i.e. mainly technological resources), and little investigation is conducted into looking at firms’ tendencies to ally and acquire from the resource-based view.
This study attempts to establish some understanding in this area. It suggests that when firms demonstrate greater devotion to developing certain types of resources, such devotion reflects their intention to possess and utilise such resources. The characteristics of the resources they focus on will be inherent in their resource base. With respect to the technological knowledge-based resources, although both alliances and acquisitions allow firms to take advantage of the fungibility of these resources, the tacit and uncertain characteristics of their resource endowment make acquisitions more risky to undertake for resource acquisition due to high irreversibility of such mechanisms. Furthermore, as these resources are costly to develop, firms with greater focus on developing such resources may face greater resource constraints when undertaking acquisition activities intensively and simultaneously. In comparison, alliances are optimal mechanisms as they provide greater degrees of flexibility and the advantages of cost- and risk-sharing. In contrast to technological knowledge-based resources, the opportunities to create value through physical property-based resources are mainly efficiency-based. Since acquisitions allow firms to enjoy economies of scale and scope without sharing the benefits with others, firms that are more focused on developing physical property-based resources have stronger motivation and needs to acquire more.

The findings also support the notion that firms with a greater focus on developing technological knowledge-bases resources are likely to possess a higher level of innovative capabilities and absorptive capacities (Hagedoorn & Wang, 2012; Heeley et al., 2006; Tsai & Wang, 2008). According to Cohen and Levinthal (1990), the ability of a firm to recognize the value of new, external information, assimilate it and apply it to the commercial ends is critical to its innovative capabilities. It is expected that a firm’s prior investments, existing knowledge base, intensity of research and activities, speed and direction of innovation significantly impact on its scope of search for new technological resources, ability to
establish new connections, and the speed and quality of learning (Boynton, Zmud, & Jacob, 1994; Cohen & Levinthal, 1990; Kim, 1998; Lyles & Schwenk 1992; Mowery, Oxley, & Silverman, 1996; Van Wijk, Van den Bosch, & Volberda, 2001; Veugelers, 1997). A firm’s ability to interpretate, understand and learn new technological knowledge contributes to a better assimilation process (Fichman & Kemerer, 1999), which in turn, leads to better transformation process (i.e. internalize and convert externally obtained resources) (Zahra & Gorge, 2002).

Since firms committed to developing technological knowledge based resources are more likely to establish a set of organizational routines and processes by which they can effectively acquire, assimilate, transform, and exploit externally obtained technological knowledge, engaging in alliances is beneficial for them. This is because their strong absorptive capacity largely reduces the threat of partner firm winning a learning race. Moreover, the information asymmetry and ambiguity may make it rather difficult for the partner firm to fully appropriate the value of their own knowledge assets. As more tacit knowledge and capabilities accumulated from a firm’s commitment to research and development activities are also difficult to appropriate by other firms (Mowery et al., 1996), the disadvantage of alliances is more tolerable. Therefore, firms with greater technological knowledge-based resources are in less need to commit significantly to pursue deals that allow for full control.

In comparison, firms with fewer technological knowledge-based resources may lack the absorptive capacity to effectively and efficiently learn from their partner/target firms. On the one hand, ineffectiveness in absorbing and integrating external resources imposes a significant challenge for firms with lower focus on technological knowledge-based resources as acquirers. Conversely, these firms are more likely to experience problems such as abuse of power by partners, limited exposure to valuable resources possessed by partners, and “losing
the learning race” in collaborative relationships. Taking these factors into consideration, acquisitions still represent good options for these firms to obtain critical resources to catch up with competitors. The reduced attractiveness of alliances for these firms largely derives from perceived problem of low bargaining power due to high dependence on partner firms for resource access. High levels of dependence often translate to abuse of power by partner firms, which in turn results in limited resource access granted by partner firms. As proposed by Pfeffer and Novak’s (1976) study on resource dependence, when firms face problematic relationships, horizontal and related acquisitions are more viable options for minimising the chances of negative outcomes. The findings lend strong support to this notion.

The result that physical property-based resource focus is positively related to acquisitions confirms the efficiency-based value creation argument (Cardinal, Alessandri, and Turner, 2001). Acquisitions allow firms with greater focuses on physical property-based resources to enjoy the entire benefit of economies of scale and scope without sharing with other firms. Although not specifically argued in this study, the results still show that a physical property-based resource focus has a stronger impact on acquisitions than on alliances. This difference represents an interesting implication. Although imperfect mobility and perfect legal protection of physical property-based resources reduce resource appropriation risks associated with alliances, these same characteristics put a constraint on how much benefit the firm contributing such resources in a collaborative relationship can gain. This is because firms contributing physical property-based resources often end up forming “shallow” collaborative relationships (Das & Teng, 2000). Although firms with a greater focus on physical property-based resources need to obtain complementary resources externally to develop competitive advantage (Das and Teng, 1999; Teng, 2006), due to the perceived limitation on achieving such goal through forming sub-optimal alliances, their motivations to
ally will be reduced to an extent. However, despite some of the disadvantages inherent in acquisitions, firms’ needs to achieve economies of scale and scope as well as resource acquisition can be well satisfied by acquisitions. Full ownership and control provided by acquisitions also facilitate in-depth integration that allow for better calibration of comprehensive systems with interwoven components. Such a process is critical to value creation and development of competitive advantage.

The fewer acquisition activities conducted by firms with a low level of physical property-based resources may reflect their low emphasis on pursuing scale and scope economies. More importantly, the results are consistent with the notion that when firms seek to utilise physical property-based resources, they prefer to involve in light engagements (Das & Teng, 2000). With respect to acquisitions, despite the tangible nature and certainty in functionality of physical property-based resources, acquisitions are still risky and sub-optimal options for firms with a low focus on such resources to achieve resource acquisitions. This is because these firms may lack the necessary capabilities to manage and deploy these resources.

The findings demonstrate how differences in resource focus can lead to variations in firms’ alliance and acquisition behaviours. The embedded characteristics of different types of resources lead to different value creation opportunities for firms with different resource focuses. This in turn, affects their needs and desires to acquire or ally. Given alliances and acquisitions are largely deployed for resource access or acquisition purposes, this study provides some complementary empirical evidence to Wernerfelt’s (2011) study proposing that differences in current stock of resources lead to heterogeneous resource acquisition activities. The findings here also imply that firms’ tendencies to ally and acquire are made upon weighing inherent advantages against disadvantages of respective mechanisms.
contingent upon their technological knowledge-based and physical property-based resource characteristics.

5.1.2 The Moderating Effect of Industry Growth

The findings of the statistical analysis support some but not all of the hypotheses with respect to the moderating effect of industry growth. The results support the moderating effect industry growth has on relationships between both types of resource focus and acquisition activities. Specifically, the findings confirm that the negative relationship between a technological knowledge-based resource focus and acquisition activities is stronger in low growth industries than in high growth industries. The positive relationship between a physical property-based resource focus and acquisition activities is also stronger in low growth industries than in high growth industries. The weakened negative relationship between a technological knowledge-based resource focus and acquisition activities in high growth industries implies that firms with a greater technological knowledge-based resource focus become less acquisition averse than counterparts operating in low growth industries. The strengthened positive relationship between a physical property-based resource focus and acquisitions, in contrast, implies that firms with greater focus on developing physical property-based resources operating in low growth industries acquire more than firms with a similar level of resource focus operating in high growth industries.

