

**A STUDY OF ALLIANCE FORMATION AND ALLIANCE MODE
CHOICE FOR NON-EQUITY STRATEGIC ALLIANCES IN THE HIGH
TECHNOLOGY SECTOR**

by

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Submitted in partial fulfillment of
the requirements for the degree of
Masters in Business Administration

Faculty of Graduate Studies
University of Ottawa
Ottawa, Ontario
September 1996

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ISBN 0-612-19994-0

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ABSTRACT

Firms are increasingly relying on strategic alliances as tools by which to accomplish their strategic objectives. Alliances in the high technology industry are used to cope with internationalization, increasing technological complexity, increasingly rapid rates of technological changes, and intense competition on a global scale (Bettis and Hitt 1995; Prahalad and Hamel 1994; Ohmae 1989). Strategic alliances take on multiple forms from equity based joint ventures, minority equity investments, to non-equity based alliances, to licensing arrangements. Previous alliance research has focused predominantly on equity based alliances and joint ventures. This dissertation focuses on non-equity strategic alliances in the high technology sector.

The objective of this research was to broadly study the topic of non-equity strategic alliances in the high technology sector. The *a priori* assumptions were that non-equity alliances were different, and that treatment of non-equity alliances in high technology firms was different from other industries. The objectives of the study were to understand: a) why are non-equity alliances chosen in the high technology sector; b) what roles do strategy and core competencies play in the choice of non-equity alliances; and c) what role do technology and market factors play in high technology alliances?

This study investigated twelve alliance formation decisions among three firms in the Ottawa-Carleton Region, in Ontario, Canada. The firms in the sample ranged in size from \$150 million in annual revenues, to more than \$10 billion. The partner organizations reflected an international scope with headquarters in Japan, Europe and North America. The sample covered non-equity strategic alliances formed from 1990 to 1996.

The research was based on a blended approach of grounded theory development and traditional verification techniques. Alliance research is a relatively new topic in the management literature, with the bulk of the existing research focused on equity based alliances. While this research provided a theoretical basis, there was relatively little

coverage of non-equity alliances. Larson (1992) performed one of the few alliances studies with an exclusive focus on the non-equity mode.

Several techniques were used to address the research study. The principal technique used to study alliance formation and mode choice was through the calculation and analysis of frequencies. The quantitative analysis was supplemented with qualitative information gathered through the interviews.

The research study confirmed a relationship between the uncertainties in technology and the market, to both alliance formation and non-equity mode choice. Further, the research established a relationship between time-to-market and non-equity alliance formation. In addition, by looking at market, technology, and time-to-market a more integrative, multi-dimensional view of alliance formation was possible.

Additionally, the results of this study indicate that partner considerations play a fundamental role in the mode choice of non-equity. This was in contrast to previous studies suggesting environmental uncertainty was a primary factor in mode choice.

The results indicated that non-equity alliances are different from the more traditional equity based alliances. The research also suggested that the high technology sector may treat non-equity alliances differently than other industry sectors.

Non-equity alliances in high technology exhibited lower levels of trust to what are expected in more traditional alliance forms. While the results showed that firms considered alliance as important and critical elements of their business strategy, there was also a tendency for non-equity alliances not to participate in core activities. The results also suggest a tendency to limit the access to alliance partners in some fashion. The results are indicative of the importance high technology firms place on their technological assets and knowledge.

ACKNOWLEDGMENTS

There are a number of grateful acknowledgments to be noted to mark the completion of this dissertation. An effort of such magnitude is impossible without the support and assistance of numerous people and organizations.

I am grateful to the Faculty of Administration at the University of Ottawa, which has provided a stimulating environment conducive to learning and exploration in the study of management and business. Special thanks to Diane Sarrazin in the MBA office for her help and guidance through the administrative aspect of this dissertation process.

I extend my thanks and whole hearted appreciation to the numerous executives who took the time to be interviewed for this research. Their openness, candor and patience was a significant contribution to this research. Their anonymity does not diminish their contribution.

My thanks to Newbridge Networks Corporation, my employer, for supporting me in my part-time studies. Special thanks are in order to Michelle Van Tol and Jim Arseneault in their patience and flexibility, especially during the last few weeks of completing this effort. Without their support and understanding this effort may not have been realized. I also extend my thanks to the numerous colleagues at Newbridge who provided a stimulating environment in which to debate the topic of alliances, and the insights they added to my understanding.

There are four people without whom this dissertation would have been impossible. Dr. Jonathan Calof, my thesis advisor, was instrumental in coaching me through the dissertation process. He has made the work interesting, challenging and exciting. His encouragement, tenacity, and enthusiasm helped me to get through this learning process. He has taught me not only how to do research, but also the value of research. To this end I am grateful and hope to continue my association and learning from Jonathan. My children, Brianna and Ryan, have been very supportive in this effort to complete my thesis. They have tried to understand what I was doing, and even though

they weren't really sure, they helped tremendously with their patience and by "letting Dad do his thesis." Most significantly, my sincerest appreciation has to go to my wife Carol. She has helped in so many ways, but most of all she was a constant source of encouragement and support. To Carol I extend my sincerest appreciation and dedicate this thesis.

Ralph Michaelis,
13 September 1996
Ottawa, Ontario

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1. INTRODUCTION

1.1 Overview

Strategic alliances are tools, used by firms to implement strategy. In the current environment of internationalization, increasing technological complexity, rapid rates of technology change and evolution, and intense competition on a global scale, firms are looking at all options with which to better compete. One of the options open to a firm is to search for other firms with complementary skills in order to exploit opportunities for collaboration.

By their general nature and potential scope of application, alliances must be viewed as general purpose strategic tools that can be used to accomplish a wide variety of strategies. Consider a sampling of the intent, scope and purpose of alliances as portrayed in the literature: Hamel (1991) describes alliances as vehicles for organizational learning; Beamish and Banks (1987) portray alliances as vehicles for globalization and overseas expansion; Nanda and Williamson (1995) suggest alliances can be used to increase the value of, and decrease the risk of a divestiture; Ohmae (1989) portrays alliances as vehicles to address issues of globalization and internationalization; Ouchi and Bolton (1988) portray alliances as joint R&D opportunities; McFarlan and Nolan (1995) suggest alliance models are appropriate for outsourcing; and Buzzell and Ortmeier (1995) suggest alliances can help to streamline channel and distribution issues. In short, the opportunities to use alliances to whatever benefit or strategic intent is virtually boundless.

The objective of this research was to broadly look at the topic of non-equity strategic alliances in a context of the high technology sector. Specifically, the key objectives are:

- Why are non-equity alliances chosen in the high technology sector?
- How are strategy and core competencies associated the choice of non-equity alliances?

- How are technology and market factors associated with high technology alliance formation?

These issues are of considerable importance in the area of alliance research. The bulk of alliance research is directed towards the joint venture form of alliances - commonly understood to be equity based (Tallman and Shenkar 1994; Harrigan 1988a; Beamish and Banks 1987). This research attempts to establish a basis for non-equity alliance research as it is assumed this form of alliance is actually a comparable form of alliance in the high technology sector. Non-equity alliances need to be positioned alongside equity joint ventures as important forms of firm partnering vehicles. The fact that the equity alliance is more dominant in the literature should not be taken as a signal of its relative importance. As Yoshino and Rangan (1995) and Schaan and Farrell (1995) have suggested, alliance structure receives considerable attention by managers, but it is unclear how the mode choice is made within the firm, nor what the primary influences on this decision are.

1.2 The Research Model: Non-Equity Alliances

The research model is based on existing models from the literature, with the bulk of the model derived from Yoshino and Rangan (1995). Yoshino and Rangan focus on both equity and non-equity alliance forms in their book. Refinements to the model are from Kanter (1994) and Mintzberg (1994). As the majority of the existing literature is based on equity alliances, this research will extend the model to incorporate non-equity alliances in the high technology sector. Previous research has not focused on non-equity strategic alliances, and not specifically in the high technology sector.

Figure 1.1 presents a synthesized model. The backdrop is a well used strategy model from the literature (Mintzberg 1994; Fry and Killing 1989; Calof 1991). In this aspect the strategy model establishes the relationships of the internal environment, external environment, and strategic objectives to the strategy formulation process. This is referenced by Yoshino and Rangan (1994), but they focus their descriptive model specifically on alliances by suggesting alliance formation is an element of strategy formulation, and that alliance structure is a result of alliance formation.

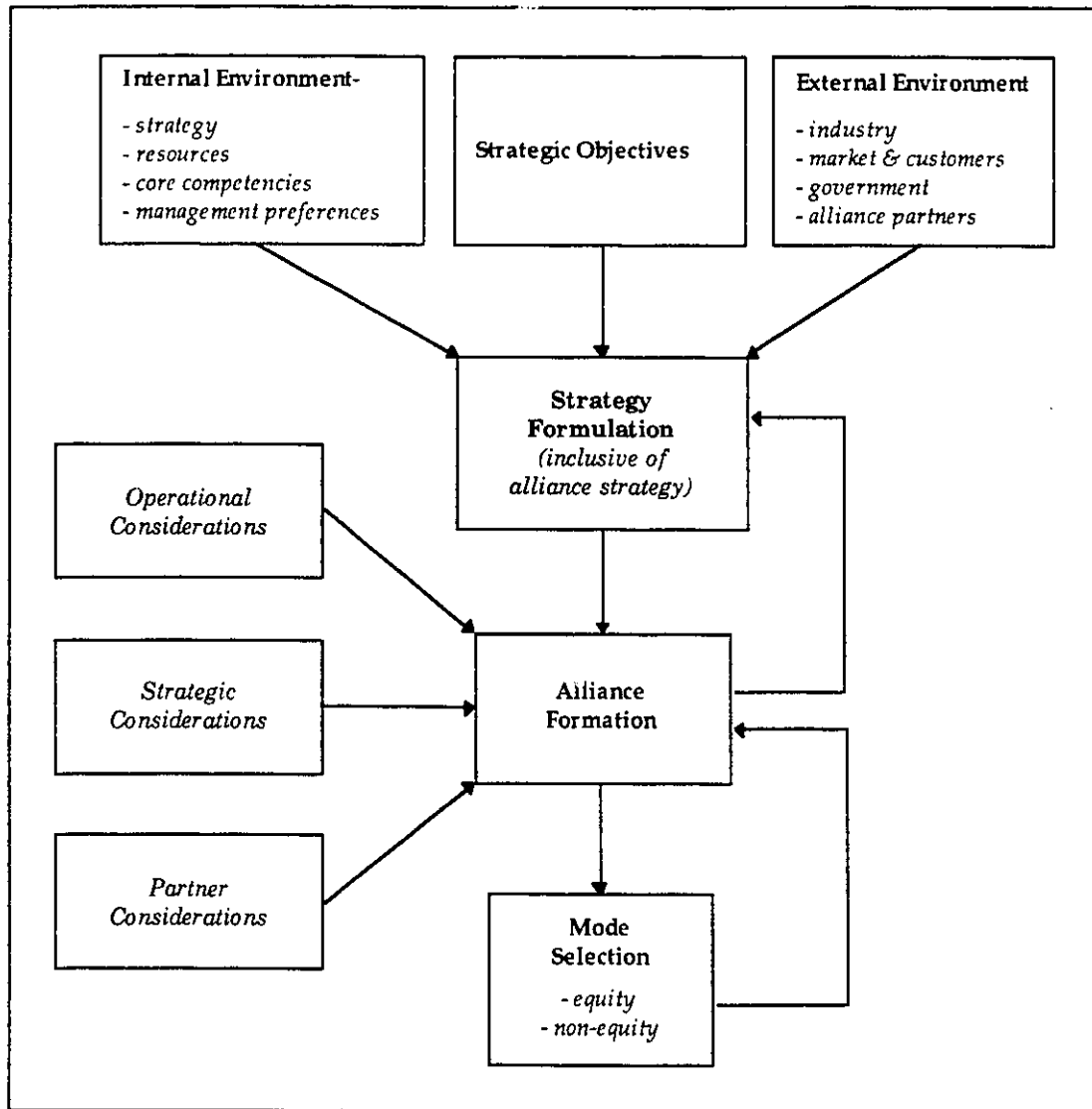
The basis of this model is that the alliance structure is a function of the alliance formation process, which in itself is a function of strategy formulation. The model states that:

- Alliance structure is an outcome or result of the process of forming an alliance.
- Strategic, operational and partner considerations influence the formation of an alliance, and are key influences in the resulting structure of an alliance.
- There is a feedback loop from the alliance formation process to the strategy formulation process: how an alliance is formed, with whom, and all the other considerations that go into alliance formation can and does impact the resultant strategy.

As Yoshino and Rangan (1995) suggest, alliance structure is a result or outcome of the strategy formulation and alliance formation processes. Managers are faced with the challenge of forming an alliance based on certain considerations. An outcome of that process is a structure that meets the strategic requirements and the operational requirements of both partners. Managers do not go into an alliance with the aim of creating an equity or non-equity alliance, but rather with the aim of furthering their own strategic objectives (Yoshino and Rangan 1995).

According to Yoshino and Rangan (1995), the process of forming an alliance structure is a result of strategic and operational considerations. The three factors identified under the strategic category are; the alignment of the alliance strategy with the long term strategy, the strategic interdependence of the partners, and the role that organizational learning will play in the alliance. The operational considerations identified relate mainly to the costs of running the alliance, in which of course structure can have a major impact. Kanter (1994) suggests careful consideration must also be made for managing the relationship aspects of an alliance. The inference made is that as an alliance is forming, and being structured, the consideration of the partner plays a very significant role that cannot be ignored.

Figure 1-1: Non-Equity Alliance Model



The relationships used in the model are primarily those that relate the external factors of market, technology and time-to-market to alliance formation through the strategy formulation process, and similarly, the internal factors of strategy and core competencies to alliance formation through strategy formulation. These are the relationships explored in the research.

The final point, based on Mintzberg (1994), that as the alliance forms, the outcome or end structure is not always entirely predictable. What one firm sets out to do with an alliance is not always the result it ends up with. In Mintzberg's terminology, a strategy

starts out as a deliberate strategy. Factors outside of the firm's control, for example a prospective partner, influence that strategic direction with their own strategic direction (or it may just come from the environment). This is known as emergent strategy. Finally, the combination of emergent strategy and deliberate strategy gives us realized strategy. In the model this is represented by the feedback loop from alliance formation to strategy formulation.

Throughout this dissertation there are two decisions referenced: the alliance formation decision and the alliance mode selection. The formation decision is the decision, as referenced in the model, that undertakes or signals to management to form an alliance to address a particular situation or environmental situation. This dissertation did not investigate the partner selection decision, although it is acknowledged this decision may be coincident with the formation decision. The mode selection is the decision process by which the alliance mode, equity or non-equity, is chosen. Again, there is no assumption made as to when in the sequence this decision happens, only that it is a distinct occurrence and decision with its own identifiable drivers. This dissertation focuses on measuring decision influences rather than processes.

1.3 Core Propositions

The basic proposition surrounding strategic alliances in the high technology sector is that while the industry sector is not radically different than other industry sectors, there is a higher concentration of the competitive forces and environmental factors that come to bear on this sector (Bettis and Hitt 1995; Prahalad and Hamel 1994). The high technology sector may see, and thus respond to these forces earlier, and perhaps more comprehensively than in other sectors. High technology is also immersed in the trends and issues such as time based competition, globalization, internationalization, and high rates of technology diffusion.

The key factors that the firm considers are how the alliance strategy relates to the following factors:

- P-1 A high degree of market uncertainty is associated with non-equity alliance formation.

- P-2 A high degree of technology uncertainty is associated with non-equity alliance formation.
- P-3 Time-to-market pressures are associated with non-equity alliance formation.
- P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm.
- P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.

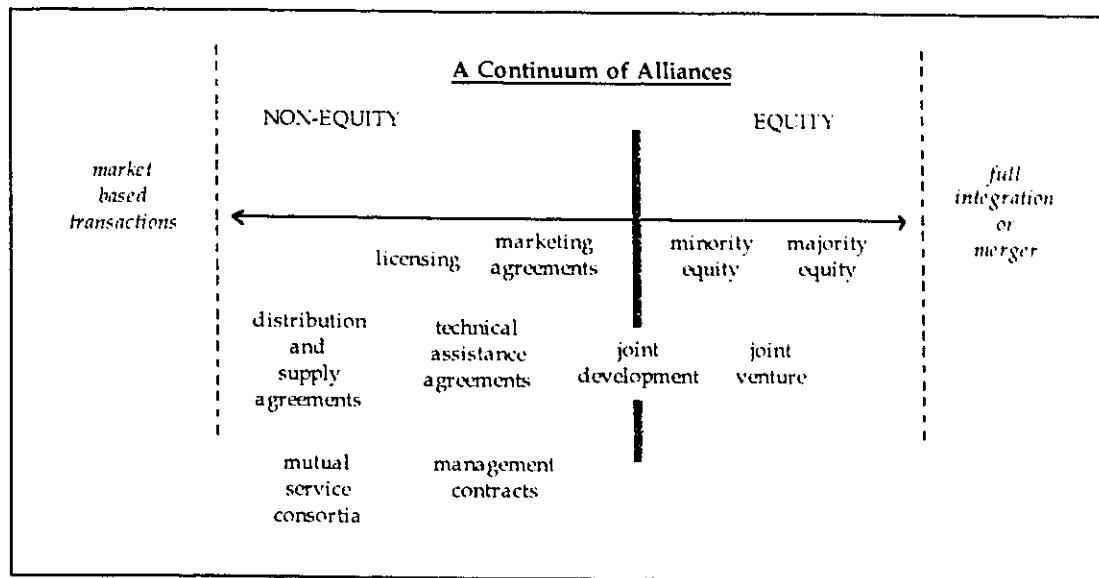
1.4 Definition of a Strategic Alliance

This section introduces a definition of the non-equity strategic alliance to be used throughout this research. The definition is an important reference in selection of the sample frame, and generally sets the frame of reference for the research.

The literature is replete with definitions of strategic alliances, but most of these are focused on international equity joint ventures (Geringer 1991; Beamish and Banks 1987; Parkhe 1991; Gomes-Casseres 1989; Perlmutter and Heenan 1986). An important part of this research is to extend the definition beyond this narrow realm.

Alliances are an organizational form that fall somewhere in between a pure hierarchy and a market based transaction (Williamson 1975). Using the market-hierarchy structure identified by Williamson (1975) as a reference, Figure 1-2 depicts a continuum between the pure market based transaction and a fully integrated hierarchy. It is stated as a continuum because at this time there is no structure suggested to clearly segment and position these alliances. The only clear demarcation is the transition from non-equity to equity, which is easily measured.

