

# **Governance of Strategic Alliances in Technology-based Industries: The Case of Wireless Services**

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*Στους γονείς μου, Γρηγόρη και Σοφία,  
και στον αδερφό μου, Ηλία*



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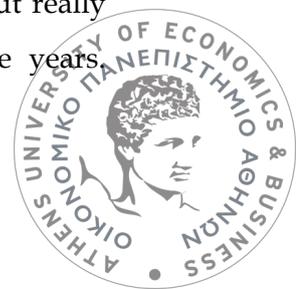
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## DECLARATION

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The research discussed in this thesis has directly or indirectly inspired the work presented in the following publications:

### Journal Papers

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- Pateli, A., Giaglis, G., Spinellis, D. (2006) Wireless Value Added Services in Exhibition Shows, *International Journal of Mobile Communications*, 4, 2, pp. 193-209.
- Vlachos, P., Vrechopoulos, A., Pateli, A. (2006) Drawing Evolutionary Business Models for the Mobile Music Industry, *Electronic Markets*, 16, 2, pp. 154-168.
- Pateli, A. and Giaglis, G. (2005) Technology Innovation-Induced Business Model Change: A Contingency Approach, *Journal of Organizational Change and Management*, 18, 2, pp. 167-183.
- Pateli, A. and Giaglis, G. (2004) A research framework for analyzing eBusiness Models, *European Journal of Information Systems*, 13, pp. 302-314.

### Papers in Refereed Conference Proceedings

- Pateli, A., Giaglis, G. (2006) Governance Options for Strategic Technology Alliances in Value Webs, In: *Proceedings of the Hawaii International Conference on System Sciences (HICSS-39), January 4-7, Hyatt Regency Kauai, USA (CD-ROM Proceedings)*.
- Pateli, A. (2005) A Value-Driven Decision Making Model on Governance Mode of Strategic Technology Alliances, In: *Proceedings of the 17th National Conference of the Hellenic Operational Research Society (HELORS), June 16-17, Rio, Greece*.



- Pateli, A., Spinellis, D., Giaglis, G. (2004) Wireless Info-Communication and Navigation Services in Exhibition Shows, In Horwitch M. (eds.): *PROCEEDINGS – The Third International Conference on M-Business – m>Business 2004, Uncovering the Next Waves – Major Opportunities and the Essential Lessons, July 12–13, New York, USA.*
- Pateli, A., Giaglis, G. (2003) A Framework for Understanding and Analysing e-Business Models, In *Proceedings of the 16<sup>th</sup> Bled Electronic Commerce Conference – eTransformation, June 9–11, Bled, Slovenia, (CD-ROM Proceedings).*
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- Vassilopoulou, K., Ziouvelou, X., Pateli, A., Pouloudi, N. (2003) Examining E-Business Models: Applying a Holistic Approach in the Mobile Environment, In C. Cibora et al. (eds.): *New Paradigms in Organizations, Markets and Society - Proceedings of the 11<sup>th</sup> European Conference on Information Systems (ECIS) 2003, June 16-21, Naples, Italy, (CD-ROM Proceedings).*
- Fouskas K., Pateli A., Spinellis D., Virola H. (2002) Applying Contextual Inquiry for Capturing End-Users Behaviour Requirements for Mobile Exhibition Services, In: *Proceedings of the First International Conference on Mobile Business, July 8-9, Athens, Greece (CD-ROM – Proceedings).*
- Giaglis, G.M., Pateli, A., Fouskas, K., Kourouthanassis, P., Tsamakos, A. (2002) On the Potential Use of Mobile Positioning Technologies in Indoor Environments, In C. Loebbecke, R.T. Wigard, J. Gricar, A. Pucihar, G. Lenart (eds.): *15<sup>th</sup> Bled Electronic Commerce Conference - e-Reality: Constructing the eEconomy, June 17-19, Bled, Slovenia, Proceedings, Vol.1: Research, pp.413-429.*



## ABSTRACT

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This research is concerned with the examination of the mechanism through which decisions on the governance mode of strategic technology alliances are made at the firm level. Strategic alliances constitute a primary implementation means of corporate strategies that aim at innovation development and exploitation, which is considered of high strategic importance for firms in technology-based industries. A special feature of technology-based industries is the rapid rate and the difficulty of forecasting change. Strategic decision making in such environments should assure flexibility and opportunities for future value creation on the one hand, and optimization of resource allocation and cost minimization on the other.

More particularly, this research addresses the strategic decision-makers' dilemma of whether to internalize the transactions with their strategic partners or not, or, in other words, whether to pursue quasi-hierarchy or quasi-market alliances. This dilemma has already been addressed by a number of traditional theoretical perspectives, such as Transaction Cost Economics, the Resource-based, the Dynamic Capabilities, and the Knowledge-based View of the Firm, as well as the Theory of Real Options. We argue in favor of integrating a set of antecedent factors and propositions, sourced from the aforementioned theoretical perspectives, with the ultimate purpose of developing an integrative governance model. This integration is pursued under the concern of investigating the value, along with the resource and the cost, aspects of alliances.

The integrative governance model is empirically tested through a survey involving strategic alliances in the wireless business environment. The quantitative data collected are analyzed with the aid of a Structural Equation Modeling (SEM) technique, namely Partial Least Squares (PLS). Moreover, an extreme cases analysis approach, involving qualitative data on two real-world alliances, is applied to confirm and substantiate the quantitative results. The research results provide support for the integration of complementary theoretical perspectives over alliance governance and set the groundwork for the development of a decision-aiding tool helping strategic managers to make up their mind on the alliance governance mode that best aligns with their firm's corporate strategy.