The finding that firms with a greater technological knowledge-based resource focus become less acquisition averse in high growth industries is consistent with findings from the majority of the literature that looks into acquisition activities in different industry contexts in terms of growth rates (Audretsch, 1989; Christensen & Montgomery, 1981; Schoenberg & Reeves, 1999). Increasing external opportunities and market demand reduces firms’ resource
constraints while increasing managerial confidence to initiate more aggressive actions. Since industry growth reduces the levels of risk inherent in investing in and obtaining a long-lived technology at its emergent point (Russo & Fouts, 1997) and firms with greater focus on technological knowledge-based resources may experience a certain level of inertia in their ability to innovate from a different direction, acquisitions allow them to obtain and integrate valuable technologies quickly. The higher absorptive capacities also make integration of externally obtained knowledge-based resources easier to implement. These advantages mitigate some of the disadvantages of acquisitions. The opposite effect holds for low growth industries. Since low industry growth brings contraction in market opportunities and greater resource constraints and pessimisms to incumbent firms, it intensifies all the perceived disadvantages of acquisitions for firms with a greater focus on technological knowledge-based resources.

The strengthened positive relationship between physical property-based resources and acquisition activities in low growth industries offers some opposite evidence to the propositions that more acquisitions are generally attracted to high growth industries (Audretsch, 1989; Christensen & Montgomery, 1981; Schoenberg & Reeves, 1999). This finding is largely explained by the characteristics of physical property-based resources. As discussed previously, the main value creation opportunities derived from physical property-based resources are achieving scale and scope economies. When industry growth is low, a lesser degree of market change is expected. This stable condition helps to preserve the value of existing physical property-based resources. But at the same time, low market demand may lead to increasing excess capacities of firms with a greater focus on physical property-based resources. Acquisitions allow for immediate expansion in product lines, and the increasing use of existing physical property-based resources in turn contributes to efficiency gains.
Since firms in low growth industries generally experience greater growth pressures, the advantage of gaining market power provided by acquisition is therefore magnified in this industry context.

In contrast, despite the proposed general preference of acquisitions in high growth industries, when the external environment is less stable, firms with a greater focus on physical property-based resources will be more wary about generating even higher organisational inertia. The rigidity of physical property-based resources and disadvantages of acquisitions such as irreversibility and inflexibility become greater problems in high growth industries. The benefits of acquiring for firms with greater focus on physical property-based resources reduce to some extent. Therefore, with the same level of devotion into physical property-based resources, firms operating in high growth industries restrain themselves from being overly committed in acquisition activities.

The empirical results indicate that how the relationships between a firm’s resource focus of both types and alliance activities are affected by industry growth is less clear. Existing literature on how industry growth affects alliance activities directly may provide some help in explaining these observations. As discussed in the previous chapter, research into the impact industry growth has on alliance formation has generated inconclusive findings. On the one hand, the resource dependence theory proposes an increase in alliance formation in industries where external resources become scarce and market demand malaise is present (Burgers et al., 1993; Oliver, 1990; Pfeffer & Salancik, 1978). On the other hand, strategic management researchers link industry growth with resource munificence and postulate that firms are more motivated to ally with others to capture the window opportunities emerging in rapidly expanding markets (Harrigan, 1988b; Kogut, 1988a). Since both effects can take place simultaneously, the direct impact industry growth has on alliances becomes ambiguous.
Even when a resource focus is taken into consideration, the ambiguous effect is likely to hold. On the one hand, the value of existing technological knowledge-based resources is largely preserved or even enhanced due to limited supply of competing or substituting resources in low growth industries. Firms with greater focus on these resources therefore can reap more benefits out of alliance activities. They can collaborate with other firms to achieve resource access and secure demand (Kogut, 1988a). Their superior absorptive capacities allow them to better take advantage of resources developed externally, especially under stable market conditions. Further, as the market is more stable and does not permit great room for competitors to maneuver, and partners’ dependency upon each other increases, partner opportunistic behaviours will reduce and are easier to monitor. All of these increase firms’ desires to ally with others. On the other hand, as argued in Chapter 2, when high industry growth brings in both opportunities and instability of the market place, firms have greater desires to capture emerging opportunities but at the same time need to remain flexible. Given the uncertain nature of technological knowledge-based resources, alliances allow firms with greater focus on developing and utilising these resources to share the risks and costs with others, and quickly capture market window opportunities while remaining flexible. These benefits together increase their preference for alliances.

With respect to physical property-based resources, similar logic applies. In low growth industries, both incumbents and newcomers lack the incentive to commit to large-scale development of physical property-based resources that incur high fixed costs. This contributes to the preservation or enhancement of the value of existing physical property-based resources. Firms with greater focus on these resources will have more desire to ally due to perceived increasing bargaining power and opportunities to demand access to complementary resources from partner firms. Since market demand increases slowly, allying
with others and pooling resources to production activities also allow these firms to achieve both scale and scope economies and resource parsimony. Given the importance of remaining highly efficient in low growth industries, these advantages further increase their motivations to form alliances. However, in high growth industries, the unstable market conditions make firms with greater focus on physical property-based resources more wary about increasing organisational inertia and inflexibility. By allying with other firms with similar resources, these firms can still enjoy scale and scope economies without undertaking irreversible investments.

To summarise these discussions, it is difficult to determine the impact industry growth has on the relationship between resource focus and alliance activities. Since industry growth may interact with firms’ resource focuses and affect their alliance behaviours both ways, the effects end up cancelling each other out and revealing no support to the predictions. Nevertheless, the results of the third and fourth sets of hypotheses generally demonstrate the importance of industry growth in influencing firms’ alliance and acquisition behaviours, which are consistent with the theoretical proposition that external environmental factors have to be taken into careful consideration when analysing alliances and acquisitions decisions (Yin & Shanley, 2008). The findings also complement previous studies that have examined the direct relationship between external environments and organisational strategies (e.g. Guimaraes Cook, & Natarajan, 2002; Steensma & Corley 2000).

5.1.3 Alliances and Acquisitions and Firm Performance

The results support both hypotheses that (1) firms with greater focus on technological knowledge-based resources perform better from acquisitions than from alliances; and (2) firms with greater focus on physical property-based resources perform better from
acquisitions than from alliances. These findings indicate that with both types of resource focus, firms generally perform better from undertaking acquisitions than from forming alliances.

With respect to the technological knowledge-based resource focus, although perceived advantages such as flexibility, reversibility and low demand on resource commitment associated with alliances increase the preference of these mechanisms by firms with greater focus on technological knowledge-based resources, these firms do not necessarily generate great performance outcomes through engaging in alliances. This is because the partner opportunistic behaviour and resource appropriation risks cannot be completely prevented in collaborative relationships. In fact, partner firms may come into a collaborative relationship with some sort of incentives to appropriate valuable resources contributed by the other party. When partner firms are equally capable of developing technological knowledge-based resources, the aforementioned risks become even stronger. On the one hand, the exploration-associated risks derived from the uncertain nature of technological knowledge-based resources can be reduced through collaborations. On the other hand, severe competitive risks can arise from competitors appropriating these resources. Given the fungibility of technological knowledge-based resources, exposing them to the competitor could have a long-term profound detrimental effect on a firm’s competitive position and hence performance outcome. In comparison, acquisitions provide better protection of the focal firm’s valuable resources and innovative capabilities. Applying the resource-based view rationale, it can be argued that preserving the value of existing resources and isolating competitors from imitating or appropriating these resources help to sustain a firm’s competitive advantage. This is of critical importance to firm performance.
In regard to physical property-based resources, the finding lends support to the proposition that firms contributing these resources to collaborative relationships experience limited gains. This is because they often end up becoming involved in only “light” engagements that provide them limited opportunities to gain access to valuable complementary resources needed. If economies of scale and scope can be achieved through acquisitions, having to share the benefits with other firms makes alliances less optimal mechanisms. Furthermore, since acquisitions entitle firms to full control and integration, adopting these mechanisms contributes several major advantages to firms with greater focus on physical property-based resources. First of all, these firms can obtain needed complementary resources quickly through acquisitions. Secondly, once valuable complementary resources are acquired, acquisitions allow them to fully integrate these resources with their existing comprehensive systems. This process leads to more effective calibration of resources and synergy creation. Finally, expanded operational scale or scope through acquisitions allows these firms to better exploit their property-based resources and enjoy scale and scope economies without sharing the benefits with others. These benefits from acquisitions together contribute to better performance outcomes.