Figure 1-2: Strategic Alliance Definition and Positioning



There are reasons why an alliance is considered more than a market based transaction. Pucik (1988) suggests strategic alliances leverage both resources and competencies. Hamel (1991) suggests collaboration is a vehicle for organizational learning, and thus acquisition of new skills and competencies are the strategic intent. As competencies are fundamentally knowledge based and tacit in nature, they cannot be purchased or easily priced (in a market sense), and thus can only be appropriated over time. While this knowledge transfer is a transaction (Hamel 1991; Kanter 1994), it is clearly not a market transaction as defined by Williamson (1975).

There is also clearly some distance between the alliance form and full integration. Yoshino and Rangan (1995) state in their definition that alliance partners must remain independent subsequent to the formation of the alliance, regardless of equity or non-equity structure. Thorelli (1986) and Miles and Snow (1986) suggest this intermediate form of organization be labeled as a network. Osborn and Baughn (1990) suggest a non-equity alliance is "quasi-market", and an equity alliance is "quasi-hierarchy". Klein and Zif (1994) see the alliance as "lying in the middle of a contractual continuum". As is evident from the literature, there has been difficulty in succinctly defining the form of this intermediate structure of organization.

Therefore, for the purposes of this research, a non-equity strategic alliance shall be defined¹ as:

- two or more firms agree to pursue a set of common goals, yet remain independent, and do not exchange or pool equity subsequent to the formation of the alliance,
- partner firms share the benefits and risks of the alliance, and jointly control of the performance of the agreed upon activities
- the alliance contributes, on a continuing basis, to one or more key strategic areas (e.g. technology, products, process), and these transactions are beyond the realm of simple market transactions.

One other term used frequently throughout the research is *alliance formation*. For the purpose of this research, *formation* signals that an alliance has progressed to the stage in which there is some level of formal agreement: a jointly authored and agreed letter of intent, a memorandum of understanding, or equivalent. This formalizes the degree of understanding between the partners about the objectives of the alliance, and about the operating framework. It is also typically a precursor to a more extensive and definitive set of agreements governing a broader set of aspects of the alliance.

1.5 Rationale for the Dissertation

There is a managerial imperative behind this research in that it would provide managers insight into how non-equity alliances are formed. Alliances are becoming an increasing mode used by firms to enhance their competitiveness. Alliances are a very flexible form of organization, and thus understanding the constraints and pitfalls will essentially help a firm get there more effectively.

The academic rationale is that it introduces a rarely investigated topic - non-equity alliances - into the alliance research stream. While this is a very difficult area to measure and quantify as the research will show, it is nonetheless a quickly emerging component in the firm's and manager's strategic toolbox. Understanding the formation factors

¹ A substantial part of the definition is derived from Yoshino and Rangan (1995).

behind non-equity alliances will help academics to better understand the alliance formation process and how loosely coupled organizations are evolving.

1.6 Significance of the Research

This research extends and complements prior research in a number of important ways.

Most of the previous research focuses on equity based alliances. This research begins to extend the scope of alliance research by focusing on the non-equity form. The non-equity mode of alliances has not extensively been covered in the existing research (Tallman and Shenkar 1994).

Much of the existing alliance formation theory is grounded in transaction cost economics. This research presents an alternate view of alliance formation based on strategic considerations. Alliance formation, as posited in this dissertation, is significantly influenced by a firm's environmental factors, and driven manager's perceptions and interpretation of these environmental factors.

Previous research has focused on external determinants of the typology selection (Harrigan 1988a; Auster 1992; Schaan and Farrell 1995). This prior research has considered industry stage of evolution, industry environment, level of investment, market factors, technology factors as predictors of alliance mode. This research complements these prior findings by considering the managerial decision factors internal to the firm - what factors influence managers to form alliances and make the mode choice decisions.

From a business perspective this research will provide:

- insight into factors affecting non-equity alliance formation and mode selection,
- a basis for understanding the phenomenon of non-equity alliances, and their role relative to equity based alliances,

1.7 Limitations and Caveats

There are a number of limitations affecting the generalizability of the research findings.

First, the sample size of twelve limits the inferences that can be made within a larger population. However, this is a reasonable sample size for the area of strategy research.

Second, the focus on a high technology within the research sample controls the impact of external factors.

Third, all alliance cases were from firms with a presence in the Ottawa-Carleton region of Ontario, Canada. There were three firms overall in the sample. It is unknown whether this sample is representative of a larger population.

Fourth, all data collected was based on manager's perceptions of past events. While both Geringer (1991) and Hambrick (1980) have shown this a valid method of data collection, the extent to which these observations reflect objective conditions is unknown.

Fifth, as the research methodology contained a strong element of grounded theory development, the theory developed can at best be viewed as a substantive model, and therefore the generalizability is limited. Significantly more research is required to generate formal theory.

These limitations were addressed as comprehensively as possible within the thesis. Steps were taken to ensure as broad a sample as possible within the constraints identified. Anonymity for the respondents generally encouraged candor in exposing the underlying themes within particular case studies.

1.8 Organization of the Thesis

This thesis is organized into five main chapters. Chapter 2 presents the literature review relevant to each proposition. Chapter 3 presents an overview of the methodology used for this research, including a discussion of the research design, the research instrument, definition of the sample frame, data collection, organization and analysis techniques. Chapter 4 reviews the findings resulting from the analysis. Chapter 5 presents a

summary of the findings, coupled with resulting conclusions and recommendations for further research topics.

There are two appendices included covering the inclusion of the instrument used to conduct the research. Appendix A presents the cover letter used to introduce the research topic and solicit support from executives. Appendix B presents the interview guide / questionnaire.

2. A REVIEW OF THE LITERATURE

2.1 Introduction

This section reviews the existing literature as it pertains to the thesis propositions. The market factors influencing alliance formation and mode selection are reviewed in Section 2.2. Following in Section 2.3 the influence of technology factors on alliance formation are reviewed. In Section 2.4 the time-to-market factors for Proposition P-3. Section 2.5 and 2.6 looks at the topic of strategy and core competencies as they relate to alliances, covering Propositions P-4 and P-5 respectively.

2.2 Literature Review of Market Uncertainty (Proposition P-1)

Market factors have been generally been established in the literature as determinants to both alliance formation, and to a lesser degree, selection of alliance mode. The market determinants of alliance formation and alliance modes are segmented in two ways in the literature: the macro view of why alliances are forming (Ohmae 1989; Osland and Yaprak 1995), and the micro view that is much more direct (referenced below). Market factors broadly encompass competitive factors, market and customer issues, and distribution and channel factors as considerations.

This literature review of the market uncertainty factors will focus primarily on the latter - the micro view - simply because the relationship between market uncertainty and alliance mode choice is more clearly established.

The study that most closely parallels this research study is the one performed by Larson (1992). Larson's research² consisted of seven alliances between entrepreneurial firms, five of which were identified as high technology, non-equity alliances. The market environmental factors were characterized as "turbulent and uncertain". The findings were that non-equity worked well in this type of environment as there was more flexibility inherent in the non-equity form of governance. Larson also placed significant

² This was also one of the few studies referenced that used grounded theory development (Glaser and Strauss 1967).

importance on the elements of reciprocity and trust in a non-equity relationship, as a proxy for control. Thus, a study with a smaller sample size, but highly related, established a link between market uncertainty and non-equity. The research for this dissertation focused exclusively on high technology and non-equity.

One of the most extensive studies was done by Harrigan (1988a), which included both equity and non-equity alliances, but did so on a broad category of industries. Harrigan's research established a relationship between demand uncertainty and alliance mode - high demand uncertainty indicated a greater tendency to use of cooperative agreements³. Her study used demand uncertainty as a general proxy for market uncertainty, which was appropriate considering the diversity of her sample. High demand uncertainty is also suggested as a generalized attribute of the high technology sector by Harrigan. This article had a strong influence on establishing the first proposition. Harrigan's study was very broad in nature, and she used industry data to measure demand uncertainty. This research measures uncertainty in a different manner, and is focused specifically on high technology, non-equity alliances.

Schaan and Farrell's (1995) study is focused on high technology, but includes both equity and non-equity, and focused on the international domain. The research by Schaan and Farrell includes market uncertainty as a variable, uses Harrigan's (1988a) demand uncertainty as a dimension, and adds uncertainty about the local environment as another dimension. Schaan and Farrell also suggest a relationship between higher market uncertainty and risk, and the tendency to form non-equity alliances.

In another article, Harrigan (1987b) suggests alliances in embryonic industries strongly favour the choice of the non-equity mode. Embryonic industries, according to Harrigan, are characterized by highly uncertain environments, and an internal infrastructure that is less formal, and less suited to the more formal joint venture mode. Certain firms and sectors within the general high technology industry could be considered embryonic, but that is complemented by well-established firms such as IBM and Hewlett Packard. However, the linkage of market uncertainty and non-equity is reinforced again by Harrigan.

³ Harrigan (1988a) uses the term cooperative agreements instead of non-equity alliances, and for the

Auster's (1992) tends to reinforce the relationship between uncertainty and non-equity, but in a less direct manner. Rather than characterize alliances by equity and non-equity, she uses the dimension of resource investment⁴. Auster's characterization of uncertainty tends to not be confined to market uncertainty, but rather a general sense of uncertainty including market, technology and partner.

Hagedoorn (1993) found that market access and market restructuring were strong motives for "strategic technology partnerships". Market access and restructuring are broader classifications than market uncertainty, but as Hagedoorn's study suggests it is the nature and speed of change in these technology areas that are causing firms to seek out alliances. The inference between market uncertainty and non-equity is less direct as Hagedoorn generally includes all modes of partnering in his research.

Prahalad and Hamel (1994), in a more macro view of competition, suggest a phenomenon known as "pre-market competition" exists, and is becoming crucial in some fast moving industries and market sectors. Prior research suggested a market had to exist in order to analyze the competition. However, in some areas such as the anticipated convergence between telecommunications and entertainment, where no firm market has yet been established, there is certainly a great deal of pre-competitive competition and significant alliance activity (Arnst and Mandel 1996). Pre-market competition reinforces the link between market uncertainty and alliance creation, but does not specifically suggest the non-equity mode choice.

In summary, the literature strongly supports the relationship between market uncertainty and alliance creation. Therefore,

P-1 A high degree of market uncertainty is associated with non-equity alliance formation,

is a proposition generally supported by the literature and prior research findings.

purposes of this dissertation they are assumed to mean the same thing.

⁴ Auster (1992) defines a continuum bounded by HRILs (High Resource Investment Linkages) and LRILs (Low Resource Investment Linkages) as a way of defining alliances. For the purpose of this research, LRILs are assumed to translate to non-equity alliances, HRILs translate to equity alliances.

2.3 Literature Review of Technology Uncertainty (Proposition P-2)

Technology factors have also been established in the literature as determinants of alliance formation, but the literature is *less* conclusive in the influence on alliance mode choice. There are a small number of studies that establish a relationship between technological uncertainty and mode selection. Additionally, there are two broad themes in the literature beyond the specific research findings, that support the derivation of this proposition. First, the literature clearly reflects the speed and magnitude of change in the technology arena. Second, there is strong acknowledgment that no one firm can own, control, or create all the necessary and diverse technologies that are required to compete in today's environment⁵.

In a high technology alliance, partners look for technologies, skills and competencies that are not within the current purview of their own firm in order to compete more effectively (Harris et al. 1996; Hamel 1991). Technology confers a very fragile competitive advantage on a firm, especially where people are at the source of the technological advantage (Harrigan 1988a). There is a stronger ownership tendency for firms when technology assets are the subject of an alliance (Kogut 1988a).

Osborn and Baughn (1990) performed an analysis of technology factors as they relate to alliance formation and mode selection. They established a technological intensity⁶ metric, which was a proxy for uncertainty - a higher technological intensity is likely to reflect higher uncertainty. Osborn and Baughn (1990) also related a high technological uncertainty to the choice of non-equity where technological positioning was a consideration⁷. While this study did focus on technology as a determinant in alliance formation, it did include equity and non-equity. This was a strong influence in the generation of the second proposition.

⁵ Both of the statements regarding "speed of technological change" and "technology ownership and control" are supported by the same articles. Example references are Ohmae (1989), Prahalad and Hamel (1994), Bettis and Kitt (1995).

⁶ Refer to Section 3.3.2 for a definition.

⁷ Technological positioning, as identified by Osborn and Baughn (1990), is a phenomenon whereby firms are interrelated by the technology they are developing. Examples given are high definition television, nuclear power, and VCR development. Thus, in this network firms tend to position themselves in a loosely coupled network. This is in contrast to joint R&D, which is a different scenario.

Hagedoorn and Narula (1996) and Schaan and Farrell (1995) also established that a higher technological risk and uncertainty were related to a higher tendency to form a non-equity alliance. Both studies focused on technology alliances in the international domain. Hagedoorn also found that a larger proportion of international strategic technology alliances tended to be formed around non-equity.

Ring and Van de Ven (1992), in assessing the general subject of risk and uncertainty, found that greater risk tended to imply a more complex the governance structure. An equity relationship is considered a more complex governance structure than non-equity. Ring's findings, which are supported in Osborn and Baughn (1990), suggest an intensive R&D collaboration, which require higher levels of commitment, will more likely be supported by an equity based alliance. Therefore, the literature is suggesting that besides technological uncertainty, the type or intensity of technology development may also be a determinant in the alliance mode choice.

Hagedoorn (1993) established one of the key motives for entering into an alliance is technology monitoring, and market entry as a function of technology. Hagedoorn found that firms tended to use alliances to monitor the manner in which firms were exploiting new technologies, and also for how technologies were converging. Hagedoorn found, in support of Ring and Van de Ven (1992), that complex alliances favoured complex governance forms (i.e. equity).

Auster (1987) found that there was a relationship between non-equity alliances and the stage of evolution of the firm. She found that firms that participating in emerging technology industries tended to focus on non-equity arrangements because they were simpler and allowed more flexibility. Emerging firms typically has to deal with volatile environments, convergence of technologies, and divergence of products.

Ohmae (1989) establishes an argument that the rapid dispersion of technology is a major factor in alliance formation. The fact that there are so many critical technologies in today's products, coupled with the fact that firms cannot maintain a cutting edge lead in all of these technologies, imply that no one organization can control the technologies.

In summary, for technological uncertainty, there is support through a small number of studies, between technology uncertainty and non-equity alliance mode choice. Therefore:

P-2 A high degree of technology uncertainty is associated with non-equity alliance formation,

is a proposition supported by the literature and prior research findings.

2.4 Literature Review of Time-to-Market Factors (Proposition P-3)

Time-to-market is portrayed in the literature as a strong determinant of, and a rationale for, alliance formation, and yet there are few studies that directly measure the impact of time-to-market. Time-to-market is referenced in both anecdotally, and as a result of apparent deductive reasoning. In taking all of this into consideration, there is strong support in the literature for the time-to-market proposition within this dissertation.

In the article by Jonash (1996), improving time-to-market is stated as a principal factor in alliance formation. "Partners can add considerable value through resources and skills, which can reduce substantially the costs and time frames" (Jonash 1996).

The article by Bettis and Hitt (1995) succinctly states nature of technological changes, and the speed with which firms must react in high technology. Bettis proposes a "self reinforcing technology diffusion model" which in effect supports the essence of why time-to-market is important. Paraphrasing Bettis; "speed of diffusion results in increased speed of technological change; increased speed of change necessitates more rapid acquisition of technology, which in turn reinforces diffusion increasing behaviour". While this model helps explain the rate of change in high technology, it does nothing to suggest or support the selection of alliance mode. However, it does reinforce time-to-market as an important element as no firm can hope to acquire and master all the requisite technologies (Ohmae 1989).

Hagedoorn (1993) found in his research that the "reduction in the innovation time span" was one of the key motivators for technology alliances. Hagedoorn's research covered 10,000 technology cooperation agreements, with 3,500 parent firms involved. In the data

collection he looked for key words that identified a time-to-market objective in a public announcement of some sort.

Hamel (1991; et al. 1989) suggest time is absolutely critical factor in alliances. He suggests collaboration is a “race to learn”, and that it is very important to learn faster than your partner in an alliance. Hamel’s argument is that bargaining power within an alliance is a function of the knowledge distribution, and if you learn more, and learn faster than your partner, you will be in a stronger position. Ohmae (1989) also suggests time as a critical factor in that an alliance will bring a firm to the revenue stage more quickly than it could independently. He cites access to skills, market presence, or distribution channels as key factors an alliance partner can add to improving time-to-market.

Prahalad and Hamel (1994) suggest a phenomenon known as disintermediation is breaking down traditional barriers to entry and allowing firms to compete in a non-traditional basis. “Disintermediation impacts the value chain, reduces barriers to entry, challenges the profit engine, and allows non-traditional and creative competitors to enter the market quickly” (Prahalad and Hamel 1994). Therefore, firms must react and change their mode of operation and competition rapidly in order to remain competitive with the new entrants. The type of change Prahalad refers to is revolutionary and firms must respond quickly and effectively. Time-to-market is a critical factor.

In summary, while there is general support in the literature for a relationship between time-to-market and alliance formation, there has only been one study clearly identifying time-to-market as a key motivation in alliance formation (Hagedoorn 1993). Therefore,

P-3 Time-to-market pressures are associated with non-equity alliance formation,

is a proposition generally supported by the literature and prior research findings.

2.5 Literature Review of Alliance Strategy (Proposition P-4)

This section examines the literature to more clearly establish what “strategic space” an alliance does and should occupy, and what bearing alliance mode has on the nature of

this relationship between the firm strategy and the alliance. In order to put this section and proposition into context, the following definition of strategy⁸ is offered:

"The problems of policy have to do with the choice of purpose, the molding of the organizational character, the definition of what needs to be done, and the mobilization of resources for the attainment of goals in the face of competition, uncertainty or adverse circumstances."

The proposition is that a non-equity alliance is formed primarily for strategic considerations. The strategy, as per the above definition, is the guiding light for the business. Commitment to an alliance, as part of a broader firm strategy, should thus include definition of strategic objectives, and commitment of resources, in addition to other strategic activities and plans. Prahalad and Hamel (1994) take the definition to a higher level of abstraction and define strategy as "positioning a business in a given industry structure". The reality is that structures are undergoing major transitions, which provides both the opportunity and impetus for alliance formation.

The literature is quite broad, and non-specific in the treatment alliance relationship to firm strategy. The most explicit references to strategy are in the context of international alliances (Woodcock, Beamish and Makino 1994; Geringer 1991; Tallman and Shenkar 1994).