The caveat here is that although a stronger positive performance outcome is achieved from conducting acquisition activities by firms with different resource focuses, the positive outcome is explained by different factors that associate closely with resource characteristics. Given these resource characteristics, perceived advantages of alliances may not translate to performance benefits.
5.2 Implications

5.2.1 Research Implications

Despite the fact that alliances and acquisitions have been widely researched into, not many studies examine firms’ tendencies to ally and acquire simultaneously. Although alliances and acquisitions are frequently considered as strategic alternatives, they do differ in respective advantages and disadvantages. Some recent studies that compare alliances and acquisitions investigate how similarity between two firms, prior knowledge and previous experiences impact on firms’ preferences of these strategies (Hagedoorn & Duysters, 2002; Villalonga & McGahan, 2005; Wang & Zajac, 2007), which contributes to the development of a more in-depth understanding of this topic. However, one area that remains under-explored is the application of the resource-based view to the study of alliances and acquisitions in tandem. In fact, the resource-based view is especially appropriate to study these strategies as firms essentially utilize these strategies to gain access or obtain valuable resources from other firms (Das and Teng, 2000). By investigating firms’ alliance and acquisition activities through the lens of the resourced-based view, this study demonstrates that a firm’s resource focus is a key determinant of its structural and strategic formulation. Specifically, analysing firms’ alliance and acquisition behaviours by assessing their resource positioning, this study contributes to a better appreciation of how and when alliances and acquisitions are utilised to fulfill firms’ resource needs. More importantly, investigating alliances and acquisitions in tandem presents a significant attempt to establish greater understanding in an under-explored area of research. The linkage between firms’ strategic adoptions of alliances and acquisitions and their internal resource characteristics contribute to a profound understanding of the relative advantages and disadvantages of these strategies respectively.
In addition to its contribution to the alliance and acquisition literature, this study also contributes to a more “fine-grained” application of the resource-based view. One of the critiques of the resource-based view is that it is overly inclusive - the typologies predominately focus on the four criteria and treat all types of resources in the same way (Kraaijenbrink et al., 2010). It is suggested that understanding of the resource-based view could improve substantially if differences among the types of resources and their ownership can be explicitly recognised and discussed (Kraaijenbrink et al., 2010). More recently, there has been some discussion on how characteristics of a firm’s current resource base determine its resource acquisition activities (Wernerfelt, 2011) and choosing alliances vis-à-vis acquisitions as mechanisms for resource access/acquisition (Yang et al., 2010). This study contributes to the discourse by specifically distinguishing knowledge-based resources from property-based resources and explicitly discussing major differences between these two types of resources. Firms’ commitment in developing a certain type of resources largely determines the characteristics of their resource base. It is expected that the resource base firms with greater focus on knowledge-based resources develop over time will be dissimilar to the one possessed by counterparts with greater focus on property-based resources. Such differences lead to varying resource acquisition needs and value creation opportunities. By explaining more in depth on how differences in firms’ resource characteristics ultimately affect their strategic adoption of alliances and acquisitions, this study contributes to an improvement in the understanding of the resource-based view by extending beyond a generic discussion of the relationship between sustainable competitive advantage and four resource characteristics.

Past studies that compared alliances and acquisitions have looked at firm-level, dyadic-level, industry-level and network-level factors (Hagedoorn & Duysters, 2002; Villalonga & McGahan, 2005; Wang & Zajac, 2007; Yang et al, 2010; Yin & Shanley, 2008). However,
little attention is given to how firm-level and industry-level factors interact to affect firms’ alliance and acquisition decisions. Traditional strategy research suggests that firms need to seek a strategic fit between their internal characteristics (strengths and weaknesses) and their external environment (opportunities and threats) (Andrews, 1971; Chandler, 1962; Schendel & Hofer, 1979, p.8). Through examining how the relationships between resource focus, alliances and acquisitions change in industries with different growth rates, this study responds to the proposition that internal and external factors must be taken into consideration simultaneously to facilitate strategic decision making in regards to alliance and acquisition choices (Dyer et al., 2004; Yin & Shanley, 2008). Specifically, it demonstrates that firms with different resource base are confronted with varying opportunities and threats in different industry contexts and the relative advantages and disadvantages associated with alliances and acquisitions are also altered by industry environment. Therefore, strategy formulation is a process that requires continuous and multi-dimensional assessment of fit among available strategic options, internal and external characteristics. Overall, this study contributes to a better appreciation of the systems theory - firms are structured collectivities that are embedded in and dependent upon the broader systems in which they operate (Scott, 1998). Their strategic decisions therefore are affected by such systems and should not be attributed to determinants in a single level.

The finding that firms with greater focus on technological knowledge-based resources generate better performance outcome from acquisitions than from alliances shares great consistency with Tsai and Wang’s (2008) study of external technology acquisition on firm performance. Both studies demonstrate that when a firm’s internal R&D commitment is high, it develops stronger absorptive capacity that allows it to better utilise externally acquired technological resources. The results also lend support to Hagedoorn and Wang’s (2012)
argument that when firms’ internal R&D efforts are great, external technology strategy is complementary to internal technology strategy. These findings impose a challenge on the proposition from earlier research suggesting that acquisition of technological resources from external sources substitutes firms’ internal technological development effort (Cohen & Levinthal 1989, 1990; Gomes-Casseres 1996; Harrison et al. 2001; Lambe & Spekman 1997; Mytelka 1991; Porter & Fuller 1986; Teece, 1992).

In fact, it is well grounded in both path dependency theory and evolutionary theory that a firm’s current technological portfolio shapes its subsequent technological innovations (Blind, Cremers and Mueller, 2009). It can be expected that firms relying predominantly on internal effort for technological development may find themselves accumulating a resource base that is largely path-dependent and demonstrates a continuous trajectory (Breschi, Lissoni, & Malerba, 2003). Acquiring technological resources that are different or complementary to a firm’s existing technological resource base allows the firm to expand their technological horizon. This to a large extent helps the firm overcome some of the inertial forces discussed previously that could prevent it from successfully adjust to technological and market change.

It is important to note that while both acquisitions and alliances are strong mechanisms to engage in technological activities, there are fundamental differences between the two. In particular, Yin and Shanley (2008) have suggested that the biggest difference between these two mechanisms is the level of control that the focal firm has. Compared to alliances that may create long term negative consequences such as partner applying core technological resources obtained through collaboration in other competitive markets, acquisitions provide acquiring firms greater control and protection. Acquisitions also allow firms to achieve full integration, which contributes to a better absorption and assimilation of externally obtained resources with their existing resource base.
The performance results show that firms with greater focus on physical property-based resources generate better performance outcome from acquisitions than from alliances. This implies that although physical property-based resources allow firms to enjoy efficiency-based gains through large scale production, efficiency-based gain itself is insufficient in providing firms a sustainable competitive advantage. According to the resource-based view, a sustained competitive advantage requires that resources possessed by the firm are heterogeneous in nature and not perfectly mobile (Peteraf, 1993). Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort (Barney, 1991). Although firms with greater focus on physical resources can establish an asset base that is valuable and imperfectly imitable, such resource base is hardly rare nor non substituable. It is a comprehensive, interwoven and synchronised system composing of various property-based resources that enables firms to achieve cost-leadership and better value-adding, which is difficult for competitor to replicate or substitute. Therefore, firms with greater focus on physical property-based resources must adopt strategic options to facilitate the creation of such systems in order to achieve better performance outcome. Specifically, despite the fact alliances allow firms to share costs and risks with partner firm(s) and pool resources together to enjoy economy of scale and scope, when firms with greater focus on physical property-based resources can merely engage in “shallow alliances”, they do not enjoy the benefit of learning from partners or forming in-depth integration. Acquisitions in comparison facilitate greater integration and acquisition of valuable and complementary resources, through which the creation of synergy and systems that are difficult to imitate can be achieved. Furthermore, enlarging operational/production scale and scope via acquisitions also allow firms to reap the entire cost benefits without sharing with others. The findings of this study therefore provide great insights into how resource characteristics significantly determine firms’ strategic formulation.
5.2.2 Managerial Implications