The notion that a firm deals with a multiplicity and hierarchy of strategies, is well documented (Hofer and Schendel 1978; Mintzberg 1994). The stratification into corporate, business or functional level strategies (Hofer and Schendel 1978) assists in understanding the position of these strategies relative to the core strategies of the firm. The existing literature does not clearly establish any relationship between alliance form and strategy.

An alliance will always be subsidiary to a more encompassing strategy. The often cited international joint venture literature clearly positions alliances as elements of a firm's strategy to implement either multidomestic or global strategies⁹. Nanda and Williamson

⁸ This definition is taken from the course outline of ADM 5360: Strategic Management and Policy, at the University of Ottawa. Within this course outline, the definition is attributed to a catalogue from the Harvard Business School.

⁹ Hout, Porter and Rudden (1982) and Ghoshal (1987) distinguish between a global strategy and

(1995) describe alliances as an assist to a divestiture strategy. Harrigan (1988a) portrays alliances as components of a more encompassing competitive strategy. All of these scenarios implicitly reference a higher level strategy, whether that is internationalization, divestiture, competitive strategy, etc. Krubasik and Lautenschlager (1993) acknowledge that cooperation in itself is not a strategy, but it can be an element of one. The implication from the literature is that alliances serve a multiplicity of strategic purposes at both the corporate and business levels of strategy. However, most of this literature references equity alliances, and therefore the implications of a non-equity alliance are unknown.

Hagedoorn (1995) attempted to establish a linkage between strategic alliances and the core businesses within firms. He found it extremely difficult to systematically identify the core business of a large group of firms because many of these firms were diversified. Hagedoorn however did test a sample of the large diversified firms, and found that they did not pursue a significant number of alliances in their core businesses, but did extensively pursue a significantly larger number of alliances outside of their core business domain. Hagedoorn did not differentiate between equity and non-equity in his research findings.

There is literature that does mention strategy in the context of alliance mode. Harrigan (1988a) suggests that high strategic importance and volatile competitive environments are related to non-equity alliances. As the environment stabilizes, the tendency is to move towards an equity arrangement. The inferences in Harrigan's findings are that non-equity alliances do in fact address strategies of significance within firms.

Hamel et al. (1989) views alliances, not as equity or non-equity, but rather as collaborations that have a significant role in the development of competitive advantage and core competencies. As Hamel describes, there is a constant tug of war going on within a firm: collaboration conflicting with competition, strategic goals conflicting with competitive goals. Again, the statement from Hamel is that collaboration and strategy

multidomestic strategy. A multidomestic strategy considers each foreign market unique and addressable in its own right. A global strategy views its product strategies and market positions within an integrated, global framework.

are strongly interrelated, but there is little distinction between equity and non-equity alliances.

In a study on collaborative learning, Hamel's (1991) sample frame contained both equity and non-equity alliances. Hamel found that organizational learning took place in both modes of alliances. As organizational learning is clearly a strategic activity, and also a longer term activity (Hamel 1991), the fact that it can be accomplished with both types of alliances suggests that perhaps strategy should not be constrained by alliance mode.

There may be other strategies influencing the form and formation of an alliance. Investment strategies and the attractiveness of acquiring a small start-up or rapidly growing firm may be preferable to striking an alliance (Balmuth 1995). Further, start-up firms, particularly in North America, may prefer an acquisition to an alliance or minority equity position depending upon the circumstances (Farrell et al. 1995). Conversely, start-ups, such as General Magic, require alliance partners for both credibility and financial support during the initial phases (Brandt 1995). These references suggest acquisition or equity investment as more appropriate vehicles to implement strategy.

In summary, there is support within the literature for the derivation and investigation of this proposition. Therefore,

P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm,

is a proposition suggested by the literature and prior research findings.

2.6 Literature Review of Alliance Core Competencies (Proposition P-5)

The research objective within this dissertation was to understand the relationship between non-equity alliance and the core competencies within a firm. The literature does provide some insight into how a firm should manage core competencies in a strategic context, but little insight into relationship to the mode choice. The term core competencies is taken directly from Hamel and Prahalad (1994) and is defined as:

“... a bundle of skills and technologies that enables a company to provide a particular benefit to customers. To be considered a “core” competence, a skill must meet three tests: customer value, competitor differentiation, extendibility.”

Hamel (1991) views a firm as a portfolio of core competencies and disciplines, and thus inter-firm competition and acquisition of skills are key alliance objectives. Core competencies and value-creating disciplines are not distributed equally among firms, which provide the underlying premise for collaboration. The balance of power in an alliance is based on knowledge and core competencies, and knowledge and skills form the basis for the appropriation of value. Hamel also found firms limited their transparency¹⁰ to ambitious partners by restricting the collaborative agreement to a narrow range of products or markets. Hamel found successful firms clearly identify skills and technologies that are off limits to their partners, and monitor partner requests for information and people. While Hamel’s study included both equity and non-equity alliances, he made no distinction in his findings over the implications of mode choice.

Woodcock et al. (1994) states “if a firm perceives unacceptably high risks of exposing or inadvertently sharing its core competencies with a competitor, relative to the benefits, it should either pursue equity or full scale acquisition”. According to Beamish, equity is generally viewed as a stronger, more binding commitment and it is because of this that equity is seen as a pre-requisite for providing a partner access to core competencies.

Chesbrough and Teece (1996) present one of the few studies that suggests a positioning of core competencies relative to alliance mode choice, and extending to vertical integration. Chesbrough and Teece use the terms systemic¹¹ innovation and autonomous¹² innovation rather than core competencies. By definition, there is a strong relationship between systemic innovation and core competencies. Chesbrough suggests that systemic innovations are better candidate for vertical integration, or at least organizational structures where a high degree of coordination is possible. On the other

¹⁰ A term defined by Hamel to describe the concern over the openness of a firm to its partner

¹¹ Systemic innovations, as defined by Chesbrough and Teece (1996), rely on tacit knowledge and a high degree of coordination throughout the entire product system.

¹² Autonomous innovations as defined by Chesbrough and Teece (1996), rely more on codified information and the coordination requirements are substantially less.

hand, autonomous innovations are good candidates for non-equity alliances and joint ventures because the level of coordination required is less intense.

Osborn and Baughn (1990) suggest that in areas of technology collaboration, firms are likely to be concerned about control of proprietary knowledge, products and services. Firms may prefer an arm's length agreement as it provides them some distance, and implicitly a control mechanism.

However, just the act of having two firms working together presents a potential for learning because of the implicit diversity (Ghoshal 1987). Learning can, and will occur regardless of the alliance mode, but only if there is an explicit objective to do so. Ouchi and Bolton (1988) term this type of knowledge transfer as leakage, which will occur to some extent regardless of the safeguards that are put in place. As per the study by Crossan and Inkpen (1995), as long as there are gaps between beliefs and experience, the opportunity for learning is present. The implication is that if a firm needs to protect its core, it may have to be very diligent.

Two observations from Hamel (1991) are particularly relevant: alliances are rarely perfectly and perpetually collusive, and the decision to collaborate does not displace intent to compete. Where the key objective was internalization, alliances were regarded as transitional: the measure of success was termination due to successful learning. The alliance relationship is a dynamic one that will change as the partnership evolves. Second observation is that the partner you are collaborating with today may in fact be your competitor tomorrow, and therefore Hamel suggests to not assume collaboration will last forever - protect your core!

Osland and Yaprak (1995) posit that when the strategic intent is to develop new knowledge and protect the core the equity alliance form is used more than non-equity. An interesting paradox they raise is where the joint venture may foster a better learning environment, it typically lacks the integrative linkages with the parent that enables the learning to be dispersed. Osland and Yaprak's findings are in the context of equity alliances, but in concept the integrative linkages might be easier in non-equity as there is typically no separate and distinct organization.

Summarizing this section, the clear theme from the literature is that firms must protect their core competencies. They must also seek to acquire and build new competencies through collaboration. The literature is less clear on the implications of alliance mode choice in general, let alone the distinction between non-equity and equity.

Therefore:

- P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.

Is suggested by the literature, but supported by few research findings.

2.7 Summary

In summary, all the propositions are grounded to various degrees in the literature.

- P-1 *A high degree of market uncertainty is associated with non-equity alliance formation.*

and

- P-2 *A high degree of technology uncertainty is associated with non-equity alliance formation.*

are well grounded in the literature and are generally supported by prior research findings.

- P-3 *Time-to-market pressures are associated with non-equity alliance formation.*

is strongly suggested by the literature and yet is not strongly supported by prior research findings.

- P-4 *Non-equity alliances are focused primarily within the business strategies of the high technology firm.*

is generally supported by the literature, but supported by even fewer research findings.

- P-5 *The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.*

is suggested by the literature and not supported with research findings.

3. METHODOLOGY

3.1 Introduction

The framework for the analysis is the formation of a strategic alliance in the high technology sector. This dissertation broadly explores the following aspects of the strategy formulation process:

- Why are non-equity alliances chosen in the high technology sector?
- How are strategy and core competencies associated the choice of non-equity alliances?
- How are technology and market factors associated with high technology alliance formation?

The methodology is directed at measuring the determinants of the alliance formation process, with particular attention focused on the selection of non-equity over equity. The measures are focused at understanding management's perception of, and reactions to, the internal and external environmental determinants. This is in contrast to prior research directed at correlating exogenous environmental factors to the alliance formation and mode selection (Harrigan 1998a; Hagedoorn 1993; Auster 1992).

The scope and extent of the analysis is centered on the five propositions introduced in Chapter 1:

- P-1 A high degree of market uncertainty is associated with non-equity alliance formation.
- P-2 A high degree of technology uncertainty is associated with non-equity alliance formation.
- P-3 Time-to-market pressures are associated with non-equity alliance formation.

- P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm.
- P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.

The non-equity alliance model, as depicted in Figure 1-1, asserts itself in that the alliance formation process and mode selections are assumed as a subset of the strategy formulation process. It is assumed for the purpose of this research that mode selection is an element of the alliance formation decision, which in turn is an element of the strategy formulation process.

This dissertation measures the factors influencing the strategic decision process that resulted in the formation of a non-equity strategic alliance. There are three core propositions that address the alliance formation process using a cause and effect model: market uncertainty, technology uncertainty, and time-to-market factors are the external influences that result in a non-equity alliance. The remaining core propositions assess the type of relationship a non-equity alliance establishes within its parent or sponsor firm. The key objective is to understand why the alliance decision resulted in a non-equity arrangement, and how does this impact structure relative to strategy and core competencies. This will provide a better overall understanding of the non-equity phenomenon, and provide a guide to the type of constraints a non-equity alliance must typically deal with.

The investigation is structured around these five interrelated propositions. This chapter establishes the overall methodology, the variables, the research instrument, the sample frame, and the process for collection of data. Section 3.2 describes the base methodology used in defining the research. Section 3.3 presents all of the research variables. Sections 3.3.1 through 3.3.3 present the variables relating to Proposition P-1, P-2 and P-3 - market uncertainty, technology uncertainty, and time-to-market factors. Section 3.3.4 describes the measures for Proposition P-4 relating strategy to the alliance formation process. Section 3.3.5 establishes variables for Proposition P-5 to determine how core competencies are related to the formation process. The remaining Sections 3.4 through

3.9 present the research instrument, reliability and validity measures, the sample frame and how the data was collected, organized, and analyzed.

3.2 Discussion of the Research Methodology Adopted

The objective of this research was to broadly look at the topic of non-equity strategic alliances in a context of the high technology industry. The relative lack of prior research on non-equity strategic alliances, coupled with a reasonable availability and breadth of equity based alliance and joint venture¹³ research, suggested more of a hybrid approach to the research based on using grounded theory development (Glaser and Strauss 1967) and the more traditional verification approach (Nachmias 1981). This allowed the freedom to approach the topic in a more broad based, emergent theory fashion, and yet utilize and extend the existing equity based alliance research as applicable.

This hybrid approach was necessary for two reasons. First, the traditional approach of theory extension was utilized to leverage and extend the base of research and theory already accumulated on joint ventures. The existing equity based literature at least provided the starting foundation and structure for the non-equity based research. However, it became clear that in introducing the contexts of non-equity and high technology the existing literature was insufficient for any significant extension of the theory¹⁴. The only study that has focused on high technology, non-equity alliances was the one performed by Larson (1992), and her study was non-exclusive to high technology. Hagedoorn (1995; 1996) has focused on strategic technology partnering but has included both equity and non-equity alliances in his research.

Second, many of the existing research approaches viewed alliance formation from macro levels based on sectoral characteristics (Harrigan 1988a; Hagedoorn 1993), and industry evolution (Auster 1992), and did not specifically focus on the management decision factors intrinsic to the firm. As there was little to no alliance theory to extend from in this

¹³ A joint venture is a common term for an equity based strategic alliance where a separate, jointly-owned legal entity is created by two or more parents, and which the parents jointly participate in the decision making activities. (Geringer 1991)

¹⁴ The equity based literature and its relevance is more extensively covered in the literature review in Chapter 2.

area, the approach taken was based on the grounded theory approach identified by Glaser and Strauss (1967).

This blended verification/grounded theory approach also emerged somewhat naturally through the research process. The research was designed with a set of propositions to serve as a starting point for measurement and categorization. For example, the focus on market, technology and time-to-market served as a catalyst to initially frame the interview discussion, but through open ended questions and probing many themes emerged during the interviews.

3.3 Variables

All variables utilized *ex post* measures of senior managers' perceptions at the time of alliance formation. The senior managers' perceptions that were assessed were those relating the factors and uncertainties to the formation of the alliance and selection of alliance mode. The expectation was these measures would reasonably reflect the executive's perception of the situation at the time the alliance was being formed. This technique was used by Geringer (1991), and was confirmed in an *a priori* manner by Hambrick (1980) as a valid approach. Geringer (1991) states "prior research of strategic issues indicated that self reporting represents a sound method for identifying intended strategies and that it produces reliable data".

The variables chosen were analogous in nature to Geringer's (1991) concept of critical success factors. Managers' perceptions of the environmental and internal characteristics, in contrast to objective characteristics of the environment, are generally accepted as important properties to consider in the strategy formulation process. The parallel is that in this research, managers were interviewed as to their perceptions of the critical influences in the formation and mode selection decisions.

There are three broad sets of dependent variables being measured in this research: i) the decision factors of alliance formation and mode selection, ii) the nature of the relationship between the alliance and the firm strategy, and iii) the nature of the relationship between the alliance and core competencies. Three independent, generalized variables - market uncertainty, technology uncertainty, and time-to-market

factors - are posited as primary influences on the alliance formation decision and mode selection.

The general methodology was to measure each of the independent variables, assess the depth and extent of influence qualitatively, coupled with an understanding of the relative uncertainty with each of the factors. Once each variable had been measured independently, they were assessed in an integrative context to establish which variables were dominant, and finally variables that were not *a priori* defined¹⁵ were considered. Table 3-1 provides a summary overview of the measurement process.

Table 3-1: Variables Mapped Against the Measures

	Reference Proposition	Measurement Criteria			
		individual factor assessment	level of uncertainty	formation decision	mode selection
market uncertainty, technology uncertainty, time-to-market factors	P-1, P-2, P-3	<i>factors enumerated and ranked within category</i>	<i>low medium high</i>	<i>ordinal ranking against other factors</i>	<i>ordinal ranking against other factors</i>

The purpose and intent was to develop some simple measures by which to capture and quantify the basic phenomenon and driving factors for alliance formation. Then, using the questionnaire and interview techniques, supplement the basics with additional facts to add richness to the analysis with qualitative information.

3.3.1 Market Uncertainty (Proposition P-1)

Market uncertainty is widely referenced in the existing alliance literature as a factor and a consideration (Klein and Zif 1994; Oliver 1990; Larson 1992), but has been operationalized as variable on a much less frequent basis. There are two studies where market uncertainty has been operationalized as a variable, and these are listed in Table 3-2. No one has specifically measured market uncertainty in a non-equity strategic

¹⁵ This was done by asking managers, in an open-ended fashion, if there were any more dominant influences than already discussed.

alliance context. The closest study has been the one by Schaan and Farrell (1995) study of international high technology alliances. In general, market uncertainties were assessed in relation to “demand side” attributes.

Table 3-2: Market Uncertainty Variables Used in Alliance Research

Market Uncertainty Measures	Author(s)	Research Context
demand uncertainty	Harrigan (1988a)	broad study covering large industry cross-section
market uncertainty	Schaan and Farrell (1995)	international alliances in high technology

Harrigan (1988a), whose research includes both equity and non-equity alliances, has operationalized market uncertainty in terms of demand uncertainty. Harrigan’s research, which covered a broad cross-section of industries, focused on assessing demand and competitor traits; demand uncertainty was an instance of a demand trait. Demand uncertainty was likely the most appropriate measure of market uncertainty that could be generalized across the variety of industries surveyed. However, as Harrigan also suggests, demand uncertainty is typically high in the high technology sector, in comparison to other industries. Demand uncertainty is too specific a variable to use in this research; market uncertainty was viewed in a broader context.

Schaan and Farrell (1995) define “market characteristics” in their investigation of the determinants of alliance mode choice in international high technology strategic alliances for small and medium sized firms. Market characteristics is a general variable incorporating “market uncertainty” and “industry stage of evolution”. Schaan and Farrell reference market uncertainty to the location of the target market, and level of demand uncertainty (back to Harrigan 1988a) or business risk. Schaan and Farrell’s study included both equity and non-equity alliances. The characterization by Schaan and Farrell of market uncertainty is the most appropriate to this study, although it is viewed in a broader context in this dissertation.

In summary, market uncertainty has been used in previous research as a variable, and therefore this study is not introducing a new construct. This research looks at the issue of market uncertainty in a broader context considering all market related factors. The market uncertainty variable in this research is operationalized as a subjective measure, assessing an executive's perception of the influence of market uncertainty on the alliance formation decision. Market uncertainty is identified and ranked in the questionnaire during the interview. Data collection is done via Questions #9 from the questionnaire, as shown below.:

Question #9: What level of uncertainty would you associate with these market factors? Uncertainty is a measure of how predictable the characteristics of the particular factor or group of factors in terms of the results or outcomes. How did the amount of uncertainty influence: (1) the formation of the alliance, and (2) the selection of alliance type?

3.3.2 Technology Uncertainty (Proposition P-2)

Technology uncertainty is also widely referenced in the literature as influences and factors impacting various aspects of alliances (Afriyie 1988; Doz 1988; Bettis and Hitt 1995). However, few alliance studies have operationalized technology uncertainty as a variable. The literature referenced in this section tended to view alliances as both equity and non-equity. In general, technology uncertainties are related to the supply side attributes. Table 3-3 summarizes the technology uncertainty variables used in previous research.

Table 3-3: Technology Uncertainty Variables Used in Alliance Research

Market Uncertainty Measures	Author(s)	Research Context
technology intensity	Osborn and Baughn 1990	broad study covering large industry cross-section
technological uncertainty	Schaan and Farrell 1995	international alliances in high technology

Osborn and Baughn (1990) use technological intensity as a proxy for technological uncertainty. Technological intensity is defined as the "average ratio of R&D to sales

over a three year period” and a “high technological intensity is likely to reflect high uncertainty” (Osborn and Baughn 1990).

This measure of technological intensity, which Schaan and Farrell (1995) also use in their study¹⁶, is an objective measure. In contrast, this dissertation utilizes technology uncertainty as a subjective measure of the executive’s perception of the uncertainty level influencing the alliance formation and the selection of mode.

Schaan and Farrell (1995), who also define technological uncertainty, relate the level of risk to the level of resource investment. Gulati (1995), in his study on governance structures for interfirm alliances, suggests trust and familiarity are appropriate proxies for uncertainty and risk.

As with market uncertainty, this research broadly looks at the variable for its influence on the alliance formation decision. It is a subjective measure which assesses the manager’s perception of the level of uncertainty, and the influence of that uncertainty on the alliance formation decision. The technology factors will be identified and ranked using the questionnaire and the interview process. Data collection is done via Question #12 from the questionnaire, as shown below:

Question #12: What level of uncertainty would you associate with these technology factors?

3.3.3 Time-to-Market Factors (Proposition P-3)

Time-to-market is a frequently cited as an important consideration in the alliance literature (Harris et al. 1996; Kotabe and Swan 1995; Ohmae 1989; Hagedoorn 1993), but it has not directly been operationalized as a variable in assessing alliance formation. Therefore, this research introduces time-to-market as a new variable, but one that is based on accepted and established measurement principles¹⁷, and it is a unidimensional variable. Time-to-market is assessed for its influence on alliance formation and mode selection, and therefore in its simplest form will be a “yes/no” answer.

¹⁶ Schaan and Farrell (1995) directly reference Osborn and Baughn’s (1990) use of technological intensity, and they use it to complement another variable they call technological uncertainty.

¹⁷ Reference Section 3.3 and the Geringer (1991) reference.

Time-to-market is not operationalized in its expected units of time and impact on interval reduction (Hagedoorn 1993). As with market and technology uncertainties, the time-to-market variable is a measure of the relative influence that time-to-market pressures had on the alliance formation decision. The measure represents the executive's perception of the priority of time-to-market in the alliance formation decision.

Harris et al. (1996) stress the importance time and speed to market within R&D, but within this article the concept is not fully developed as a variable. Hagedoorn (1993) suggests the reduction in innovation period as a motive for interfirm cooperation. While these references suggest time-to-market as a factor in alliance formation, none of the studies go so far as to define and operationalize the variable.

Time-to-market, as an influence, is assessed quantitatively via the questionnaire in the interview. It is also assessed qualitatively to better understand why the alliance had an impact on the time-to-market. Data collection is done via Questions #15 and #16 from the questionnaire, as shown below.

Time-to-market pressures were assessed in two ways. Time-to-market was defined in this research as the manager's perception of the urgency attached to delivering a product or service to market.

First, Question #15 asked the executive if time-to-market alliance formation. Later, time-to-market was also ranked relative to the other perceived influences.

Second, in a more qualitative manner, the executive was asked to identify the sources of the urgency, and the responses to the urgency, as per how the alliance contributed to responding within the overall formation factors. The categorization for these two urgency measures emerged as a result of the data collection instead of a Likert-scale question.

*Question #15: Was time-to-market a factor in the decision to pursue an alliance?
How was time-to-market to be achieved with this alliance? Resources? Skills?
Which was more important?*

*Question #16 What alternatives for improving time-to-market were considered?
Why were they discarded?*

3.3.4 Strategy (Proposition P-4)

A key research objective was to assess the relationship between the alliance and firm strategies. Similar to the concept of product positioning within a market space, an alliance must be positioned within a more comprehensive firm strategy¹⁸. Strategy is measured in three ways: first, the level of strategy is assessed; second, the importance of the alliance to the firm strategy is measured; and last the relative criticality of the alliance to the firm strategy is measured. While these are fairly simplistic measures, they do collectively provide a measure of how the alliance strategy is positioned within the firm.

The strategic management literature is more voluminous and diverse than the body of alliance literature. Strategy related variables have been operationalized in prior research using numerous methods; Table 3-4 provides a brief summary. Within the alliance literature, strategy variables have typically been operationalized within an international business context (e.g. Ghoshal 1987; Yoshino and Rangan 1995; Beamish and Banks 1987; Tallman and Shenkar 1994). As the international dimension is not a specific focus of this research this method of operationalizing strategy variables is not particularly relevant.

Therefore, the strategy related variables are referenced primarily from the strategic management literature. Generally, the concepts are adopted, but the operationalization is simplified to suit the scope of this research.

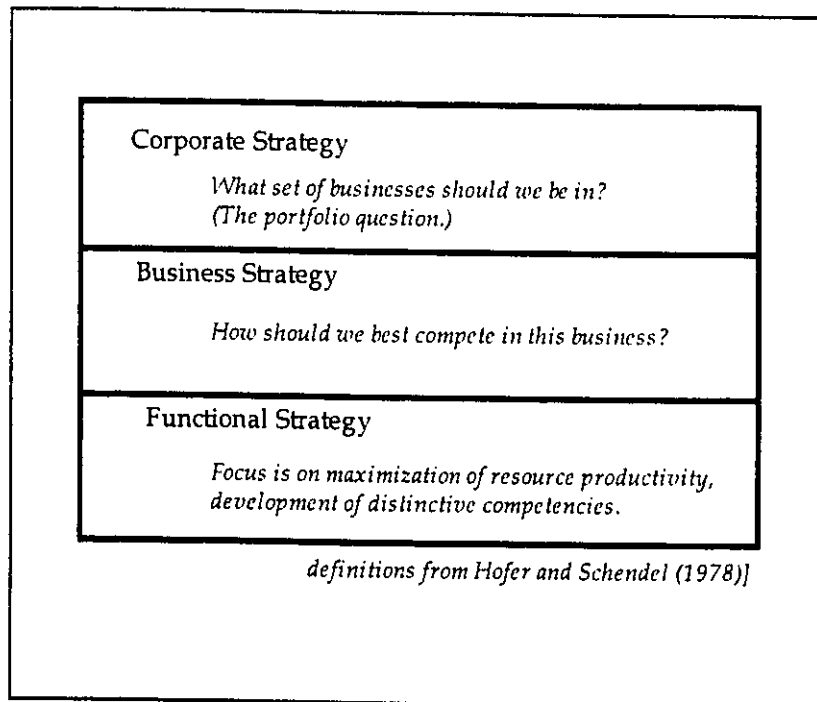
¹⁸ An important assumption made in this research is that an alliance is essentially a subsidiary strategy to an encompassing corporate or business strategy.

Table 3-4: Strategy Variables Referenced from the Literature

Strategy Variables	Author(s)
strategy level & alignment	Hofer and Schendel (1978), Burgelman and Grove (1996), Mintzberg (1994)
competitive intensity	Porter (1985)
value chain relationships type of integration (vertical, horizontal)	Harrigan (1983), Root (1988), Porter (1985)
strategy evaluation framework	Rumelt (1979)

In the context of this research, the variables operationalized are the *strategy level*, *alliance importance*, and *alliance criticality* to the firm strategy.

Figure 3-1: The Hierarchy of Firm Strategies



The variable *strategy level* identifies the class of strategy the alliance is related to - corporate, business or functional. The reference is Hofer and Schendel (1978), which is summarized in Figure 3-1. Corporate strategy addresses the portfolio question of what

businesses a firm should participate in. Business level strategy addresses how to compete in a particular industry or product/market space. Functional strategies primarily are focused at functional level implementations - marketing, product, manufacturing. Hofer and Schendel (1978) and Mintzberg (1994) suggest strategies can be grouped into a hierarchy of subsidiary strategies, with corporate strategies spawning business level strategies, which in turn spawn functional strategies and programs. Mintzberg (1994) stresses that at any point there will exist a multiplicity of strategies, and this hierarchy construct is a conceptual tool to help describe and position strategies within a firm's strategic space. Data collection is done via Question #21 from the questionnaire, and is shown at the end of this section.

The *alliance importance* variable measures the relative importance of the alliance to the firm strategy. It is loosely based on Rumelt's (1979) strategy evaluation framework, which outlines a set of tests for goal consistency, framing, consistency, competence and workability. Relevant to this research variable is the concept of Rumelt's frame test - "to separate the important from the unimportant, and to define the critical sub-problems to be dealt with". Using this as a starting point, the questionnaire posed a question based on a 4-point Likert-type scale. While Rumelt's framework was too extensive for this study, it did provide the guidance to determine this variable. Data collection is done via Questions #23 from the questionnaire, and as is shown at the end of this section.

The *alliance criticality* variable assesses how critical the alliance strategy is to the firm strategy. It is operationalized by measuring how viable the firm strategy is without the alliance. It is derived from, and is generally an abstraction of the work by Nath and Sudharshan (1994) and MacCrimmon (1993). Nath defined a framework for assessing coherence between firms' business level and functional level strategies with a construct to measure the validity of a subsidiary strategy in the context of its parent strategy. MacCrimmon takes a different approach by successively measuring strategy as; "*a coordinated series of actions; a comprehensive, coordinated series of actions; and a conditional, comprehensive, coordinated series of actions*". Both of these constructs are too complex and extensive to implement within this study, but they do provide the impetus and framework for defining this variable. Data collection is done via Questions #35 in the questionnaire.

In summary, the relationship between strategy and non-equity, high technology alliances have not been extensively or specifically studied. Therefore, the strategy related variables were referenced from the strategy literature and adapted to this research.

Question #21 *What element is the alliance strategy best represented within:*

☐	corporate strategy:	<i>addresses the business portfolio questions, synergy across businesses, macro level competitive advantage</i>
☐	business strategy:	<i>how to compete, competitive advantage and distinctive competencies</i>
☐	functional strategy:	<i>maximization of resource productivity; synergy within a single function, development of distinctive competencies</i>
☐	other	<i>please elaborate</i>

Question #23: *How would you explain the rationale of the alliance relative to the overall strategy?*

<i>critical</i>	<i>important</i>	<i>minor</i>	<i>not important</i>
☐	☐	☐	☐

Question #35 *How much of the business strategy can be executed exclusive of the alliance partner? If the partner goes away for whatever reason, would a viable strategy remain?*

3.3.5 Core Competencies (Proposition P-5)

The research objective was to understand how a firm would either protect, or provide access to skills and competencies it considers important to its own competitive health, in the context of a non-equity strategic alliance. The term core competencies is taken directly from Hamel and Prahalad (1994) and is defined as:

"... a bundle of skills and technologies that enables a company to provide a particular benefit to customers. To be considered a "core" competence, a skill must meet three tests: customer value, competitor differentiation, extendibility."

The variables to measure the alliance interaction with a firm's competencies are *nature of access*, and *scope of access*. Nature of access refers to the type of access a partner is either looking for, or has received within the alliance. Scope of access refers to how much

access is limited to a partner within an alliance. This area was the most difficult aspect of the research to quantify, and therefore this aspect of the research is significantly supported by qualitative observations.

Previous research provides some basis for operationalizing these variables. A summary of the references are provided in Table 3-5.

Table 3-5: Core Competency Variables Referenced from the Literature

Core Competencies Variables	Author(s)
nature of access	Hamel (1991)

Hamel (1991) provides the basis for defining the *nature of access* variable. His research introduced the concept of utilization and internalization. Utilization is defined as a process whereby knowledge or skills are *not* transferred across the collaborative membrane¹⁹. Therefore, the scenario results where the knowledge is never transferred to the partner to any significant degree. Therefore, depending on the type of knowledge and skills pertinent to the alliance, there remains a long term interdependence between partners. In contrast, internalization does involve the flow and acquisition of knowledge and skills across the collaborative membrane. Hamel (1991) terms this type of transaction *appropriation of value*. In this scenario, the need for long term interdependence is obviated as either or both partners have essentially acquired and internalized the relevant competencies. Data collection is done via Questions #38 through #41 in the questionnaire, replicated below:

Question #38: How does the partner use the core competencies identified? How would you characterize the type and scope of access to these core competencies?

Question #39 To what extent is the partner allowed access to your core competencies? How is access managed?

Question #40 To what extent is the partner denied access to the core competencies? How is access limited?

¹⁹ Collaborative membrane is term defined by Hamel (1991) to describe the interchange interface between two alliance partners.

Question #41 *What type of access do you have to your partner's core competencies?
How does your partner manage and limit your access to their core competencies?*

The *scope of access* variable is not directly defined within the literature, although numerous references exist as to why a firm needs to protect its core competencies in a collaborative situation (Hamel 1991; Hamel et al. 1989; Woodcock et al. 1994). Therefore, to operationalize this variable a simple 5-point Likert-type scale was used to characterize the scope of access from *no access* at one end of the scale, to *full access* at the other. There is also a point on the scale identified as *access not an issue*, where access to core competencies and skills did not turn out to be an issue. The value in this variable is that it provides a simple means to understand how a partner may have limited access to core competencies. Hamel (1991) generally describes these concepts in his article. Data collection is done via Questions #37 in the questionnaire, replicated below:

Question #37: *How would you characterize the scope of access to the core competencies identified?*

<i>full access</i> ☐	<i>limited access</i> ☐	<i>very limited access</i> ☐	<i>no access</i> ☐	<i>access not an issue</i> ☐
--	---	--	--	--

Summarizing, core competency variables are also not extensively covered in the literature. What is there in terms of Hamel's (1991) research provides a good base and sufficient for the scope of this research.

3.3.6 Additional Measurements

Additional measurements were taken through the interview to add qualitative depth to the quantitative data collected through the Likert scale question.

These questions were posed as open-ended questions, and were designed to be consistent with the Likert scale questions. There are two types of questions posed, with examples provided below. Question #24, follows the Likert scale question on "*how important is the strategy?*", and adds contextual depth by asking an open-ended question to explain "*how is the strategy important?*". Question #19 asks a different style of question in that it does not assume a context, but rather asks the question in such a way as to not bias the respondent to an *a priori* model.

*Question #24: How does the alliance improve the competitive advantage?
Technology? Resources? Skills? Market clout? Market positioning? Other?*

*Question #19: What factors could have changed the selection to favor an equity (or
non-equity) arrangement?*

These added measurements, used throughout the interview, represents the grounded theory approach within the research.

3.4 The Research Instrument

3.4.1 Selection

Strategy research can be approached from multiple vantage points, all of which have some degree of limitation. Research techniques for possible use, either individually or in combination, are direct observation, examination of archived records, questionnaires, or interviews. The research instrument had to reflect the hybrid nature of the methodology between verification and grounded theory development.

Direct observation is a very powerful method for following a management decision process, but it is not always practical. Time, coupled with sample size, can be a limiting factor in direct observation. For example, in this research, four alliance formation processes would have been available for direct observation, but two of these alliances have been “forming” for greater than 12 months. This approach was not feasible given the time horizon on this study.

Examination of archival records was an option investigated for this research. However, this method proved more difficult, and less beneficial, than anticipated. Structured information such as contracts and agreements did very little to illuminate the decision factors. Unstructured information, such as memos, meeting minutes, presentations were only useful in fact confirmation, not in discovery. It proved very difficult to develop a comprehensive view using only this archived information. Further, this information was typically scattered among numerous participants, various forms and media, and thus proved difficult to develop an integrated view from. The key difficulty was rooted in the fact that few firms attempt to capture their full decision factors in an organized,

written form. External documentation, such as press releases, was generally not useful in adding more information to the understanding of the internal managerial decision factors.

The research instrument chosen was a combination of questionnaire and interview guide, administered to key decision makers involved in the alliance formation. This proved the most workable approach - the questionnaire provided the vehicle for the quantitative responses, while the interview allowed exploration to a reasonable depth of the decision factors.

The research instrument had to reflect the hybrid nature of the research methodology. Propositions were developed to focus the investigation around some specific factors (i.e. market factors, technology factors, etc.), but then the instrument was interspersed with questions to clarify, confirm, and expand the understanding. That is also the style in which the interview was conducted through more qualitative information.

The expectation was to generate substantive theory as a result of this research. Substantive theory was the expected result as the sample size was both not large enough, nor generalized enough to generate formal theory. More significantly, formal theory was also not plausible at this stage as alliance research, and specifically non-equity alliance research, is still too emergent in nature.

As strategic alliances are typically a fairly sensitive aspect within a firm, there was difficulty in getting firms to participate. This tended to limit the size of the population in the sample. Attempts were made to ensure the sample was as diverse as possible.

As suggested by Geringer (1991), as the nature of the information to be gathered was quite specialized, participants had to be the executives most knowledgeable about a particular alliance case study. The interviewees were chosen with this fact in mind, and the first choice of interviewee was not always the best. Respondents were also assessed based on what functional area they represented (e.g. business units, R&D, business development). It was generally found that there was a high degree of consistency between functional areas, as long as the respondent had played a significantly decisive role in the alliance formation.

By granting anonymity and offering a summary of the research results, the participants were more encouraged to provide candor and more accurate results. This is similar to the results Geringer's (1991) found in his research. This technique was used in presenting this research and candidates, upon confirming anonymity, generally were more open. The interviewees all proved candid when reflecting on their particular strength and weaknesses, and what they would do differently next time.

3.4.2 Description

Data collection was done primarily through interviews. The interview guide and questionnaire was piloted at the start of the research cycle with two individuals familiar with the topic to ensure the questionnaire was clear enough to be easily understood by interviewees. The interview guide and questionnaire was also reviewed by an expert in the field to assess whether the instrument was in fact comprehensive enough and clear enough to ensure relevant and sufficient data would be captured. Modifications were made to the instrument prior to data collection as a result of the pilot testing.

Interviews lasted on average 2 hours per case study, and were held with the executives who had an active role in the alliance formation, and in the choice of equity /non-equity type. This interview was typically prefaced by a review of the existing documentation if available.

The interview guide / questionnaire²⁰ was structured along the lines of the five propositions. Part A provided background information. Part B focused on Propositions 1, 2 and 3 exploring the market, technology, time-to-market, and any other factors influencing both the formation decision, and the mode selection. Part C focused on establishing an understanding of the relationship between the alliance and the competitive strategy. Part D focused on core competencies and how they were managed within the alliance.