The resource-based view applied in this study is a call to the managers to pay close attention to their internal resource characteristics. Although alliances and acquisitions are both strong mechanisms that allow firms to get access and obtain valuable resources from other firms, they differ in many aspects and each has its advantages and disadvantages. This study proposes that managers must assess advantages and disadvantages of alliances and acquisitions in a dialectic manner, such that the adoption of these strategies should be contingent on characteristics of the resource base of their firms. For example, there is generally a higher level of perceived risk associated with acquisitions due to their irreversibility and demand for large financial commitment. But for firms who are not recognized as attractive alliance partners and experiencing limited gains from collaborative relationships, their needs to acquire complementary resources can be well satisfied by acquisitions. Furthermore, acquisitions provide acquiring firms with full control and more opportunity to achieve in-depth-integration. This is ideal for firms with greater focus on physical property-based resources as they have the capabilities to fully calibrate externally acquired resources with their existing systems to create synergy and an interwoven system that is non-substitutable and imperfectly imitable. In summary, when firms commit to developing a certain type of resources, the characteristics of those resources will be inherent in their accumulated resource base. Different characteristics will represent different value creation opportunities. Managers need to conduct alliance and acquisition activities in a way that allows their firms to access or acquire resources that strengthen their existing resource base.

Firms in possession of resources underpinning competitive advantage are often highly sought after alliance partners. Such perceived attractiveness provides them stronger bargaining
power and opportunity to engage in more beneficial collaborations. The opposite holds true as well. Managers should, therefore, examine their own resources base and determine whether these resources contribute to better value creation, not only from their own perspective but also in terms of how valuable these resources are for other firms. This assessment enables them to establish a better understanding of why other firms are interested in forming alliances with them (Das & Teng, 1997a). As discussed in previous chapters, possession of a resource base that contributes mainly to efficiency-based cost advantage does not make a firm an attractive partner. This is because such resource base is substitutable – other firms could seek alternative ways to achieve similar efficiency gains and cost saving by adopting contract-based outsourcing arrangements and options alike. It is expected that even when these firms form alliances with others, they are only able to engage in shallow collaborations that allow for limited learning and resource access opportunities. Since better value creation derives from synergy generation and valuable resource combination, when alliances fail to fulfill these purposes, acquisitions might be the ultimate choice given the control and full integration the acquiring firms are able to enjoy.

The implication of industry growth is also significant. Managers should understand that environmental change can alter the value of their existing resource base and industry effects are persistent, relative to business or corporate-parent effects (McGahan & Porter, 1997). As industry growth largely determines available resources, market opportunities and environmental stability, the industry requirement for commitment and environmental pressure for flexibility affect firms with different resource focus in different ways. Specifically, while firms with a great focus on physical property-based resources prefer acquisitions in general for efficiency-based benefits, in a high growth industry, inflexibility of acquisitions together with the rigidity of resource base should be of concern to these firms when the external
environment is generally less stable. Furthermore, when most industry participants are under lower growth pressure in a high growth industry, firms should try to avoid engaging in sub-optimal acquisition activities and incurring opportunity costs that are proven to be significant in a fast moving environment. Similarly, although firms with greater focus on technological knowledge-based resources generally prefer alliances for their flexibility, lower financial commitment and opportunity to share risks with other firms, these firms should be more cautious towards collaborating with other in low growth industries. This is because reserving existing competitive advantage derived from their resource base is of critical importance in a stable environment. Acquisitions offer better protection for their valuable resources. To summarise, managers need to establish a good understanding of their internal resource characteristics and adopt a dialectic approach in assessing advantages and disadvantages of each strategic option. In the context of alliance and acquisition decisions, managers must determine which strategy effectively serves their resource needs and at the same time responds better to the external pressure on organizational flexibility, control, etc in order to achieve optimal performance outcome.

The finding that firms with greater focus on technological knowledge-based resources generate better performance outcome from acquisitions than from alliances also imply that managers of this type of firms should become more cautious about engaging in alliances despite its seemingly advantages. As proposed by Dyer, Kale and Singh (2004), for firms desiring for “reciprocal synergies”, acquisitions are better than alliances. This is because to achieve such an ideal outcome, firms must work closely together and execute tasks through an iterative knowledge-sharing process. Not only do firms have to combine resources, but they have to customize them a great deal to make them reciprocally interdependent (Dyer, et al., 2004). Although alliances could facilitate such process and allow firms to share risks and
costs, the deep engagement could impose a long-term competitive threat on firms with valuable yet imperfectly protected resources that exceeds the short-term gain. Furthermore, while there is a high level of demand for managerial attention for conducting acquisitions, managers should not perceive acquisitions as a substitute for internal development of technological knowledge-based resources. As discussed previously, acquiring resources that are different or complementary to its own resource base helps a firm to expand its technological horizon and overcome internal constrains derived from the path-dependent nature of technological knowledge development. Compared to alliances that are subject to disadvantages such as resource appropriation by partner firms, acquisitions provide firms with perfect protection of their valuable resources and greater integration opportunity, which are prudent for long-term benefits.

5.3 Limitations and Future Suggestions

Like many studies, this study is anchored on the focal firm perspective (Hagedoorn & Duysters, 2002; Vanhaverbeke et al., 2002; Villalonga & McGahan, 2005). However, since both alliances and acquisitions involve at least two companies and the decisions are made upon mutual agreements between the focal firm and the other parties, a dyadic approach could add to a better understanding of the topic. For example, assessment on the resource focus of both the focal firm and the partner/target firm will contribute to a clearer explanation of the final implementations of alliances and acquisitions. As firms that differ in resource focus will have different needs for resource access, recombination and exploitation, these differences may lead to reduced mutual goals to achieve, or difficulty to integrate if one firm acquires the other. Moreover, given the difference in value creation opportunities endowed with different types of resources, firms with a different resource focus may experience
different levels of dependency and bargaining power when entering into collaborative relationships. These factors could individually or collectively affect firms’ alliance and acquisition activities, which present opportunities for future research.

For the purpose of this study, the focus is on technological-knowledge-based resource focus and physical-property-based resource focus. Although there are valid reasons to discuss firms’ focus on the sub-sets of knowledge-based and property-based resources, a more in-depth understanding of the impacts different resource focus have on alliance and acquisition behaviours can be established by including other sets of resources in respective categories. A more inclusive measurement of property-based resources can also be developed using more than only financial data (e.g. encompassing intellectual property and distribution channels). Furthermore, this study adopts one approach to distinguish resource types, knowledge-based and property-based. More insightful understanding may be developed by comparing and contrasting differences in predictions when multiple resource type classifications are adopted (e.g. tangible and intangible; financial, physical, managerial, human, organisational, and technological). These attempts, however, require the adoption of potentially some qualitative research methods and the collection of primary data.

This study has investigated how a focus on different types of resources affect alliance and acquisition activities, future research could approach the comparative study by looking into how firms’ resource base in terms of both types and sizes affect alliance and acquisition activities differently. It is likely that a firm’s asset size could affect its perceived attractiveness by others such that firms possessing larger stock of technological resources may be perceived as more attractive partners. Furthermore, the size of the focal firm’s asset base can also impact on its resource and business integration processes. It has been argued that the absorption and assimilation activities will become more difficult between two firms.
with relatively dissimilar sizes of such capability bases (Ahuja & Katila, 2001). By a similar
token, some scholars have suggested that the disruption of existing organisational routines
was a major challenge which merging firms must deal with carefully in order to achieve a
smooth resource/capability sharing process (e.g. Haspeslagh & Jemison, 1991; Singh &
Zollo, 1997). According to Ahuja and Katila (2001), when the target firm has a relatively
similar or larger technological capability base in comparison to the acquirer, the
modifications required are likely to be minor, which leads to a minimal level of disruption.
On the other hand, if the acquirer has a smaller technological capability base relative to the
target firm, fairly large changes would be expected, which is associated with significant
disruption of existing routines. Together, these factors will strongly impact on firms’ decision
regarding alliances and acquisitions.