The interview generally opened with the interviewee being asked to provide an introduction to the alliance under investigation. This provided a broader understanding of why the alliance was formed, who the partner was, what role they played. It was also

²⁰ A copy of the research instrument is included as Appendix B.

the basis for a consistency check with responses to more specific questions. This introduction tended to be an open-ended discussion that provided a base understanding for the interviewer, and established the dialog with the interviewee.

At that point, the interview launched into the interview guide / questionnaire. The next step was to cover the remaining aspects of Part A of the interview. Part B consisted of a combination of filling out the questionnaire, and answering the questions. The combined questionnaire/interview format proved useful because the time was taken to clarify and confirm issues, deviate on interesting points, etc. For example, as respondents were asked to rank the most influential market factors, a discussion ensued explaining the background and rationale for the ranking. This is where most of the information on alliance formation was discovered.

3.5 Reliability and Validity of the Research Instrument

Reliability refers to how well items measure their intended construct. The reliability of the research instrument was established through three activities. First, the interview guide / questionnaire was pre-tested with managers familiar with the topic of alliances. Second, the research instrument was also reviewed by an industry expert. Third, the measures for this instrument were taken from the literature. Statistically based reliability factor analysis could not be performed due to the population size of the sample.

The pre-testing performed with practicing managers in the field was done to ensure clarity of the research questions. This pre-testing did result in modifications to the initial drafts of the research instrument.

The questionnaire was read by an expert, thus adding to the reliability of the research instrument. This was an important consideration because of the complexity of some of the questions, and their openness to interpretation by the respondent. The reliability was also improved as the research methodology utilized existing measures from the literature, excepting the open-ended questions. There were no new constructs introduced by this research.

All variables utilized *ex post* measures of executives' perceptions of variables relative values at the time the alliance was being formed. Prior research on strategic issues indicated that self reporting represents a sound method for identifying the intended strategies (Geringer 1991; Hambrick 1980) and that it produces reliable data.

Validity is concerned with ensuring the instrument measures what it was designed to measure. As a significant portion of the research was directed at gathering qualitative data based on grounded theory development, it was difficult to apply traditional checks of validity.

However, content validity is established in that the variables utilized are derived from the literature. Where they are not derived directly from the literature, the concept is taken from the literature and simple measures are operationalized.

Available background information was reviewed for a number of the cases selected, and there was consistency between what was found in the interview and through the background documentation. The interview did produce a greater depth of information than the background documentation.

There were two samples where two executives were interviewed for one case, and again there was no significant inconsistency in the data provided. This approach was abandoned for the remaining cases primarily due to difficulties in scheduling the executive's time, and secondarily due to time constraints in the research.

3.6 The Sample Frame

3.6.1 Selection of Firms

There were three factors that largely defined the sample frame for this research.

The main criterion was that the firm must be engaged in the high technology sector. High technology was interrelated with the main objectives of the research. The focus on the high technology sector allowed for control of external factors.

The sample frame of non-equity alliances was difficult to identify because of the relative lack of public information. Traditional techniques such as industry databases were of

little use as most non-equity alliances are not registered. Further, public companies are not required to disclose interest in a non-equity alliance as they might have to with an equity investment.

Therefore, the sample frame was identified through the author's contacts within the industry, including a judgmental sample directly from the author's employer. While this may have reduced the generalizability and size of the sample frame, it did provide a reasonable method of defining the sample.

The sample frame was also limited to the Ottawa-Carleton region. The geographic constraint was a factor to minimize the cost of the research and data collection. However, Ottawa is a recognized centre for high technology, and has a high concentration of technology firms. Therefore this sample was considered to provide a reasonable representation of high technology.

However, the fact that this research utilized the grounded theory development approach also suggested that at this stage of the theory development a sufficiently diverse set sample of alliances would serve as a basis for the research.

3.6.2 Generation of the Frame

The sample of alliances was largely generated by gaining an understanding of what firms were establishing alliances in the Ottawa-Carleton area. The search then led to the executive in charge, with whom the author communicated the research objectives. In return the executive provided introductory type details about the alliance. At that stage it was a negotiation to see if the alliance met the sample criteria, and if the executive wished to participate.

The definition of an alliance, as defined in Section 1.4, was used as the framework for identifying and selecting an alliance case for study. However, in more specific terms, an alliance was considered for inclusion if the following conditions were met:

- The exchange transaction between the partners was more than a simple commercial or market transaction.
- There had to be some sharing of risk.

- There had to be a joint determination of the objectives, and joint management towards the results.
- The partnership was perceived to have an impact on the strategic direction of the firm.

The selection criteria were kept reasonably broad to ensure a diversity in the research sample.

There were also two minority equity alliances that were included in the sample for comparative purposes. These are not considered to be a formal part of the sample and therefore the sample size used is twelve (N = 12).

3.6.3 Sample Characteristics

With the twelve sample cases collected as part of this research, a fairly broad cross-section of alliance modes and strategic intents were captured.

Table 3-6: Sample Distribution by Scope of Alliance Activities

Distribution by Scope of Alliance Activities	
single mode ²¹ alliance	6
multiple mode alliance	6
Total	12

²¹ Number of modes refers to the number of activities and the nature of the exchange transaction. A single mode alliance suggests there is only one key exchange transaction - perhaps a focused joint development, or one partner does development, the other performs the distribution function. In contrast a multiple mode alliance suggests interaction on a broader range of activities in the value chain.

Table 3-7: Sample Distribution by Activity Type and Stage of Evolution

Distribution by Activity Type		Distribution by Stage of Evolution	
distribution	3	alliance in start-up phase	1
joint product development	9	in process, alliance operating	5
		alliance has delivered results	5
		alliance has failed	1
Total	12	Total	12

Table 3-8: Sample Distribution by Partner Characteristics

Distribution by Partner Location		Distribution by Relative Partner Size	
North American partners	3	much smaller partner	2
Asian partner	1	smaller	1
European partner	8	larger	2
		much larger	7
Total	12	Total	12

3.7 Data Collection

As alliance case studies were identified, the executives involved were contacted to explain the research study and solicit their participation. It was at this time pre-screening was performed to identify the best interview candidate.

The objective of pre-screening was to ensure the executive being interviewed did in fact play a significant role in the alliance. Pre-screening was done prior to the interview, and

consisted of asking the executive to describe their role in the alliance. If the response indicated that the executive was a key decision maker in the alliance process, then the in depth interview was proposed and scheduled. The executives also proved to be a reliable source of references for future interviews.

Once the executive had been pre-screened and confirmed as a participant, a meeting was arranged and a copy of the interview guide / questionnaire was provided prior to the interview. This was done to provide the executive a preview of the type of information being requested. If the executive had a chance, they completed as much of the questionnaire as was practical. This advance copy of the questionnaire was also used by some firms to judge whether they would participate in the research study.

Other documentation, when available, was reviewed prior to the interview to ensure familiarity with the subject matter.

In some instances, there was executive overlap in the interview process. Executives had naturally participated in more than one alliance under study. All attempts were made to ensure an executive was not interviewed twice. In all, there was only one instance where one executive was interviewed for two cases. In two cases, two executives were interviewed, and it was found that there were no significant differences in the interview results.

3.8 Data Organization

The information collected throughout the interview process was coded in a database comprised of four partitions:

- summary and background data
- market, technology and time-to-market data
- competitive strategy data
- core competency data

The data was coded quantitatively where possible. Other areas, where the information was provided in a qualitative fashion, the data was entered in the qualitative form in order to perform some analysis to assess whether it could be quantified.

- alliance name
- alliance number (coded)
- firm name
- partner name
- country of residence for partner
- alliance objectives
- partner role
- value chain
- relative, absolute partner size
- decision making process
- alliance mode choice
- ranked market factors
- market factors influencing formation
- market factors influencing mode choice
- market uncertainty rating
- ranked technology factors
- technology factors influencing formation
- technology factors influencing mode choice
- technology uncertainty rating
- relative rank: technology & market on formation
- relative rank: technology & market on mode choice
- source of time-to-market pressures
- achievement of time to market
- time-to-market alternatives
- relative rank: market, technology, time-to-market
- other factors influencing formation and mode selection
- factors influencing a change in mode selection
- equity/non-equity advantages/disadvantages
- strategy level
- scope of development
- importance relative to firm strategy
- competitive advantage

- customer/competitor reactions
- new market entry
- standard product life cycle
- addressable market (stage of evolution)
- competitive intensity
- competitive concentration
- relative firm size of competitors
- geographic dispersion of competition
- new technology introduction
- viability of technology development
- viability of business strategy
- core competencies, ranked
- partner use of core competencies
- partner access to core competencies
- partner denied access to core competencies
- access to partner's core competencies
- core competency leverage
- core competency access w/ equity
- benefits of core competencies
- new core/distinctive competencies

3.9 Data Analysis

The primary method of analyzing the factors influencing alliance formation and alliance mode selection was using frequency analysis on the ranked and stated reasons in the comment fields of the database. Those questions that use Likert scales were tested for statistical validity using SPSS's Kolmogorov-Smirnov's *Goodness of Fit* test. A uniform distribution was selected to ensure that results were statistically different and not uniformly distributed. A chi-square test could not be used as fewer than five observations were in each cell.

The qualitative comments were also thoroughly assessed to understand the motivations, particularly for the mode selection decision.

A similar type of analysis was performed on the strategy and core competency variables. However, this analysis was much more directed towards analysis of the qualitative data

that was gathered. The focus here was to understand the underlying rationale for how a firm related the alliance to its own strategy, and how it impacted a firm's position towards protecting its core competencies.

4. FINDINGS

4.1 Introduction

This chapter presents the results of the research study and integrates the findings into a framework to provide a more comprehensive view of the determinants of non-equity alliance formation and mode choice.

Section 4.2 provides a description of the alliances studied. Section 4.3 presents a preview of the findings for all propositions. Section 4.4 examines the results of the findings for Proposition P-4. Sections 4.5 and 4.6 examine the results for Propositions P-2 and P-3 respectively. Section 4.7 consolidates the findings from P-1, P-2 and P-3 into a more integrative view of the determinants of alliance formation and mode choice. Section 4.8 presents the findings for Proposition P-4. Section 4.9 examines the findings for Proposition P-5. Section 4.10 presents a discussion of related findings. Section 4.11 concludes with a chapter summary.

4.2 Description of the Alliances Studied

This section provides a summary overview of the observed alliance characteristics. The information presented in this section includes a profile of alliance market objectives, a summary of markets addressed with the alliance, a summary of the products being developed in the alliances, and a profile of the technologies developed in these alliances.

The sample size represented in the findings is twelve ($N = 12$), except in the technology uncertainty section (Section 4.5) where the sample size is ten ($N = 10$). Data was collected for fourteen alliances in total, with two of these alliances represented by minority equity relationships. The intent in gathering two equity alliance samples was to utilize the information for comparative and discovery purposes. Therefore, these equity based alliance samples are not included in the sample frame.

Table 4-1: Strategic Market Objectives Associated with Alliance Sample

Primary Market Objectives or Results ^(a)	Distribution (N = 12)	Percentage Distribution
market entry into new or emerging market	2	16.7%
market entry into established segment, new to alliance	4	33.3%
market and/or product positioning activity	3	25.0%
distribution channel issues	3	25.0%
Total	12	100.0%
^(a) The factors listed are those ranked as the most significant market factor influencing alliance formation.		

Table 4-1 summarizes the strategic market objectives identified by the alliance executives as reasons for alliance formation. The results presented in Table 4-1 depict the diversity in market objectives for non-equity alliances. For this sample, there were no clearly dominant market objectives. In this sample, two of the twelve alliances studied facilitated entry into an emerging market²². Four of the alliances enabled the parents enter into an established market where at least one of the parents did not have a prior presence. Three of the alliances were struck to improve or change the positioning of the firm and/or the product in a particular market. Three of the alliances dealt with distribution channel issues.

Table 4-2 presents a distribution of the types of markets alliances are targeted at addressing. The distribution is by stage of market evolution. Two-thirds of the sample (67%) participated in emerging²³ or growth markets, whereas only one-third participated in mature, stable markets.

The participation in the mature market segments provided an interesting contrast, as it was assumed from the literature (Auster 1992; Harrigan 1988a) that alliances in mature

²² Emerging market equivalent to what Porter (1980) defines as an "emerging industry", and what Moore (1995) defines as the "early market".

²³ New and emerging markets as discussed in this research study were defined by Prahalad and Hamel (1994) as pre-competitive markets, where Prahalad and Hamel suggested that competition starts years before products are delivered to the market.

markets would likely be equity based alliances. However, one of the alliances represented a case of mature market entry with an intent to position its newer technology in that market, and to leverage the installed base onto that new technology base. The other cases identified entry into a mature market as a niche player, but with an expected technical advantage.

Table 4-2: Distribution by Stage of Market

	Distribution (N = 12)	Percentage Distribution by all Categories	Percentage Distribution by Two Categories
new markets	0	0.0%	66.7%
emerging market	5	41.7%	
growth market	3	25.0%	
mature market	4	33.3%	33.3%
declining market	0	0.0%	
Totals	12	100.0%	100%

Table 4-3: Distribution by Product Life Cycle

	Distribution (N = 12)	Percentage Distribution Across All Categories	Percentage Distribution Across 2 Categories
yet to be introduced	2	16.7%	83.3%
new product	5	41.7%	
in growth stage	3	25.0%	
mature product	2	16.7%	16.7%
ready for retirement	0	0.0%	
Totals	12	100.0%	

As per Table 4-3, the majority of the alliances (83%) are directed at development of products not yet introduced, new products, and products in their growth stage. Non-equity alliances are also directed at products in the mature stage, although not as prevalently within this sample (17%).

Table 4-4 presents a distribution by technology type for the alliances sampled. These are the categories defined by Harris et al. (1996) to identify the type of technology, relative to their criticality within a firm and market context. Harris suggested firms own both emerging and key technologies, and influence basic and commodity technologies.

Table 4-4: Distribution by Technology Category

Technology Type	Distribution (N = 10 ^(b))	Percentage Distribution by all Categories	Percentage Distribution by Ownership & Influence ^(a)
emerging technology	1	10.0%	ownership 30.0%
key technology	2	20.0%	
basic technology	7	70.0%	influence 70.0%
commodity technology	0	0.0%	
Total	10	100.0%	
(a) as per study by Harris et al. (1996)			
(b) 10 cases of the 12 reported technology as a factor, thus reducing the population size for these results			

The findings are consistent with the results from Harris²⁴ et al. (1996) in that the majority of the samples (70%) are in the basic technology category. However, in the key technology samples, the data suggests the firms are not highly dependent upon the partner for technology, but the partner brings complementary development strengths to

²⁴ Harris et al. (1996) suggested that firms should strive to own emerging and key technologies, and influence basic and commodity technologies. Influence is associated with a non-equity alliance, and owning would be accomplished either through full vertical integration, or quasi-vertical integration through an equity alliance.

the alliance. Interestingly enough, the emerging technology sample²⁵ has since turned into a key technology for the firm. The seven base technology samples were all classified as product line extensions to a mature product platform.

In summary, the purpose of this section was to provide an overview and summary of the nature and character of the alliances as observed through the field research. The underlying theme is that the samples do present a wide diversity of strategic situations when measured against market and technology attributes.

4.3 Preview of the Research Findings

As a preview of the research findings, the outcomes for the propositions are summarized in Table 4-5.

All five propositions were tested in the research. For P-1 through P-3, the propositions for alliance formation were confirmed based on the quantitative information. However, the qualitative results suggested that partner considerations played a more dominant role in mode choice than environmental uncertainty. P-4 and P-5 were confirmed.

Table 4-5: Summary of Research Findings For Propositions

Proposition	Outcome
P-1 A high degree of market uncertainty is associated with non-equity alliance formation.	• confirmed
P-2 A high degree of technology uncertainty is associated with non-equity alliance formation.	• confirmed
P-3 Time-to-market pressures are associated with non-equity alliance formation.	• confirmed
P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm.	• confirmed
P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.	• confirmed

²⁵ Emerging technology was the technology type as measured at the time the alliance was formed.

The following sections describe the detailed findings.

4.4 Findings Related to Market Uncertainty (Proposition P-1)

This section presents the findings for Proposition P-1 The first proposition states:

P-1 A high degree of market uncertainty is associated with non-equity alliance formation.

Table 4-6 presents the measurement of market uncertainty across all of the alliance samples. Market uncertainty was ranked as high or medium-high by 58.3% of the sample. Only 8.3% of the sample listed market uncertainty as low, and 16.7% listed uncertainty as medium-low. These were cases where alliances were used to enter relatively mature markets for strategic purposes in order to leverage entry into an adjacent, higher growth segment. These results are significant at the 0.001 level.

Table 4-6: Distribution of Market Uncertainty Across Alliance Sample

Market Uncertainty	Frequency (N = 12)	Percentage by each category	Percentage by 3 categories of uncertainty
high	4	33.3%	58.3%
medium-high	3	25.0%	
medium	2	14.3%	16.7%
medium-low	2	16.7%	25.0%
low	1	8.3%	
Total	12	100%	100%
KSZ = 2.021			$p = 0.001$

Therefore, in terms of Proposition P-1, the relationship between market uncertainty and non-equity alliance formation was confirmed. This is consistent with Harrigan (1988a) who found high demand uncertainty was related to non-equity alliance formation.

Related observations further support this finding as a majority of the alliances (67%) participated in new, emerging and growth markets, which have been characterized by a higher degree of uncertainty (Bettis and Hitt 1995).

4.5 Findings Related to Technology Factors (Proposition P-2)

This section presents the findings for Proposition P-2. The second proposition states:

P-2 A high degree of technology uncertainty is associated with non-equity alliance formation.

Two of the alliance did not provide technology data. These alliances are not included in this sample, thus reducing the sample population to ten.

Table 4-7: Distribution of Technology Uncertainty Across Alliance Sample

Technology Uncertainty	Frequency (N = 10)	Percentage by each category	Percentage when reduced to three categories
high	4	40.0%	50.0%
medium-high	1	10.0%	
medium	2	20.0%	20.0%
medium-low	1	10.0%	30.0%
low	2	20.0%	
Total	10	100%	100%
KSZ = 1.581			$p = 0.01$

Table 4-7 presents the distribution of technology uncertainty across the alliance sample. While the majority of the cases identified a high level of technology uncertainty, comparatively there was marginally less technology uncertainty than market uncertainty: high market uncertainty was in 58% of the samples and high technology uncertainty was represented in 50% of the sample. The lower rates of uncertainty are

partially explained by the fact that three (3 of 10 cases) of the cases dealt with mature technologies where the uncertainty level was considered to be low by the respondents. The results are significant to the 0.01 level.

Therefore, in terms of Proposition P-2, the relationship between technology uncertainty and non-equity alliance formation was confirmed. This is consistent with the findings of Osborn and Baughn (1990) who suggested high technology uncertainty favoured non-equity alliance creation. There was generally a lower amount of technology uncertainty²⁶ which is supported by the relatively higher content of basic technology components (70%, Table 4-4).

4.6 Findings Related to Time-to-Market Factors (Proposition P-3)

This section presents the findings for Proposition P-3. The third proposition states:

P-3 Time-to-market pressures are associated with non-equity alliance formation.

Table 4-8: Distribution of Time-to-Market as an Influence on Alliance Formation

	Distribution (N = 12)	Percentage Distribution
Time-to-market was an influence on alliance formation	12	100%
Time-to-market was not an influence on alliance formation	0	0%
Total	12	100%

Table 4-8 presents the distribution of responses for time-to-market as an influence on alliance formation. Executives unanimously stated time-to-market was an influence on the alliance formation decision.

²⁶ There was a lower amount of technology uncertainty (high = 50%) when compared to market uncertainty (high = 58%)

Table 4-9 and Table 4-10 provide additional depth to the information summarized in Table 4-8 by expanding on why time-to-market was considered an influence. Table 4-9 provides a summary of perceived sources of the time-to-market urgency, and Table 4-10 provides a summary of how the alliance responded to that time-to-market urgency.

Table 4-9: Distribution of Time-to-Market Source of Urgency Across Alliance Sample

Source of Urgency	Distribution (N = 12)	Percentage Distribution
internal	7	58.3%
customers	4	33.3%
competitors	1	8.3%
Total	12	100.0%

Table 4-10: Distribution of Time-to-Market Response to Urgency Across Alliance Sample

Response to Urgency	Distribution (N = 12)	Percentage Distribution
skills ^(a)	6	50.0%
resources ^(b)	5	41.7%
products	1	8.3%
Total	12	100.0%
^(a) Partner brought both resources and skills to the alliance, skills were considered more critical.		
^(b) Resources brought to the alliance were skilled in all cases, but the resources were considered more critical. In other words, skills were more substitutable in nature.		

Table 4-9 presents the distribution of what the perceived sources of time-to-market pressures were within the research sample. It was evident from the interviews that the major source of the urgency was internal pressures. From the interviews it was evident that “internal” did not mean executives were oblivious to external pressures, but rather they had internalized those pressures into a committed strategy. Where customers were

identified as the primary source of urgency, the alliance was a vertically oriented relationship: the development partner provided product to the distribution channel partner. In three of the four cases, the alliance partner was considered as a proxy for the end customer. In the other case, the alliance partner was the end customer.

Table 4-10 presents the distribution of how the alliance achieved the time-to-market objectives. According to the measures, the dominant impact on time-to-market was attributed to *both* the skills and resources a partner brought to the table. Although skills showed a slight majority (50% vs. 42%), it was evident through the interviews that it was difficult for managers to clearly prioritize skills over resources. In general, managers did state that resources and skills were both considered crucial.

Therefore, in terms of Proposition P-3, time-to-market factors were confirmed to have a specific influence on the formation of the alliance. While time-to-market factors did not explain alliance formation on their own, time-to-market was frequently linked with the other factors in explaining alliance formation.

4.7 Additional Findings: Propositions P-1, P-2, and P-3

This section establishes a basic framework to consolidate the findings and observations on alliance formation. These observations were related to the open-ended questions and emergent themes discovered through the interviews.

The results and interviews indicated there was more of a multi-dimensional nature to the phenomenon of alliance formation. When considered in the integrated context of all three propositions - market, technology, and time-to-market - alliance formation took on a more comprehensive view. Table 4-11 presents a consolidated view of factors ranked as to their influence on alliance formation. The table identifies the distribution of factors that were ranked first, and then the distribution of factors that were ranked second.

In many of the cases the executives pointed out that not only did the partner help by providing market presence, or a distribution channel, but the partner frequently had working technology, which provided significant benefit in bringing credibility to the alliance.

It was evident from the interviews that all alliances were struck in response to some element of market uncertainty and risk. However, it also became apparent from the interviews that environmental uncertainty, as measured through market and technology uncertainty, was not a dominant factor in mode choice. Partner considerations were assessed as a more important factor in mode choice.

Table 4-11: All Factors Influencing Alliance Formation

	As Ranked First (N = 12)		As Ranked Second (N = 12)	
	Frequency	Percentage	Frequency	Percentage
Market Factors	5	41.7%	3	25.0%
Technology Factors	1	8.3%	5	41.7%
Time-to-Market Factors	6	50.0%	4	33.3%
Total	12	100.0%	12	100.0%

As Table 4-11 shows that market and time-to-market combinations could be identified as primary factors in alliance formation. Technology was not considered a primary reason for alliance formation, but was a secondary factor. During the interviews, executives were asked to identify more significant alliance formation influences than those mentioned. In all cases, there were no additional factors identified.

In summary, the combination of time-to-market, technology, and market factors and uncertainty were used by managers to explain alliance formation. This was also confirmed by examining background documentation. Of the documentation samples investigated, these three factors typically formed the basis of an alliance justification. Partner considerations were assessed as a fundamental influence on non-equity mode choice.

4.8 Findings Related to Strategy (Proposition P-4)

This section provides the findings for Proposition P-4. The fourth proposition states:

P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm.

Table 4-12 provides a summary of the measures of strategy levels as identified through the research. In the majority of cases (92%), the alliance was an element of a business strategy. These findings were consistent with the expectations derived from the literature (Krubasik and Lautenschlager 1993; Mintzberg 1994; Hofer and Schendel 1978). It was evident from the interviews that in all cases the alliance was a subsidiary element of a more encompassing strategy. These results are statistically significant.

Table 4-12: Distribution by Strategy Level Across Alliance Sample

Strategy Level	Distribution by Strategy Level (N = 12)	Percentage Distribution
Corporate	0	0.0%
Business	11	91.7%
Functional	1	8.3%
Other/None	0	0.0%
Total	12	100%
KSZ = 3.175		$p = 0.000$

Table 4-13 provides a summary of the measurements taken of the strategy importance variable. This variable measured how important the alliance was relative to the business strategy. Over 90% of the sample responses stated the strategy was either important or critical to the their business strategy. These results are significant to the 0.03 level.

Table 4-13: Distribution by Strategy Importance Across Alliance Sample

Strategy Importance	Distribution by Strategy Importance (N = 12)	Percentage Distribution Across 4 Categories	Percentage Distribution Across 2 Categories
not important	0	0.0%	8.3%
minor importance	1	8.3%	
important	6	50.0%	91.7%
critical	5	41.7%	
Total	12	100%	100%
KSZ = 1.443		p = 0.031	

Table 4-14 provides a summary of the findings for how critical the alliance was to the strategy. The question asked was:

Question #35 How much of the business strategy can be executed exclusive of the alliance partner? If the partner goes away for whatever reason, would a viable strategy remain?

This was not measured as a Likert-type question, but the categories did emerge as a result of the interview process. In the interview results, the executives consistently stated the categories identified, and therefore the information was converted into a Likert scale. The results are significant to the 0.03 level.

As a result of the interviews, it became evident the responses contained multiple levels of information. On one level, the response fell into two basic categories - either the alliance was considered essential, or not essential. During the interviews, when an alliance was identified as essential it meant that partner substitution²⁷ was acceptable, but alliance substitution²⁸ was not. In two-thirds of the sample (66.7%), the alliance was considered essential to the strategic objective.

²⁷ Partner substitution was identified as act of substituting one alliance partner for another; either partner would be expected to perform a similar role in the situation.

²⁸ Alliance substitution was identified as the act of substituting the alliance activities with non-alliance

Table 4-14: Distribution of Alliance Criticality to Strategy

Criticality of the Alliance to Strategy	Distribution by Alliance Criticality (N = 12)	Percentage Distribution	Percentage Distribution by How Essential Alliance Is
little impact (alliance opportunistic)	2	16.7%	not essential 33.3%
compromised (alliance non-essential)	2	16.7%	
compromised (alliance essential)	5	41.7%	essential 66.7%
unworkable (alliance essential)	3	25.0%	
Total	12	100%	100%
KSZ = 1.443		p = 0.031	

When the alliance was considered essential, there were two scenarios that became evident in the interviews. In one scenario (unworkable, essential), respondents reported the strategy would have become unworkable (measure = 25%), which meant that an alliance was essential to the strategy. In the other scenario (compromised, essential), the respondents reported a viable strategy would remain, but certain aspects, such as the delivery time²⁹ or strategic reach³⁰, would be compromised.

When the alliance was considered non-essential the two scenarios took on a different character. In the one scenario (compromised, non-essential), the strategy would be compromised but recovery would be possible through alliance substitution. The type of alliance substitutions that were typically referenced in the interview was internal development or sub-contracting. In the other scenario (little impact, opportunistic), the base strategy was largely not impacted as a result of the alliance going away. It was evident from the interviews that these cases were opportunistic situations unique to the

activities, such as in-house development, or sub-contracting. In alliance substitution, the resultant activities would have taken on a different node than when executed by the alliance.

²⁹ Delivery time, as stated in the interviews, referred to a longer time frame for delivery of results.

³⁰ Strategic reach is a term used to identify limitations of the strategy without the alliance partner. Through the interviews, this became evident as measures of breadth of market coverage (i.e. number of markets), depth of market coverage (i.e. market share), and geographical market coverage.

current partner. Managers stated that if the alliance “went away”, that element of the strategy would not likely be recovered.

In summarizing and integrating the findings presented in the Table 4-12, Table 4-13, and Table 4-14, it is obvious that firms consider the alliances primarily as elements of their business strategy. It is also evident that firms do engage in alliances to address important aspects of their strategies: where 92% of the sample reported the alliance to be important or critical to their business strategy, and where 67% of the sample considered the alliance essential to the business strategy. That non-equity alliances are considered both essential and important in the majority of cases within this sample strongly suggests that non-equity alliances play an important role in a firm’s strategy.

Therefore, the proposition was confirmed as alliances were found to be elements of business strategy, and it was discovered that alliances were considered both important and essential elements of business strategy.

4.9 Findings Related to Core Competencies (Proposition P-5)

This section provides the findings for Proposition P-5. The fifth proposition states:

P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.

Table 4-15 presents the distribution of alliances as their activities and objectives related to the core competencies of either or both of the parent firms. Two-thirds (67%) of the alliances did not require access to what was regarded as either firms’ core competencies. However, a reasonably significant number (33%) of responses indicated that the alliance would deal directly with a parents’ core competencies. These results are statistically significant.

Table 4-15: Distribution of Alliances Direct Involvement with Core Competencies

	Distribution (N = 12)	Percentage Distribution
Core Competencies ^{(a)(b)}	4	33.3%
Non-Core Competencies	8	66.7%
Total	12	100.0%
KSZ = 2.309		<i>p</i> = 0.000
(a) measured as by the alliance dealing directly with the firm's core competencies		
(b) The core competencies discussed were those perceived at the time of the alliance formation.		

It was evident from the interviews that all alliances were intended to leverage the core competencies of both firms. This was frequently related to overall alliance objectives. However, this leverage occurred (or was intended) to happen primarily in a complementary fashion. As Krubasik and Lautenschlager (1993) suggested in their article, partner's competencies can be leveraged in an asymmetric manner, for example trading technology for market access. The key point is that there was no direct interaction required or planned in relation to the core competencies.

Table 4-16 depicts the distribution for the scope of access across the alliance sample. Scope of access measured how much access was granted to the partner. Full access was characterized during the interviews as the partner was able to gain full access to what was required in the scope of the alliance³¹. It meant the respondent did not specifically limit the partner's access to people or information, but in some cases monitored it. In two-thirds of the cases, the firms limited their partner's access in some manner to the information and people that were pertinent to the alliance objectives and activities, and to what was expected to perform the activities of the alliance. These results are significant to the 0.03 level.

³¹ In all cases access was not requested to areas outside the domain of the alliance.

Table 4-16: Distribution by Scope of Access Across Alliance Sample

Scope of Access	Distribution by Scope of Access (N = 12)	Percentage Distribution Across 5 Categories	Percentage Distribution Across 3 Categories
access not an issue	1	8.3%	8.3%
no access	0	0.0%	0.0%
very limited access	5	41.7%	66.7%
limited access	3	25.0%	
full access	3	25.0%	25.0%
Total	12	100%	100%
KSZ = 1.443		$p = 0.031$	

The results show that in two-thirds of the cases (67%), partner access was limited in some form. However, in one-quarter (25%) of the samples, full access was granted to the partner, or stated as the intent³². The results were roughly as expected with the majority of the cases reporting some type of limitations on access within the alliance. In this questionnaire the access was not specific to core competencies.

Table 4-17 depicts the distribution as measured for the nature of access variable. Neither internalization objectives, nor utilization objectives dominated in this sample. The expectation, as per the literature, was that in a non-equity situation the utilization mode of exchange would dominate (Woodcock, Beamish and Makino 1994). These results are significant to the 0.001 level.

³² In cases where the alliance was just forming (at the time of the interview) the statements made by the executives were interpreted more as a statement of intent, rather than practice.

Table 4-17: Distribution by Nature of Access Across Alliance Sample

Nature of Access	Distribution by Nature of Access (N = 12)	Percentage Distribution
utilization	7	58.3%
internalization	5	41.7%
Total	12	100%
KSZ = 2.021		p = 0.001

However, to better understand the relationships, the *nature of access* must be compared to where core competencies were relevant (or not) to the alliance. As Table 4-18 shows, only one of twelve cases (8%) identified *access to core competencies* where the objective was *internalization*. It became evident in the interview that this single case had some special circumstances³³ attached to it and might likely be considered an exception.

Table 4-18: Core Competencies Compared to Nature of Access

	core competencies involved in alliance	only non-core activities involved in alliance
objective stated as utilization	3 (25.0% of sample, N = 12)	4 (33.3% of sample, N = 12)
objective stated as internalization	1 (8.3% of sample, N = 12)	4 (33.3% of sample, N = 12)

The four cases where only non-core activities were part of the alliance, and the objective was internalization, was due primarily to *a priori* agreements. In these cases one partner agreed to ultimately become self sufficient for the long term support of the product, and thus required access to all the information. Two of these four alliances were originally

³³ The alliance in question had recently formed as of this writing and had the characteristic and intention of being a fairly broad based alliance. The partners were clearly only starting to work together and this many aspects of the relationship were stated more as intents and expectations, rather than as results or practices.

struck as sub-contract arrangements, but the risk sharing and joint management was considered more typical of an alliance than a sub-contract arrangement.

Table 4-19 summarizes the results of a comparison between core/non-core activities and scope of access. The one sample where full access to the core competencies is cited, is the same special case identified previously (see footnote 33). In general, where the core was involved, access was limited. Even in non-core activities, access was generally limited. The two cases of full access in non-core activities were the alliances that had their beginnings in a subcontract arrangement.

Table 4-19: Core Competencies Compared to Scope of Access

	core competencies involved in alliance	only non-core activities involved in alliance
access limited, no access	3 (25.0% of sample, N = 12)	6 (50.0% of sample, N = 12)
full access	1 (8.3% of sample, N = 12)	2 (16.7% of sample, N = 12)

Table 4-20: Scope of Access Compared to Nature of Access

	objective stated as internalization	objective stated as utilization
access limited, no access	2 (16.7% of sample, N = 12)	6 (50.0% of sample, N = 12)
full access	3 (25.0% of sample, N = 12)	0 (0.0% of sample, N = 12)

Table 4-20 provides a comparison of *scope of access* to *nature of access* findings. The *internalization* objective and *full access* corresponded to the special case (see footnote 33) and the two cases mentioned with origins in the sub-contracting mode. The majority of cases, regardless whether the objective was internalization or utilization, access was either limited in some fashion, or access was not an issue (as resolved in an *a priori* manner)

In summary, non-equity alliances were directed at primarily non-core activities (67%) in the sample studied. Access granted to partners, regardless of core involvement, was limited in some manner in nine of the twelve cases studied (75%). This is as per the expectations set by the literature (Hamel #11). Further, the exceptions to the generalization can be explained as special cases that would be considered atypical. In all cases, the respondents stated that the core would be leveraged within the alliance in some complementary manner.

Therefore, Proposition P-5:

P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.

This proposition was confirmed. The core competencies were typically not shared in a non-equity alliance, and were leveraged in a non-equity alliance. However, the results were surprising as the proposition was not confirmed in the way expected. Non-equity alliances generally did not participate in the core, and when they did, access was typically limited. These results are comparable to Hagedoorn (1995) which suggested that alliances generally did not participate in the core businesses of the firm³⁴.

4.10 Discussion of Related Findings

In measuring market, technology, and time-to-market factors by their influence on alliance formation and mode choice it became evident that environmental uncertainty was not the most important factor in non-equity mode choice. Partner considerations emerged as a more dominant factor in determining mode selection.

There is a paradox in the findings for strategy and core competencies. The strategy findings suggest that firms consider alliances important and essential elements of their business strategy. The core competency findings suggest non-equity alliances do not

³⁴ Hagedoorn (1995) generally observed through a limited sample that technology alliances generally did not participate extensively in the core business of a firm, but did participate extensively external to the core. Hagedoorn's sample was focused at information technology firms and included both equity and non-equity modes.

play a strong role in the core, and that firms generally limit access to their non-equity partner.

In the high technology sector the environment is normally very uncertain (Bettis and Hitt 1995). Therefore, why should this environmental uncertainty suggest mode choice if it is a normal part of the environment. It was evident from the interviews that partner characteristics were fundamental to mode choice. When it comes to choice of mode for a strategic alliance, managers look to the partners themselves.

Executives suggested mode choice was dominated by partner considerations (92%) as per Table 4-21.

Table 4-21: Qualitative Factors Affecting Alliance Mode Choice

	Reported as Key Determinant of Alliance Mode Choice	Percentage of Responses For Sample Size
Partner Considerations	11	91.7%
Scope of Development	1	8.3%
Totals	12	100.0%

Partner considerations was a broad classification that took into account certain characteristics of the partner. For example, partner size (i.e. partner was larger) was stated in six of the twelve samples as reasons for pursuing non-equity. A number of responses identified a poor strategic fit between themselves and the partner as a reason for choice of non-equity. The one case where scope of development was quoted was a joint development alliance where the executive stated that the size and scope of alliance activity did not warrant anything more than a non-equity alliance (i.e. a non-core activity)

Simplicity was also stated as a secondary reason for the non-equity mode selection. Managers generally perceived the non-equity form as a simpler alliance to manage, and

in particular, simpler to exit from. Managers also stated that non-equity alliances were generally perceived as having lower levels of partner and management commitment.