Many studies have investigated the impact environmental factors on firms’ strategic decisions
and performance (e.g. Drnevich & Kriauciunas, 2011; Elbanna & Child, 2007; Mitchell,
regarding how industry level determinants affect firms’ alliance and acquisition behaviours.
Technological uncertainty and change have long been identified as influencing firms’
mergers and acquisitions activities as well as formation of alliances (Dickson & Weaver,
1997; Eisenhardt & Schoonhoven, 1996; Hagedoorn & Duysters, 2002). Industry dynamism
is also perceived to be an important factor impacting on firms’ needs for control or flexibility
(Kumar & Seth, 1998; Hagedoorn & Duyster, 2002; Yin & Shanley, 2008), which ultimately
determine firms’ alliance and acquisition decisions (Lin, Yang & Arya, 2009). While this
study investigates the moderating effect of industry growth, it would be interesting to look
into how other industry level factors such as industry level technological uncertainty and
industry dynamism moderate the relationships between firms’ resource focus and alliance and
acquisition activities. As the value of both technological knowledge-based resources and physical property-based resources can be altered by technology uncertainty, firms’ needs and desires to gain resource access and acquisition would be affected. Similarly, industry dynamism represents unpredictability and room for firms to maneuver, which affects predictability of competitor behaviour and perceived risks in irreversible investments. These factors can have strong impact on firms’ assessments of advantages and disadvantages of alliances and acquisitions. Together with their changing needs for resource access and acquisitions, firms will adjust their alliance and acquisition behaviours accordingly.

Finally, despite an attempt to investigate firms’ performance outcome, this study places a much greater emphasis on analysing firms’ alliance and acquisition behaviours. This is because while alliances and acquisitions have frequently been considered as strategic alternatives, relatively little is known as to when firms should adopt these strategies. Although there is vast amount of research looking into alliances or acquisitions, there is relatively little study that examines alliances and acquisitions in tandem. Among the few studies that provide some comparative analysis (e.g. Dyer et al., 2004; Hagedoorn & Duysters, 2002; Roberts & Liu, 2001; Vanhaverbeke, Duysters, & Noorderhaven, 2002; Villalonga & McGahan, 2005; Wang & Zajac, 2007; Yang, Lin, & Lin, 2010; Yin & Shanley, 2008), the main focus has been on investigating factors impacting on firms’ strategic decision rather than on testing performance outcomes. A major reason for placing less emphasis on performance outcome among this stream of research (including the focal study) is that performance outcome is the consequence of choice and implementation of strategies. We need to establish a better theoretical understanding of firms’ strategic decisions before being able to assess more accurately the effect on firm performance. The main aim of this study is to examine firms’ tendencies to ally and acquire through the lens of a more fine-grind
resource-based view, and how such tendencies are affected by an important industry level factor—industry growth. Therefore, the key emphasis has been given to the hypothesizing and testing of firms’ alliance and acquisition behaviour. However, given the understanding that performance outcome is the ultimate test of any strategy, future research should certainly look more in-depth into the performance outcome aspect.

5.4 Conclusion

This study investigates the impact of firms’ resource focus on their alliance and acquisition activities and the moderating effect of industry growth on these relationships. Moreover, it examines the performance outcomes derived from alliance and acquisition activities. The research questions posed at the outset of this study have been answered as follows. Firstly, the results show that a firm’s resource focus determines its alliance and acquisition behaviours. Specifically, there is a positive relationship between a firm’s technological knowledge-based resource focus and the number of alliances it conducts, and there is a negative relationship between a firm’s technological knowledge-based resource focus and the number of acquisitions it conducts. With respect to property-based resources, it is found that a firm’s physical property-based resource focus is positively related to both the number of alliances and acquisitions it conducts. Secondly, industry growth interacts with firms’ resource focus and impact on their alliances and acquisitions differently, such that the relationships between resource focus and acquisitions are strengthened in low growth industries in comparison to high growth industries, whereas the effect industry growth has on the relationships between resource focus and alliances is unclear. Thirdly, firms with greater technological knowledge-based resource focus perform better from acquisitions than from alliances, and firms with greater physical property-based resource focus experience similar
performance outcomes.

Despite the limitations highlighted in the last section, this study taps into an under-explored area of research by investigating alliance and acquisition in tandem. Compared to recent attempts of comparing and contrasting alliances and acquisitions as strategic options that firms often choose one over the other, this study took an approach that does not impose an assumption of rational choice between these options. In other words, this study proposes that alliances and acquisitions could be made in isolation or in tandem. Investigations into firms’ tendencies to ally and acquire without imposing the rational choice assumption better reflects the reality. A major contribution of the study is the development and application of a “fine-grained” resource-based view. By specifically distinguishing knowledge-based resources from property-based resources, it allows for an in-depth assessment of how alliance and acquisition decisions are made upon assessing critical resource-related issues (Dyer et al., 2004). It also demonstrates an effort in responding to the critique of the resource-based view being overly inclusive and treats all types of resources in the same way (Kraaijenbrink, Spender, & Groen, 2010). Through explaining how firms with different resource focus adjust their alliance and acquisition activities according to different industry contexts, this study provides strong evidence to the notion that firms must take internal and external factors into consideration when strategising, and the use of alliances and acquisitions should not be perceived as purely internally driven decisions (Dyer et al., 2004).

Two of the major managerial implications proposed by this study include: first of all, managers must understand that strategic formulation on forming alliances and/or conducting acquisitions is a continuous monitoring process that requires multi-dimensional assessment of fit among internal resource needs, relative advantages and disadvantages of alliances and acquisitions against their resource characteristics, as well as external environment. Secondly,
seeing from a sequencing perspective, better performance outcome from forming alliances is ensured by engaging beneficial partnerships in the first place. Therefore, managers must understand whether they are attractive partners to other firms or not. Should the answer to such assessment is no, the likelihood of their firms forming meaningful alliances and benefiting from those relationships is relatively low. In this case, acquisitions might be a better option to pursue. There is still much to be learned about the complex relationship of firms’ resources and their alliance and acquisition activities, and future research should try to further unveil their connections especially since alliances and acquisitions in reality reveal high failure rates, and a better understanding is needed in terms of how to implement these mechanisms to facilitate resource access, acquisitions, exploration and exploitation for better value creation.
### TABLES

Table 1 Operationalisation of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operationalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal &amp; Related Alliances</td>
<td>Total number of horizontal and related alliances at time t</td>
</tr>
<tr>
<td>Horizontal &amp; Related Acquisitions</td>
<td>Total number of horizontal and related acquisitions at time t</td>
</tr>
<tr>
<td>Firm Performance</td>
<td>Earnings before interests, taxes, depreciation and amortisation divided by the log value of total assets of firm i at time t+1</td>
</tr>
<tr>
<td>Focus on Technological Knowledge-Based Resources</td>
<td>Total R&amp;D expenditure to total sales ratio at time t</td>
</tr>
<tr>
<td>Focus on Physical Property-Based Resources</td>
<td>Net total amount of property, equipment and machinery to total assets ratio at time t</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>(Sales in industry j at time t+2 minus sales in industry j at time t) divided by sales in industry j at time t</td>
</tr>
<tr>
<td>Firm Past Performance</td>
<td>Tobin’s Q for firm i at time t-1</td>
</tr>
<tr>
<td>Diversification</td>
<td>Value of the Herfindahl index for firm i at time t.</td>
</tr>
<tr>
<td>Unrelated Alliances</td>
<td>Total number of unrelated alliances at time t</td>
</tr>
<tr>
<td>Unrelated Acquisitions</td>
<td>Total number of unrelated acquisitions at time t</td>
</tr>
<tr>
<td>Industry Alliance Trend</td>
<td>Total number of horizontal and related alliances in industry j at time t</td>
</tr>
<tr>
<td>Industry Acquisition Trend</td>
<td>Total number of horizontal and related acquisitions in industry j at time t</td>
</tr>
<tr>
<td>Industry Capital Intensity</td>
<td>Total net capital expenditures in industry j over industry sales in industry j at time t</td>
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</table>
Table 2. Correlation matrix (N=1003)

<table>
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<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Total Alliances</td>
<td>0.04</td>
<td>0.25</td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Total Acquisitions</td>
<td>0.24</td>
<td>0.65</td>
<td>0.42</td>
<td>0.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(4) Unrelated Alliances</td>
<td>0.24</td>
<td>0.98</td>
<td>0.61</td>
<td>0.41</td>
<td>0.34</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>(5) Unrelated Acquisitions</td>
<td>0.30</td>
<td>0.79</td>
<td>0.06</td>
<td>0.08</td>
<td>0.21</td>
<td>0.08</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>(6) Industry Total Alliances</td>
<td>1.08</td>
<td>2.11</td>
<td>0.16</td>
<td>0.21</td>
<td>0.12</td>
<td>0.13</td>
<td>0.00</td>
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<td></td>
<td></td>
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<td>(7) Industry Total Acquisitions</td>
<td>16.97</td>
<td>12.63</td>
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<td>0.09</td>
<td>0.22</td>
<td>0.15</td>
<td>-0.07</td>
<td>0.49</td>
<td></td>
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<td></td>
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<td>(8) Past Performance at t-1</td>
<td>2.09</td>
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<td>-0.04</td>
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<td>0.06</td>
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<td>(9) Diversification</td>
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<td>0.13</td>
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<td>0.26</td>
<td>0.04</td>
<td>-0.03</td>
<td>-0.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) Industry Capital Intensity</td>
<td>0.04</td>
<td>0.02</td>
<td>0.14</td>
<td>0.11</td>
<td>0.11</td>
<td>-0.02</td>
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<td>0.44</td>
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<td>0.06</td>
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<tr>
<td>(11) Knowledge Resource Focus</td>
<td>-1.41</td>
<td>0.85</td>
<td>-0.01</td>
<td>0.09</td>
<td>-0.10</td>
<td>0.11</td>
<td>-0.11</td>
<td>0.07</td>
<td>0.18</td>
<td>0.21</td>
<td>-0.27</td>
<td>0.12</td>
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<tr>
<td>(12) Property Resource Focus</td>
<td>0.22</td>
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<td>0.05</td>
<td>0.02</td>
<td>0.08</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.06</td>
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<td>-0.13</td>
<td>0.15</td>
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<tr>
<td>(13) Industry Growth</td>
<td>0.02</td>
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<td>0.08</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.01</td>
<td>0.17</td>
<td>0.03</td>
<td>0.05</td>
<td>-0.23</td>
<td>0.01</td>
<td>-0.06</td>
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</table>

<p>| r | &gt; 0.031 – p &lt; 0.10; | r | &gt; 0.037 – p &lt; 0.05; | r | &gt; 0.048 – p &lt; 0.01; | r | &gt; 0.064 – p &lt; 0.001 |</p>
<table>
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<th>Industries</th>
<th># of obs.</th>
<th>ROA at t+2 (%)</th>
<th>Total Alliances</th>
<th>Total Acquisitions</th>
<th>KBR Focus (R&amp;D Intensity)</th>
<th>PBR Focus (Physical Property Intensity)</th>
<th>Diversification</th>
<th>Past Performance (Tobin's Q)</th>
<th>Industry Growth (%)</th>
<th>Industry Alliances</th>
<th>Industry Acquisitions</th>
<th>Industry Capital Intensity</th>
<th>Unrelated Alliances</th>
<th>Unrelated Acquisitions</th>
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<tr>
<td>Food and Kindred Products</td>
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<td>487.041</td>
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<td>0.980</td>
<td>0.009</td>
<td>0.267</td>
<td>0.541</td>
<td>1.251</td>
<td>2.100</td>
<td>1.640</td>
<td>38.640</td>
<td>0.041</td>
<td>0.360</td>
<td>0.360</td>
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<td>Tobacco Products</td>
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<td>842.311</td>
<td>0.000</td>
<td>0.000</td>
<td>0.007</td>
<td>0.127</td>
<td>0.000</td>
<td>1.475</td>
<td>1.000</td>
<td>0.000</td>
<td>2.400</td>
<td>0.007</td>
<td>0.000</td>
<td>0.000</td>
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<td>Textile Mill Products</td>
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<td>8.728</td>
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<td>0.591</td>
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<td>5.54</td>
<td>0.516</td>
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<td>0.000</td>
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<td>0.000</td>
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<td>0.448</td>
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<td>4.540</td>
<td>0.039</td>
<td>0.000</td>
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<td>0.600</td>
<td>0.000</td>
<td>0.000</td>
<td>0.046</td>
<td>0.085</td>
<td>0.000</td>
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<td>0.390</td>
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<td>0.258</td>
<td>2.543</td>
<td>8.600</td>
<td>3.25</td>
<td>35.58</td>
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<td>0.590</td>
<td>0.150</td>
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<td>Rubber and Plastics</td>
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<td>11.287</td>
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<td>0.000</td>
<td>0.011</td>
<td>0.281</td>
<td>0.111</td>
<td>1.239</td>
<td>2.600</td>
<td>0.000</td>
<td>2.170</td>
<td>0.038</td>
<td>0.000</td>
<td>0.170</td>
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<tr>
<td>Leather and Leather products</td>
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<td>0.355</td>
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<td>0.000</td>
<td>0.500</td>
<td>0.021</td>
<td>0.000</td>
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</tr>
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Table 3. Descriptive statistics
<table>
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<tr>
<th>Industry</th>
<th>Quantity</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Stone, Clay, Glass and Concrete</td>
<td>30</td>
<td>32.192</td>
<td>0.000</td>
<td>0.400</td>
<td>0.179</td>
<td>0.331</td>
<td>0.385</td>
<td>1.256</td>
<td>5.000</td>
<td>0.330</td>
<td>9.170</td>
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<td>Primary Metal Industries</td>
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<td>0.013</td>
<td>0.295</td>
<td>0.339</td>
<td>1.897</td>
<td>-1.600</td>
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<td>Industries</td>
<td>(74.052)</td>
<td>(0.186)</td>
<td>(0.620)</td>
<td>(0.019)</td>
<td>(0.146)</td>
<td>(0.257)</td>
<td>(4.515)</td>
<td>(17.00)</td>
<td>(6.86)</td>
<td>(2.872)</td>
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<td>Fabricated Metal Products</td>
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<td>0.150</td>
<td>4.980</td>
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<tr>
<td>Primary Metal Industries</td>
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<td>(0.129)</td>
<td>(0.524)</td>
<td>(0.391)</td>
<td>(0.098)</td>
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<td>Industrial Machinery and Computer</td>
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<td>Measuring Instruments;</td>
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<td>(0.294)</td>
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<td>0.215</td>
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<td>1.800</td>
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<td>16.97</td>
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251
Table 4. Random effect Negative Binomial regression results for knowledge-based resource focus and number of alliances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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<td>-2.526</td>
<td>-2.552</td>
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<tr>
<td></td>
<td>(27.457)</td>
<td>(1.683)</td>
<td>(2.121)</td>
<td>(2.215)</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.031*</td>
<td>0.030*</td>
<td>0.031*</td>
<td>0.030*</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.014)</td>
<td>(0.015)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Unrelated Alliances</td>
<td>0.336***</td>
<td>0.343***</td>
<td>0.378**</td>
<td>0.379**</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.086)</td>
<td>(0.125)</td>
<td>(0.133)</td>
</tr>
<tr>
<td>Diversification</td>
<td>2.331**</td>
<td>3.196***</td>
<td>3.299***</td>
<td>3.311***</td>
</tr>
<tr>
<td></td>
<td>(0.830)</td>
<td>(0.933)</td>
<td>(0.923)</td>
<td>(0.927)</td>
</tr>
<tr>
<td>Industry Total Alliances</td>
<td>0.193***</td>
<td>0.165***</td>
<td>0.144**</td>
<td>0.143**</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
<td>(0.051)</td>
<td>(0.051)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>Industry Capital Intensity</td>
<td>6.117</td>
<td>2.757</td>
<td>8.848</td>
<td>8.988</td>
</tr>
<tr>
<td>Knowledge-based Resource Focus</td>
<td>0.636*</td>
<td>0.656*</td>
<td>0.654*</td>
<td>0.654*</td>
</tr>
<tr>
<td></td>
<td>(0.281)</td>
<td>(0.319)</td>
<td>(0.330)</td>
<td></td>
</tr>
<tr>
<td>Industry Growth</td>
<td>-2.907</td>
<td>-2.782</td>
<td>-2.782</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.825)</td>
<td></td>
<td></td>
<td>(2.095)</td>
</tr>
<tr>
<td>Knowledge-based Resource Focus x Industry Growth</td>
<td>-0.035</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.285)</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-122.348</td>
<td>-120.066</td>
<td>-118.883</td>
<td>-118.876</td>
</tr>
<tr>
<td>d.f.</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Change in Log Likelihood over previous model</td>
<td>2.282* (1)</td>
<td>1.18(1)</td>
<td>0.007 (1)</td>
<td></td>
</tr>
<tr>
<td>Number of Firm Years</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
</tr>
</tbody>
</table>