These results are consistent with the findings of Larson (1992), Osborn and Baughn (1990), and Tallman and Shenkar (1994). Larson (1992) found that the type of governance was more of a partner consideration than an environmental one. Osborn and Baughn (1990) suggested in their findings that the alliance governance form needs to account for partner considerations. Tallman and Shenkar (1994) identified that motivations for alliance formation and mode choice were influenced by partner considerations. However, these results are contradictory to the findings of Harrigan (1988a) and Auster (1992), where non-equity alliance mode choice is related to external factors.

The two equity cases provide some contrast the non-equity findings. Two reasons were cited during the interview for the choice of equity. The main reason was to gain influence and visibility with the (smaller) partner. Influence was achieved through a seat on the firm's board of directors. With the board seat came influence and visibility into the strategies and operations of the partner firm. The second consideration was to ensure full commitment from the senior management in the larger firm as typically the senior manager was the sponsor for the equity investment. This points to a higher commitment relationship than discussed above. The literature also suggests that generally equity based alliances attract higher levels of commitment than non-equity alliances (Harrigan 1988a; Auster 1992).

In contrasting the strategy findings with the core competency findings, the results indicate that alliances are critical and essential elements of the business strategy, and yet these alliances generally do not participate in the core. Further, managers generally limited access to their partner in some manner

In a high technology firm, technological assets and knowledge are typically the most valued and protected assets of the firm (Prahalad and Hamel 1994; Harrigan 1988a; Bettis and Hitt 1995; Hamel, Doz and Prahalad 1989). This phenomenon was also evident in the interviews, although it was rarely explicitly stated. In one interview, a manager stated that their partner did suggest stronger cooperation on technology, but

this was rejected by his firm because this partner was also a potential competitor. Other observations were more implicit: partners were given access to people and information as required to carry out the alliance activities, but access beyond that scope was limited.

This is generally the type of collaboration Hamel (1991) described in his study. As Hamel stated "collaboration is not a substitute for competition". Hamel implied that firms should maintain a certain wariness of their partner, even though they were collaborating. While there were no direct observations in this research study, the implications are similar to Hamel's findings. This, coupled with the observations on lower commitment as attributed to non-equity alliances, suggests that perhaps lack of trust is an element of the non-equity alliance formation and mode choice.

These findings, supported by the literature are indicative of either a lack of trust, or at least lower levels of trust in a non-equity alliance. This is in contrast to equity alliances where it was suggested higher levels of trust implied better performance (Hebert 1995). The protection of technological assets, the high degrees of uncertainty, and the lack of trust with the partner may be a rationale for non-equity alliance mode choice and formation. The findings and observations of this study are indicative of lower levels of trust, but they are not conclusive. This does provide an interesting avenue for future non-equity alliance research.

4.11 Summary

Propositions P-1, P-2 and P-3 were confirmed in their relationship to alliance formation. However, in looking at Propositions P-1, P-2, and P-3 as an integrated set of findings, the multi-dimensional nature of alliance formation began to emerge.

While market and technology uncertainty were related to non-equity alliance formation, managers rationalized the formation in terms of time-to-market pressures, market factors, and technology factors. Time-to-market pressures and market factors were generally considered as the most significant influences.

Propositions P-1 and P-2 were confirmed in their relationship to alliance mode choice. However, mode choice was found to be influenced to a greater degree by partner considerations than environmental uncertainties.

Proposition P-4 was confirmed in that a non-equity alliance was related to the business strategy of the firm. Non-equity alliances were also found to be important and essential elements of the firm's business strategy.

Proposition P-5 was confirmed, but highlighted an emergent phenomenon. While firms did consider alliances important and essential (as per P-4 findings), non-equity alliances also did not participate in the core, and access was generally limited to partners. Findings were indicative of lower levels of trust within a non-equity alliance, but not conclusive.

5. SUMMARY AND CONCLUSIONS

5.1 Introduction

The key objectives of this research were to investigate the determinants of non-equity alliance formation, and non-equity alliance mode selection in the high technology sector. This dissertation broadly focused on three issues:

- Why are non-equity alliances chosen in the high technology sector?
- How are strategy and core competencies associated the choice of non-equity alliances?
- How are technology and market factors associated with high technology alliance formation?

These issues were investigated through the study of twelve non-equity strategic alliance formation decisions in the Ottawa-Carleton region. In the research sample all the alliances were understood to be independent of each other - there were no known interrelationships. In addition, two minority equity alliances were studied as part of the research for comparative purposes, but were not included in this research sample.

Section 5.2 presents a summary of the findings. Sections 5.3 and 5.4 discuss the management and academic implications of the research. Section 5.5 suggests areas for future research.

5.2 Summary of Findings

The phenomenon of non-equity strategic alliances in high technology was broadly investigated in this dissertation. The specific focus of the research was to understand why the alliance formation decision was made, and what influenced the choice of alliance mode choice in high technology.

The approach used was a blended approach between grounded theory development and traditional verification techniques. While there was existing equity based alliance

research to begin the research study with, it was deemed insufficient to fully explain the non-equity phenomenon in high technology. Nonetheless, five propositions were derived from the literature. A good part of the research consisted of open-ended questions to capture emergent and underlying themes.

Five alliance propositions were tested as part of the research; three of these tested a set of relationships between alliance formation and mode choice, and the remaining two tested a set of relationships between a non-equity alliance and a firm's strategy and core competencies.

Table 5-1: Summary of Research Findings for the Propositions

Proposition	Outcome
P-1 A high degree of market uncertainty is associated with non-equity alliance formation.	• confirmed
P-2 A high degree of technology uncertainty is associated with non-equity alliance formation.	• confirmed
P-3 Time-to-market pressures are associated with non-equity alliance formation.	• confirmed
P-4 Non-equity alliances are focused primarily within the business strategies of the high technology firm.	• confirmed
P-5 The core competencies of a firm will not be shared in a non-equity alliance, but it is highly likely that they will be leveraged.	• confirmed

Proposition P-1 confirmed the relationship between market uncertainty and non-equity alliance formation. This was supported by the observations that 67% of the non-equity alliances participated in new, emerging and growth markets. These markets are generally characterized by high levels of uncertainty (Bettis and Hitt 1995). These findings are consistent with relationships Harrigan (1988a) found between demand uncertainty and non-equity alliance formation.

Proposition P-2 confirmed the relationship between technology uncertainty and non-equity alliance formation. There was generally a lower level of technology uncertainty observed (50%), as compared to market uncertainty (58%). This is supported by the

measurement that 70% of the technology was considered basic technology. These findings are consistent with Osborn and Baughn (1990) who suggested high technological uncertainty favoured the non-equity mode choice.

While the relationship between environmental uncertainty and mode choice was confirmed, it was discovered that uncertainty is less fundamental to non-equity mode choice than partner considerations. Managers identified partner considerations as fundamental to non-equity mode choice. This is supported in the literature by both Larson (1992) and Osborn and Baughn (1990) who suggest alliance governance needs to account for partner considerations. However, these findings are in contrast to other studies (Harrigan 1988a; Auster 1992) suggesting mode choice is related to external factors in highly uncertain environments.

Proposition P-3 confirmed the relationship between time-to-market pressures and non-equity alliance formation. Time-to-market pressures were unanimously quoted in this research sample as influencing non-equity alliance formation. The results indicate that time-to-market pressures are addressed by the resources and skills partners contribute to an alliance. These results are comparable to the observations from the literature, which suggest time is one of the most critical elements in the fast paced, rapidly changing, technology intensive firms (Hamel 1991; Bettis and Hitt 1995; Prahalad and Hamel 1994).

The results were also indicative that a more comprehensive, multi-dimensional explanation was possible by looking at the observations from P-1, P-2 and P-3 in an integrative fashion. It was through the combination of these three factors - market, technology and time-to-market - that executives typically explained non-equity alliance formation. This, coupled with the findings that partner considerations are the dominant factor in non-equity mode choice, provides a comprehensive description for alliance formation and mode choice in high technology, non-equity strategic alliances.

Proposition P-4 confirmed that a non-equity alliance is an element of a firm's business strategy. The findings also indicated a non-equity alliance is considered an important and essential part of the high technology firm's strategy.

Proposition P-5 confirmed core competencies were typically not shared in a non-equity alliance, and the expectation on the part of managers that these core competencies would generally be leveraged through the alliance relationship. However, this proposition was confirmed in a manner that was unexpected as the results suggested that non-equity alliances do not generally participate in the core, and that access was generally limited in a non-equity alliance. Hagedoorn (1995) found that in limited observations on technology alliances, only a minority of alliances participated in the core business of information technology firms.

The paradox became more apparent in comparing the measurements for Propositions P-4 to P-5. Where firms indicated that non-equity alliances were important and essential elements of their business strategy, they also suggested these alliances generally did not participate in the core and that partner access was generally limited in some manner.

The findings, with support from the literature, suggest that non-equity alliances may be characterized by lower levels of trust, than traditional equity alliances. The results in this study are indicative of lower levels of commitment in a non-equity alliance. This is generally supported in the literature (Harrigan 1988a; Auster 1992). In high technology firms, technological assets and knowledge are among the most valued and protected assets within the firm (Harrigan 1988a; Bettis and Hitts 1995; Hamel, Doz and Prahalad 1989; Prahalad and Hamel 1994). The results in this study are indicative of protection of technological assets and knowledge as a consideration in non-equity alliances.

In summary, these findings relating lower levels of trust are in contrast to prior findings in the literature that suggest trust is an important element of equity based alliances (Hebert 1995). The protection of technological assets, the high degrees of uncertainty, and lower levels of trust with a partner suggests that non-equity alliances are indeed different in their formation and choice of mode.

5.3 Management Implications

This dissertation's findings suggest that non-equity alliances play a strategic role in partnering between firms. The research also suggests that non-equity alliances are positioned into a firm's strategies based on the firm's propensity to protect its core, and

the firm's propensity to only allow alliances to participate in strategies peripheral to its core business. Lower levels of trust and commitment may also limit the types of roles alliances assume within firms' strategies. The management implications of this research are structured around these findings.

A non-equity alliance generally does not participate in the core, but rather will participate in strategies peripheral to the core. Managers should not be alarmed or surprised at not being invited to participate in their partner's core strategies within a non-equity alliance. Managers should also not set the expectation that a non-equity alliance will be allowed to participate their core strategies or competencies. According to the results of this research, it is the exception rather than the rule where non-equity alliances participate in the core. Managers must take this into account to better understand what is plausible and what is probable in their particular situation.

Non-equity alliances generally do not participate in the core. This research suggested lower levels of trust within a non-equity alliance, likely because of the technological considerations. It is because of the lower trust level that participation in the core is likely limited, and that access is constrained in some fashion. A partner's technology may look very attractive within an alliance, but there may be reluctance on the part of the partner to share because the technology is core. Therefore, understanding how the alliance relates to the partner's core will provide some insight into the behaviour and options a partner may suggest for an alliance.

If partner considerations have a major influence on mode choice, by implication partner selection also has a direct influence on the mode choice. While partner selection was not measured within this research, there are obviously direct implications to managers who are forming an alliance where the selection of a partner is still an open issue. Partner selection, by implication of this research, may in itself determine mode choice. Manager's should take this into account in the partner selection process - the choice of partner may implicitly rule out either equity, or non-equity. It is also suggested by this research that proximity to the core will have a bearing on partner selection.

Understanding how a non-equity alliance relates to a partner's strategies and core competencies may be a clue to a partner's behaviour and actions in alliance formation. If

participation in a partner's core strategies and competencies are required in an alliance, and there is a tendency of the partner to stay at a distance, the partner may in fact be weighing the risks of proceeding. Using the findings of this research may provide some insight into the formation behaviours and potential barriers to an alliance.

Uncertainty is an ever present element of the external environment in high technology that must be dealt with. Alliances can help managers to manage specific uncertainties, such as technology or market related uncertainties. Alliances should not be viewed as assisting managers to reduce the general levels of uncertainty.

Skills and resources are key considerations in forming a non-equity alliance. Considering this, an appropriate strategy may be to form alliances to address the non-core strategies, in order to re-deploy the firm's own resources into the core. In this way the firm can concentrate its resources on the core, and use the alliance to address non-core activities.

Managers should ensure consistency in setting up alliance objectives, keeping in mind the relationship to strategy and core competencies. Managers must understand the risks and opportunities in using a non-equity alliance to address the core, or even the strategies at the periphery. It is crucial that partner considerations be taken into account in alliance formation.

If an alliance is directed at the core, managers must understand the implications on mode choice. Unless special considerations were made, a non-equity alliance was generally found to not participate in the core. A partner in a non-equity alliance may gain an inappropriate amount of bargaining power if it lends some critical skills and competencies to the alliance. According to Hamel (1991) and Bleeke and Ernst (1995), a firm must understand the future potential of an alliance to make appropriate decisions in the present tense. Otherwise, managers may leave themselves open to unexpected, and perhaps undesirable results (Bleeke and Ernst 1995)

Hamel (1991) states "collaboration is not a substitution for competition". In a non-equity alliance the levels of commitment appear to be lower. As per this study, firms will utilize their partners' skills, and they will also attempt to internalize partner skills. The

alliances studied in this research internalized primarily based on *a priori* agreements. Understanding the difference between internalization and utilization in a non-equity domain may allow a firm to avoid unintentional appropriation of value and skills by their partners. This reinforces the notion that firms must come to terms with the trust factor, and understand their partner's objectives and intentions of the alliance.

5.4 Avenues for Future Research

This research investigated a seldom explored area of alliances - the non-equity mode in high technology. The study was designed to broadly assess the phenomenon of non-equity strategic alliances. The research results, coupled with the comments from executives during the interview process, provided a number of areas where future research could be undertaken.

The remainder of this section identifies options for future research. The suggestions stem from the research that was conducted for this dissertation. There are numerous themes that are suggested from the emergent nature of the results and the interviews. Section 5.5.1 suggests a broader look at partner considerations. Section 5.5.2 identifies options for analysis and implications of the alliance decision making process. Section 5.5.3 discusses options for future research on partner selection. Section 5.5.4 suggests investigation of the equity vs. non-equity mode choice. Section 5.5.5 outlines an investigation around the performance implications of the non-equity mode choice. Section 5.5.6 suggests investigation of how management preferences and biases influence mode choice. Section 5.5.7 proposes a broader based sample, and larger sample to improve generalizability, and Section 5.5.8 suggests a study beyond the high technology domain.

5.4.1 A Broader Investigation into Partner Considerations

Two general themes emerged from this research. First, non-equity alliances are generally characterized by lower levels of commitment. This suggests there may also be lower levels of trust. Second, mode choice was generally influenced to a greater degree by partner considerations than by environmental uncertainty. Larson (1992), Tallman and Shenkar (1994), Kanter (1994), and Osborn and Baughn (1990) suggested partner

considerations are an important factor in both alliance formation and on-going alliance management.

The partner considerations observed through the interviews were centered primarily on issues such as relative partner size. In alliances where partners were of comparable size, or larger, the respondents suggested that equity was not a strong consideration.

Future research could more clearly identify the specific partner considerations that should be accounted for within an alliance. This research revealed partner considerations as an influence, but the investigation was beyond the scope of this dissertation and should be an area for future research consideration.

An assessment of partner considerations should also investigate the relationships between trust and commitment, the propensity to protect the core, and the propensity to position non-equity alliance participation outside of the core. The scope should include both equity and non-equity alliances as the results of this research, and as the literature suggests there are distinct differences between these two modes. For example, are the partner considerations viewed differently in an equity alliance than from within a non-equity alliance?

Another perspective on partner considerations could be to extend the research done by Killing (1982), which suggested that alliances with one dominant partner have a higher probability of success. Considering the lower levels of trust in a non-equity alliance, it would be interesting to see if Killing's results would still be applicable, or if the lower level of trust and commitment suggest this model will not work in a non-equity context?

Therefore, additional research into of partner considerations within alliance formation and mode choice is a topic worth further investigation. Further investigation into partner related issues would help to illuminate both non-equity and equity based alliance formation and mode choice decisions.

5.4.2 The Alliance Decision Making Processes

It was observed during the interviews that a number of decision elements contributed to non-equity alliance formation. The interview responses around decision making process

were indicative of four elements: initiation, partner selection, mode choice, and formal ratification. However, the contribution and visibility of these four elements appeared to vary with situational factors. These situational factors included aspects such as which parent was the initiator, the absence or presence of partner pre-selection, and the equity vs. non-equity mode choice.

If the other parent was identified as the initiator in the alliance, the initiation and partner selection elements did not appear to be evident in the firm's decision process. In the fourteen cases studied, there were two cases where the interviewed firm was not the initiator. However, even though partner selection was not an explicit activity, the act of drafting agreements³⁵ to reflect alliance intent remained a visible and joint activity. It was observed partner selection was partially completed with identification of the partner, and then fully completed with jointly authored preliminary agreements which outlined the general intent of the alliance. The interviewees suggested formal approvals of the alliance proposal were then progressed within each of the parent organizations.

Without a pre-defined choice of partner, all four decision elements were observed as individual steps in the alliance formation process. Managers were able to describe the decision to seek out an alliance, separately from the activity to select a partner. It was observed that partner selection was done in a number of ways, from very broad based searches, to constrained searches based on an identified set of prospective partners. The interviews suggested the partner selection decision processes ranged from formal analysis to gut feel type approaches.

It was observed that where the partner had been pre-selected, the decision elements of initiation, and partner selection appeared to be integrated into a single decision. In the cases studied, where partner pre-selection was evident, there was a pre-existing relationship between the partners. It would be interesting, through a broader based study, to measure whether a pre-existing relationship biases the mode choice in any way.

³⁵ As was evident from the interviews, the first step in the formalization of a partner selection and of the alliance itself was the creation of the preliminary set of agreements to jointly state alliance intent. These agreements were of sufficient depth to allow both partners to seek management ratification from their respective firms. In all cases these initial agreements were then superseded by a more comprehensive and detailed set of contracts.

The interviews indicated that the decision element of formal alliance approval was common to all alliances studied. It was observed that non-equity alliances generally required approval by a senior management committee. It was also observed that equity based cases appeared to require approval of the alliance at the board of director level. Whereas the alliance formation and partner selection were well socialized decision elements within the firm's management, mode choice appeared to be much more of an implicit decision element.

Therefore, future research could investigate the decision process in more depth to better assess the implications on alliance formation, as well as implications on performance, longevity and management of the alliance.