One tailed tests. * $p < 0.10$; ** $p < 0.01$; *** $p < 0.001$. Standard errors are in parentheses
Table 5. Random effect Negative Binomial regression results for knowledge-based resource focus and number of acquisitions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.344 (0.574)</td>
<td>-0.985 (0.601)</td>
<td>-0.998* (0.594)</td>
<td>-1.126* (0.581)</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.018* (0.010)</td>
<td>0.021* (0.011)</td>
<td>0.021* (0.010)</td>
<td>0.018* (0.011)</td>
</tr>
<tr>
<td>Unrelated Acquisitions</td>
<td>0.331*** (0.068)</td>
<td>0.327*** (0.067)</td>
<td>0.328*** (0.067)</td>
<td>0.328*** (0.067)</td>
</tr>
<tr>
<td>Diversification</td>
<td>0.952** (0.346)</td>
<td>0.724** (0.347)</td>
<td>0.721* (0.347)</td>
<td>0.761* (0.348)</td>
</tr>
<tr>
<td>Industry Total Acquisitions</td>
<td>0.032*** (0.008)</td>
<td>0.034*** (0.008)</td>
<td>0.033*** (0.008)</td>
<td>0.033*** (0.008)</td>
</tr>
<tr>
<td>Industry Capital Intensity</td>
<td>-5.599 (5.707)</td>
<td>-4.454 (5.612)</td>
<td>-4.481 (5.604)</td>
<td>-4.987 (5.644)</td>
</tr>
<tr>
<td>Knowledge-based Resource Focus</td>
<td>-0.431** (0.140)</td>
<td>-0.429** (0.141)</td>
<td>-0.497*** (0.144)</td>
<td>0.265* (0.123)</td>
</tr>
<tr>
<td>Industry Growth</td>
<td></td>
<td>0.412 (0.836)</td>
<td>0.556 (0.850)</td>
<td></td>
</tr>
<tr>
<td>Knowledge-based Resource Focus x Industry Growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Log Likelihood                       | -536.542         | -531.425         | -531.303         | -529.060         |
Number of Firm Years                  | 1003             | 1003             | 1003             | 1003             |

One tailed tests. + p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001. Standard errors are in parentheses.
Table 6. Random effect Negative Binomial regression results for property-based resource focus and number of alliances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.662 (27.457)</td>
<td>7.844 (676.838)</td>
<td>8.841 (1124.847)</td>
<td>-0.879 (7.101)</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.031* (0.016)</td>
<td>0.031* (0.016)</td>
<td>0.034* (0.015)</td>
<td>0.032* (0.016)</td>
</tr>
<tr>
<td>Unrelated Alliances</td>
<td>0.336*** (0.077)</td>
<td>0.338*** (0.072)</td>
<td>0.358*** (0.075)</td>
<td>0.363*** (0.078)</td>
</tr>
<tr>
<td>Diversification</td>
<td>2.331** (0.830)</td>
<td>2.301** (0.835)</td>
<td>2.410** (0.836)</td>
<td>2.403** (0.841)</td>
</tr>
<tr>
<td>Industry Total Alliances</td>
<td>0.193*** (0.052)</td>
<td>0.192*** (0.051)</td>
<td>0.173*** (0.051)</td>
<td>0.175*** (0.052)</td>
</tr>
<tr>
<td>Property-based Resource focus</td>
<td>0.501 (1.719)</td>
<td>0.252 (1.707)</td>
<td>-0.481 (1.883)</td>
<td>-0.841 (1.950)</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>-2.886 (1.883)</td>
<td>-3.051 (1.950)</td>
<td>-3.051 (1.950)</td>
<td>-3.051 (1.950)</td>
</tr>
<tr>
<td>Property-based Resource Focus x Industry Growth</td>
<td>-0.237 (0.246)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-122.348</td>
<td>-122.307</td>
<td>-121.191</td>
<td>-120.728</td>
</tr>
<tr>
<td>d.f.</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Change in Log Likelihood over previous model</td>
<td>0.041(1)</td>
<td>1.116(1)</td>
<td>0.463(1)</td>
<td></td>
</tr>
<tr>
<td>Number of Firm Years</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
</tr>
</tbody>
</table>

One tailed tests.  * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. Standard errors are in parentheses.
Table 7. Random effect Negative Binomial regression results for property-based resource focus and number of acquisitions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.344</td>
<td>-0.507</td>
<td>-0.539</td>
<td>-0.550</td>
</tr>
<tr>
<td></td>
<td>(0.574)</td>
<td>(0.601)</td>
<td>(0.592)</td>
<td>(0.596)</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.018*</td>
<td>0.020*</td>
<td>0.019*</td>
<td>0.017*</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Unrelated Acquisitions</td>
<td>0.331***</td>
<td>0.320***</td>
<td>0.321***</td>
<td>0.329***</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.067)</td>
<td>(0.067)</td>
<td>(0.067)</td>
</tr>
<tr>
<td>Diversification</td>
<td>0.952***</td>
<td>0.881*</td>
<td>0.875**</td>
<td>0.884**</td>
</tr>
<tr>
<td></td>
<td>(0.346)</td>
<td>(0.346)</td>
<td>(0.346)</td>
<td>(0.345)</td>
</tr>
<tr>
<td>Industry Total Acquisitions</td>
<td>0.032***</td>
<td>0.033***</td>
<td>0.033***</td>
<td>0.034***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.008)</td>
</tr>
<tr>
<td></td>
<td>(5.707)</td>
<td>(5.918)</td>
<td>(5.915)</td>
<td>(5.983)</td>
</tr>
<tr>
<td>Property-based Resource Focus</td>
<td>1.363*</td>
<td>1.426*</td>
<td>1.477*</td>
<td>1.477*</td>
</tr>
<tr>
<td></td>
<td>(0.689)</td>
<td>(0.695)</td>
<td>(0.698)</td>
<td>(0.836)</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>0.619</td>
<td>0.483</td>
<td>0.483</td>
<td>0.483</td>
</tr>
<tr>
<td></td>
<td>(0.836)</td>
<td>(0.857)</td>
<td>(0.857)</td>
<td>(0.857)</td>
</tr>
<tr>
<td>Property-based Resource Focus x Industry Growth</td>
<td>-0.218*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-536.542</td>
<td>-534.616</td>
<td>-534.341</td>
<td>-532.224</td>
</tr>
<tr>
<td>d.f.</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Change in Log Likelihood over previous model</td>
<td>1.926*(1)</td>
<td>0.275(1)</td>
<td>2.117*(1)</td>
<td></td>
</tr>
<tr>
<td>Number of Firm Years</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
</tr>
</tbody>
</table>

One tailed tests. + p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001. Standard errors are in parentheses.
Table 8. Linear regression results of knowledge-based resource focus and number of alliances and acquisitions on return on assets

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 (Alliances)</th>
<th>Model 2 (Alliances)</th>
<th>Model 3 (Acquisitions)</th>
<th>Model 4 (Acquisitions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>23.140</td>
<td>22.846</td>
<td>49.706*</td>
<td>35.736</td>
</tr>
<tr>
<td></td>
<td>(18.091)</td>
<td>(18.096)</td>
<td>(22.825)</td>
<td>(21.801)</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.493</td>
<td>0.509</td>
<td>0.444</td>
<td>0.439</td>
</tr>
<tr>
<td></td>
<td>(0.630)</td>
<td>(0.631)</td>
<td>(0.684)</td>
<td>(0.673)</td>
</tr>
<tr>
<td>Unrelated Alliances/Acquisitions</td>
<td>69.237***</td>
<td>68.575***</td>
<td>7.463</td>
<td>9.819*</td>
</tr>
<tr>
<td></td>
<td>(4.618)</td>
<td>(4.672)</td>
<td>(5.225)</td>
<td>(5.155)</td>
</tr>
<tr>
<td></td>
<td>(20.438)</td>
<td>(20.442)</td>
<td>(22.734)</td>
<td>(22.121)</td>
</tr>
<tr>
<td>Industry Total Alliances/Acquisitions</td>
<td>-11.688***</td>
<td>-11.633***</td>
<td>1.011</td>
<td>1.383*</td>
</tr>
<tr>
<td></td>
<td>(1.965)</td>
<td>(1.966)</td>
<td>(0.626)</td>
<td>(0.605)</td>
</tr>
<tr>
<td>Industry Capital Intensity</td>
<td>90.611</td>
<td>96.095</td>
<td>-970.611***</td>
<td>-831.447***</td>
</tr>
<tr>
<td></td>
<td>(272.331)</td>
<td>(272.401)</td>
<td>(299.288)</td>
<td>(294.107)</td>
</tr>
<tr>
<td></td>
<td>(8.513)</td>
<td>(8.516)</td>
<td>(10.011)</td>
<td>(9.527)</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>9.227</td>
<td>9.462</td>
<td>64.404*</td>
<td>57.592</td>
</tr>
<tr>
<td></td>
<td>(34.333)</td>
<td>(34.334)</td>
<td>(36.876)</td>
<td>(36.265)</td>
</tr>
<tr>
<td>Knowledge-based Resource Focus x Industry Growth</td>
<td>8.028</td>
<td>8.007</td>
<td>7.291</td>
<td>7.224</td>
</tr>
<tr>
<td></td>
<td>(5.088)</td>
<td>(5.088)</td>
<td>(5.578)</td>
<td>(5.467)</td>
</tr>
<tr>
<td>Total Alliances/Acquisitions</td>
<td>-13.327</td>
<td>50.796***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(14.372)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-Statistic</td>
<td>290.87***</td>
<td>291.70***</td>
<td>18.20*</td>
<td>87.190***</td>
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<tr>
<td>d.f.</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>R²</td>
<td>0.311</td>
<td>0.311</td>
<td>0.007</td>
<td>0.150</td>
</tr>
<tr>
<td>Change in R squared over previous model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Firm Years</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
</tr>
</tbody>
</table>

One tailed tests. * p < 0.10; * * p < 0.05; * * * p < 0.01; ** * * * p < 0.001. Standard errors are in parentheses
Table 9. Linear regression results of property-based resource focus and number of alliances and acquisitions on return on assets

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Alliances)</td>
<td>(Alliances)</td>
<td>(Acquisitions)</td>
<td>(Acquisitions)</td>
</tr>
<tr>
<td>Intercept</td>
<td>39.254*</td>
<td>39.078*</td>
<td>69.729***</td>
<td>55.121**</td>
</tr>
<tr>
<td>Past Performance</td>
<td>0.437</td>
<td>0.445</td>
<td>0.406</td>
<td>0.369</td>
</tr>
<tr>
<td></td>
<td>(0.630)</td>
<td>(0.631)</td>
<td>(0.685)</td>
<td>(0.673)</td>
</tr>
<tr>
<td>Unrelated Alliances/Acquisitions</td>
<td>68.856***</td>
<td>68.186***</td>
<td>7.643</td>
<td>10.280*</td>
</tr>
<tr>
<td></td>
<td>(4.615)</td>
<td>(4.674)</td>
<td>(5.226)</td>
<td>(5.152)</td>
</tr>
<tr>
<td>Diversification</td>
<td>16.063</td>
<td>15.914</td>
<td>-15.728</td>
<td>-6.314</td>
</tr>
<tr>
<td></td>
<td>(20.221)</td>
<td>(20.224)</td>
<td>(22.531)</td>
<td>(21.891)</td>
</tr>
<tr>
<td>Industry Total Alliances/Acquisitions</td>
<td>-11.734***</td>
<td>-11.677***</td>
<td>0.891</td>
<td>1.291*</td>
</tr>
<tr>
<td></td>
<td>(1.967)</td>
<td>(1.968)</td>
<td>(0.625)</td>
<td>(0.603)</td>
</tr>
<tr>
<td>Industry Capital Intensity</td>
<td>148.711</td>
<td>153.559</td>
<td>-862.681**</td>
<td>-778.988**</td>
</tr>
<tr>
<td></td>
<td>(277.385)</td>
<td>(277.501)</td>
<td>(308.031)</td>
<td>(302.111)</td>
</tr>
<tr>
<td></td>
<td>(44.549)</td>
<td>(44.549)</td>
<td>(50.957)</td>
<td>(49.008)</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>16.868</td>
<td>17.174</td>
<td>70.511</td>
<td>65.258*</td>
</tr>
<tr>
<td></td>
<td>(34.581)</td>
<td>(34.593)</td>
<td>(37.124)</td>
<td>(36.483)</td>
</tr>
<tr>
<td>Property-based Resource Focus x Industry Growth</td>
<td>-0.078</td>
<td>-0.122</td>
<td>1.019</td>
<td>1.426</td>
</tr>
<tr>
<td></td>
<td>(4.477)</td>
<td>(4.479)</td>
<td>(4.901)</td>
<td>(4.802)</td>
</tr>
<tr>
<td>Total Alliances/Acquisitions</td>
<td>-13.731</td>
<td>-13.731</td>
<td>51.442***</td>
<td>51.442***</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>287.14***</td>
<td>287.98***</td>
<td>16.76*</td>
<td>87.17***</td>
</tr>
<tr>
<td>d.f.</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>R²</td>
<td>0.305</td>
<td>0.304</td>
<td>0.003</td>
<td>0.146</td>
</tr>
<tr>
<td>Change in R squared over previous model</td>
<td>-0.001 (1)</td>
<td></td>
<td>0.143*** (1)</td>
<td></td>
</tr>
<tr>
<td>Number of Firm Years</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
<td>1003</td>
</tr>
</tbody>
</table>

One tailed tests.  * p < 0.10;  * * p < 0.05;  * * * p < 0.01;  * * * * p < 0.001. Standard errors are in parentheses.
REFERENCES


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