5.4.3 Partner Selection Process in Non-Equity Alliances

This research suggested partner considerations play a significant role in non-equity alliance mode choice. This study focused on non-equity alliance formation and mode choice, but did not assess partner selection. As the results suggested partner considerations play an influential role in mode choice it is important to understand both partner considerations and partner selection in more detail.

It was observed from the interviews that partner selection was accomplished through a diversity of methods. In some cases partner selection was performed through an explicit search process. This search process appeared to be operationalized as either a broad based search for partners, or a constrained search that involved only a few targeted partners. In the constrained search, the criterion was generally focused on specific elements such as technological positioning, distribution channel access, geographic access, or technology access. In other cases partner selection was based on pre-existing relationships between the parent sponsors, which obviated the need for a distinct partner selection activity.

Through the interviews it was observed that of the fourteen alliances studied, eight alliances were formed based on a pre-existing relationship. In these eight cases the relationship was based on commercial activities, either a customer or a distributor

relationship³⁶. In three of the fourteen alliances the pre-existing relationship included prior alliance activity. Partner selection in these cases was observed to be an implicit activity in formation. In the interviews, it was evident that these alliances were formed for rational reasons³⁷. Further study could uncover how a pre-existing relationship biases alliance formation and mode choice.

Geringer (1991) found that partner selection in an international joint venture (equity based) was a function of partner related dimensions and task related dimensions. The relative importance of the selection criteria was a function of the strategic context of the alliance, and both the competitive characteristics of the environment and the parent firms' relative position within that environment. It would be appropriate to test Geringer's findings in a non-equity domain to compare the partner selection criteria for equity to that of non-equity.

Therefore, this research suggested a relationship between mode choice and partner considerations. It is suggested that partner selection does have an impact on mode choice. Future research could assess and clarify the nature and extent of this relationship.

5.4.4 Equity vs. Non-Equity Mode Choice

This research assessed the influences on non-equity mode choice. While the two equity-based cases did not provide a strong basis for drawing conclusions, they did provide a comparative base for discovery and contrast to the non-equity findings.

It is suspected that equity and non-equity mode choice are related in some cases, in that non-equity could be a transitional mode to equity (Harrigan 1988a). A number of observations were made through the interviews. In one of the equity alliances studied, the equity relationship was preceded by a non-equity alliance relationship. In two of the non-equity alliances studied, equity was proposed by one of the partners at some point as an option, the equity proposal was turned down by the other partner. In another case

³⁶ A commercial relationship was described primarily as one parent acting as a customer, or as a distributor relative to the other parent.

³⁷ Managers applied the same formation factors of market, technology and time-to-market to these alliances, as they did to the rest of the alliance cases. To the managers, even though partner pre-selection was evident, the alliance was formed based on rational factors as measured in this study.

a non-equity alliance was struck with the intent of migrating to an equity alliance in the future (and based on success). In this case the non-equity alliance was successful but never did migrate to equity as it was suggested in the interview that no additional value would be added.

However, in other cases studied, it was observed from the interviews that the non-equity alliance would never likely lead to an equity alliance. It was suggested the strategic context did not warrant an equity alliance. In these cases, non-equity was not perceived by executives as transitional, but rather as the mode of choice.

In the generally limited assessment of equity alliances in this study, similar formation influences were suggested in the interviews, in terms of market, technology, and time-to-market factors. Managers were able to rationalize alliance formation based on these factors. However, there were also different influences on the equity mode choice. It was evident from the interviews that level of commitment was higher in an equity alliance³⁸, and that investment considerations played a role as well.

Investment considerations were observed as a factor in equity mode choices. In the two equity alliances considered, it was suggested the equity investment had to be a sound financial and strategic investment for the firm. Both of the equity alliances studied were between large and much smaller firms (i.e. greater than an order of magnitude difference in both annual revenues and number of employees).

In the non-equity mode choice cases there were frequent comments from the interviews that suggested an equity investment was not appropriate based on the information that the partner was of comparable size. Additionally, it was suggested a joint venture was deemed inappropriate because of strategic considerations. It was also suggested that certain alliances were non-equity because there was generally not a strong enough strategic fit to consider equity.

Therefore, the interviews suggested that these are important factors. Future research should assess the factors that affect mode choice for both equity and non-equity; specifically why is one mode chosen over another.

³⁸ As per Section 4.10

5.4.5 Performance Implications of the Non-Equity Mode Choice

Where this study focused on the *why* of non-equity alliance formation and mode choice, further research is suggested to assess how a non-equity mode choice affects performance. There has been prior research into performance assessment in equity joint ventures (Geringer and Hebert 1991; Anderson 1990).

Geringer and Hebert (1991) and Anderson (1990) found performance difficult to assess in a joint venture scenario as there were many different, and conflicting indicators of performance. These prior studies found that financial measures were not adequate enough to assess performance of a joint venture. Alliances were also formed for strategic reasons, which in turn rendered typical financial measures less effective. Hamel (1991) also suggested that longevity and alliance harmony were also inadequate measures of alliance success or performance. Geringer and Hebert (1991) established a relationship between partner satisfaction and alliance success, which suggested that if the partners were satisfied with alliance performance, then generally the alliance was performing well as measured by more objective measures.

Performance assessment of non-equity alliances presents an even more difficult challenge. Rarely is a non-equity alliance organized as a separate entity³⁹. Therefore, performance assessment of an organizational entity is not possible. Through the interviews it was observed non-equity alliance results were not subject to public disclosure. In general, it was suggested that alliance performance was likely buried deep within with the product line results of a business. It was observed in the interviews that alliance performance results may not even be fully shared with the partner. Therefore, performance assessment of a non-equity alliance presents some interesting challenges.

There are examples in the literature that suggest alliance success should be measured primarily in strategic terms. Hamel (1991) argues non-equity alliances are transitional in nature, and therefore should not be judged on their longevity but rather on the strategic impact resulting from skills acquisition. These types of results are very difficult to

³⁹ In the twelve non-equity alliances studied in this dissertation, none created a separate, identifiable organizational entity. These alliances had their resources blended into their respective parent

quantify. Beamish (1987) also suggests non-equity alliances may be a transitional phase to an equity alliance, which complicates objective performance assessment.

Performance assessment of a non-equity alliance presents some interesting challenges. Managers must assess the success or failure of an alliance in some manner. Establishing a framework for this success determination is a challenging future research topic.

5.4.6 The Role of Management Preferences in Mode Choice

It was evident through the interviews that in some of the alliances, executives were biased towards a particular mode. Some executives stated a preference for the non-equity mode because it was simpler, easier to initiate, and easier to exit from if it ran into insurmountable problems. Other executives suggested a preference for equity based alliances because of the stronger commitments required.

Some managers expressed a preference for non-equity, suggesting it was a less complex route to achieving their strategic objectives. In the interviews, non-equity was perceived as less complex because equity investments and organizational arrangements did not have to be worked out or justified.

Other managers suggested a preference for equity arrangements where stronger levels of commitment were required. It was also evident from the interviews that these alliances generally represented a stronger coupling to the parent firm's (future) core strategies than some of the non-equity alliances that had been portrayed. From the interviews, other managers suggested that an equity alliance was more easily understood by customers and the investment communities because of the formal investment and ownership linkages.

What was unclear from this research is how strongly those biases contributed to mode choice, relative to the other factors measured. Another source of bias in high technology may be in the large firm, small entrepreneurial firm context. The two equity based alliances studied in this research could be characterized as alliances between large firms and smaller, entrepreneurial type organizations. Similarly, the non-equity alliance cases suggest that firms of like size will like choose the non-equity form of partnering. A

organizations.

better understanding of inherent management biases and their relative impact of the mode choice would present an interesting topic for future research. It would help to explain mode choice behaviour in an alternate context, thus enhancing our understanding of mode choice.

5.4.7 Expansion of the Sample Frame Size and Scope

The population of this research sample consisted of twelve non-equity alliances. The focus of the research sample was limited to high technology in order to control the external factors.

Generalizability could be increased if the sample size was increased, and the geographic scope was extended beyond the Ottawa area. As Ottawa is recognized as a high technology center in North America, it would be interesting to include other recognized high technology areas, such as California's Silicon Valley or Boston's Route #128.

5.4.8 Non-Equity Alliances Outside of the High Technology Domain

This research study focused on non-equity alliances in the high technology domain, and this was done primarily to limit the effect of external factors. An option for further study would be to apply this research methodology in industry sectors outside of high technology to investigate how the findings are different. High technology exhibits certain characteristics, as discussed in this study, such as high degrees of uncertainty, rapid pace of change, and protection of technological assets. It would be expected that other industries would exhibit different characteristics, and it would be interesting to see what effect those characteristics have on the non-equity alliance model.

APPENDIX A: COVER LETTER

Dear _____;

I am a student in the Masters in Business Administration course at the University of Ottawa, Faculty of Administration. To fulfill the remaining portion of my MBA course requirements I am pursuing the thesis option. I am requesting your assistance through participation in a research study I am conducting for my thesis.

The objective of the thesis is to study the role non-equity strategic alliances play in the high technology sector. Non-equity strategic alliances are those alliances in which there is no exchange of equity between the parties. The thesis will focus on two aspects of alliance formation - how and why certain external factors influence the choice of the non-equity alliance type, and the relationships between an alliance and the firm's own strategies and core competencies.

Similarly, the thesis aims to develop a better understanding of the extent of the relationship between an alliance and a firm's competitive strategies and core competencies, identifying how inter-related a non-equity alliance can become with a firm's own strategies.

As a senior manager who has been a key participant in the alliance process, I would like to draw upon your experience and insight with non-equity alliances. I am interested in focusing in on specific examples of alliances to develop a better understanding of the considerations and decisions made throughout the process relevant to this study. I would be interested in talking to you and with others that played a role in the alliance formation to better understand:

1. Why was non-equity chosen as the alliance type over the other forms available?
2. What influence did the business strategies and core competencies have in the choice and structuring of the non-equity alliance?
3. How is this non-equity alliance positioned within the business strategies?

All information gathered in this research will be kept strictly confidential. Specific data on either the firm or the alliances will not be released. Within the thesis only aggregate data will be represented and

no alliance will be identifiable within the results and thesis. I will provide a summary of the results of this study upon request when completed.

It is important that academic research on business reflect the “real world” concerns and experiences of management. This is only practical when the research includes discussions with senior managers such as yourself whose expertise and insight are important to making the studies and results relevant.

Thank you for considering to participate in this study. If there are any questions or concerns please do not hesitate to contact me at (613) 836 3054, or my thesis supervisor Dr. Jonathan Calof at (613) 562 5800 ext. 4779.

Regards,

Ralph Michaelis
Masters Candidate
Faculty of Administration
University of Ottawa

APPENDIX B: INTERVIEW GUIDE

Part A: Background Questions

Part B: Market, Technology and Time-to-Market Factors

Part C: Competitive Strategy

Part D: Core Competencies

Part A. Background Questions

In the following questionnaire all references to products include services unless otherwise specified. Also, the products raised in the questions are always those considered as relevant to the alliance, again unless otherwise noted.

The objective of this section is to establish the background information.

Alliance under study:	
Interviewee:	
Title of Interviewee:	
Role in Alliance:	
Business Unit:	
Date of Interview:	

1. What are/were the key objectives of this alliance?
2. What is / was the role of the partner in this alliance?

3. What aspects of the “generic” value chain does the alliance partner participate in, contribute to?

“Generic” Value Chain Activity	Your Firm’s Participation	Alliance Partner’s Participation
Basic Technology Development	☐	☐
In Bound Logistics	☐	☐
Product Development & Commercialization	☐	☐
Service Development & Commercialization	☐	☐
Operations & Manufacturing	☐	☐
Outbound Logistics	☐	☐
Marketing	☐	☐
Sales & Channel Development	☐	☐
Service & Support	☐	☐
Other?	☐	☐

4. Is the alliance partner smaller or larger, relative to your firm? In terms of revenues? In terms of number of employees?

Part B. Market, Technology and Time-to-Market Factors

The objective of this section of the questionnaire is to establish if, and to what extent market, technology and time-to-market factors have an influence on the selection of alliance type.

5. Describe the decision making process as it applies to this alliance.
6. Describe why non-equity was chosen as the alliance type over equity.

7. Describe the market factors that influenced the formation of the alliance. Market factors include competitor actions, customers, market demand, market segmentation, price factors, etc. Rank these market factors in terms of influence on the alliance decision process, total score must add to 100.

Rank by Influence	Market Factors
	Total Score not to exceed 100

8. How did these market factors directly or indirectly influence: (1) the formation of the alliance, and (2) the selection of non-equity as the alliance type? Was the decision implicit or explicit? Was the decision individual or a consensus decision?
9. What level of uncertainty would you associate with these market factors? Uncertainty is a measure of how predictable the characteristics of the particular factor or group of factors in terms of the results or outcomes. How did the amount of uncertainty influence: (1) the formation of the alliance, and (2) the selection of alliance type?
10. Describe the technology factors that influenced the formation of the alliance. Technology factors include new, emerging technologies, convergence of technologies, standards, etc. Rank these technology factors in terms of influence on the alliance decision process, total score must add to 100.

Rank by Influence	Technology Factors
	Total Score not to exceed 100

11. How did these technology factors influence: (1) the formation of the alliance, and (2) the selection of non-equity as the alliance type? How did the amount of uncertainty influence: (1) the formation of the alliance, and (2) the selection of non-equity as the alliance type
12. What level of uncertainty would you associate with these technology factors?
13. Which of the above, technology or market factors, was the greater influence: (1) the formation of the alliance, and (2) on the selection of alliance type?
14. Where do the current time-to-market pressures on the product line primarily come from? Internal? Competitors? Customers? Other? Who sets the standard for product release cycles (as measured in time)?
15. Was time-to-market a factor in the decision to pursue an alliance? How was time-to-market to be achieved with this alliance? Resources? Skills? Which was more important?
16. What alternatives for improving time-to-market were considered? Why were they discarded?
17. In ranking time-to-market, market, and technology , which factor would be regarded most significant, and which would be regarded least significant in: (1) the formation of the alliance, and (2) on the selection of alliance type?
18. What other factors influenced: (1) the formation of the alliance, and (2) on the selection of alliance type, and were they more or less significant: (1) in the formation of the alliance, and (2) on the selection of the non-equity type than the above?
19. What factors could have changed the selection to favor an equity (or non-equity) arrangement?

20. What are your perception on the advantages and disadvantages of non-equity alliances in comparison to equity alliances?

Part C. Competitive Strategy

The objective of this section of the questionnaire is to explore the relationships between alliance strategy and the firm strategies.

21. What element is the alliance strategy best represented within:

☐	corporate strategy:	<i>addresses the business portfolio questions, synergy across businesses, macro level competitive advantage</i>
☐	business strategy:	<i>how to compete, competitive advantage and distinctive competencies</i>
☐	functional strategy:	<i>maximization of resource productivity; synergy within a single function, development of distinctive competencies</i>
☐	other	<i>please elaborate</i>

22. What is the scope of development for the alliance?

☐	to create a new core or base technology, each firm to commercialize independently
☐	to create a new core or base technology, alliance to commercialize
☐	to create an entirely new product
☐	to create a product line extension to an existing platform
☐	to enhance an existing product (e.g. performance or cost improvement)
☐	other? (please elaborate)

23. How would you explain the rationale of the alliance relative to the overall strategy?

critical	important	minor	not important
☐	☐	☐	☐

24. How does the alliance improve the competitive advantage? Technology? Resources? Skills? Market clout? Market positioning? Other?
25. What has been the customer and competitor reactions to this alliance? What measures were used to assess?

26. Does the alliance facilitate entry into new markets? How does the alliance help to address these markets?

27. Where would you position the (alliance) product(s) in a standard product life cycle?

not yet introduced ☐	new product ☐	growth stage ☐	mature stage ☐	retirement ☐
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28. How would you describe the types of market addressable with the product / alliance?

New market ☐	Emerging market ☐	Growth market ☐	Mature market ☐	Declining market ☐
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29. How would you characterize the intensity of competition in the markets segments addressed?

very intense ☐	intense ☐	moderate ☐	not intense ☐	non-existent ☐
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30. How concentrated is the competition?

<3 competitors ☐	3-6 competitors ☐	6-10 competitors ☐	10-15 competitors ☐	>15 competitors ☐
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31. Where does the most intense competition come from (use own firm size as a reference point)

start-ups ☐	smaller firms ☐	like sized firms ☐	larger firms ☐	much larger firms ☐
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32. Where does the most intense competition come from geographically?

local ☐	regional ☐	national ☐	international ☐
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33. Does the alliance bring into play any new technologies, ones that were not resident within the firm prior to this alliance?

34. Would your firm have pursued these technologies exclusive of the alliance? If alternatives were ever considered, what were they and why were these discounted?

35. How much of the business strategy can be executed exclusive of the alliance partner? If the partner goes away for whatever reason, would a viable strategy remain?

Part D. Core Competencies

Core competencies are a set of collective skills within a firm that provide a sustainable source of competitive advantage difficult to replicate by other firms. The number of core competencies is typically around 6, although there is no hard and fast rule. Core competencies are not products, and typically cannot be isolated to a single group or function within an organization. It is generally something done extremely well and thus provides a competitive advantage to the firm.

The objective of this section is to investigate the relationship between the alliance and core competencies.

36. List the core competencies that you perceive are resident within your firm and your partner as is relevant to this alliance. As applicable, rank these competencies from a pool of 100 points, giving the most points to the most influential core competency. Identify those core competencies associated with the alliance in some manner.

Ranking/ Score	Core Competencies	"We Provide"	"They Provide"
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
0	Total of all scores must = 100.		

37. How would you characterize the scope of access to the core competencies identified?

full access ☐	limited access ☐	very limited access ☐	no access ☐	access not an issue ☐
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38. How does the partner use the core competencies identified? How would you characterize the type and scope of access to these core competencies?
39. To what extent is the partner allowed access to your core competencies? How is access managed?
40. To what extent is the partner denied access to the core competencies? How is access limited?
41. What type of access do you have to your partner's core competencies? How does your partner manage and limit your access to their core competencies?
42. How is the alliance leveraging the firm's core competencies? To what extent are you limiting the amount a leverage the alliance gets from this core competency?
43. Would your view of access to core competencies change if the alliance was equity based? What other alliance arrangements would alter your views?
44. How does you or your partner benefit in having the type of arrangement with respect to the core competencies identified as part of the alliance? Is it working?
45. Do you see any core competencies or distinctive competencies being developed as an outcome or result of the alliance? How would you manage such as result?

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