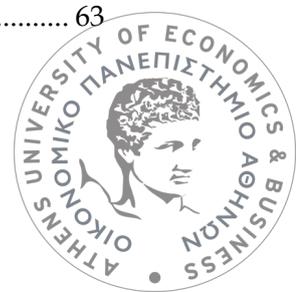
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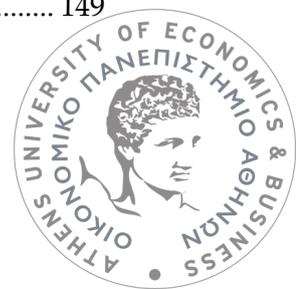
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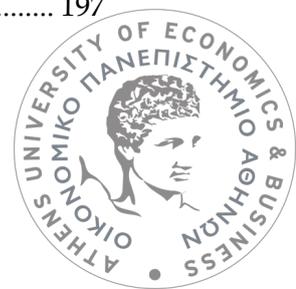
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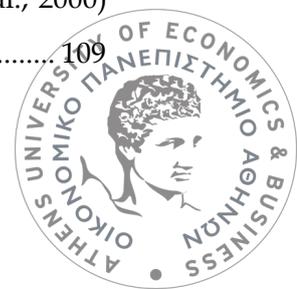


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# CHAPTER 1

## INTRODUCTION

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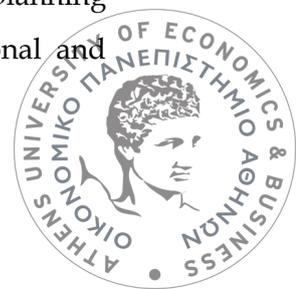
This chapter aims at setting the scene for the subsequent presentation and analysis of the work conducted within this research. To this end, it describes the theoretical and contextual research background, specifies the stimulus of our investigations, and presents the methodology chosen to fulfill the objectives set. The chapter begins with a specification of the scientific areas to which this research relates and a presentation of the context area that has been selected to apply our theoretical model. The motivation, the primary assumptions, and the objectives of this research are presented next, followed by a discussion of the methodological issues underpinning the whole research cycle. The chapter ends with a presentation of the thesis outline.

### 1.1 Research Background and Context

The research described in this thesis is primarily concerned with identifying the factors, as well as the process, through which the management of a firm makes its decision on – or raise their preference for – the governance mode of an alliance formed in a technology-based industry. The main research questions addressed by this research concern *when* (under which conditions) and *how* (through which mechanisms) firms opt for quasi-hierarchy (equity) alliances or quasi-market (non-equity) alliances. The next sections aim at pinpointing the theoretical and empirical challenges that triggered the formulation of the aforementioned research objectives.

#### 1.1.1. Corporate Strategy: Vertical Integration and Strategic Alliances

The primary concern in corporate strategy is the determination of a firm's boundaries in terms of product scope, geographical scope and scope of activities. Defining a firm's scope requires specifying the set of market and hierarchical mechanisms which it employs for operating. The market mechanism, where individuals and firms make independent decisions that are guided and coordinated by market prices, was characterized as the "invisible hand", because its coordinating role does not require conscious planning (Grant, 2002). The hierarchical (or administrative) mechanism, where operational and



tactical decisions are made by managers and imposed through hierarchies, was characterized as the “visible hand”, because it is dependent on coordination through active planning (Grant, 2002). The determination of a firm’s scope is closely related to the vertical integration issue, which refers to a firm’s ownership of vertically related activities. The greater the firm’s ownership and control over successive stages of the value chain for its product, the greater the degree of vertical integration.

The conventional transactional analysis of vertical integration has focused on the financial efficiency of the market, as compared to the hierarchical, forms of organization (Leiblein and Miller, 2003). If the cost of transacting through the market is greater than the cost of administering within the firm, then the firm should vertically integrate across all stages. Transaction Cost Economics (TCE) (Williamson, 1975; 1985) does not, however, provide the complete answer. A number of other theoretical perspectives comment on other than cost-relating factors that influence an organization’s vertical integration decisions.

The Resource-based View (RBV) of the firm provides a means to analyze the effect of firm level capabilities on vertical integration decisions. Two basic conditions are highlighted by the RBV (Leiblein and Miller, 2003). The first is that firms are largely heterogeneous in terms of their resources and capabilities. The second is that some of these resources and capabilities are limited in supply or costly to imitate. As a result of these conditions, proponents of the RBV have argued that firms’ governance choices may be directed by their attempts to leverage and protect idiosyncratic capabilities.

A third stream of research that promises to shed light on firms’ vertical integration decisions is the Real Options literature. Similar to financial options, real options are investment opportunities that confer the right, but not the obligation, to take some specific operating action in the future. These real options come into existence when existing resources and capabilities allow preferential access to future opportunities (Bowman and Hurry, 1993). The Real Options theory complements the RBV in explaining why firms with heterogeneous resource profiles may choose governance structures that are suboptimal according to standard transaction cost reasoning. Since the Real Options theory indicates that the decision to avoid irreversibly committing resources is most valuable under high levels of uncertainty, it also provides a means to explain the tradeoff



between the temporary efficiency of competing forms of organization and the value to operate flexibly in an uncertain future.

Strategic alliances play a major part in the implementation of corporate strategies of many firms. This strategy implementation mode has received increasing attention in the strategic management literature. Within Transaction Cost Economics, alliances are often considered as intermediate organization forms combining elements of markets and hierarchies (Williamson, 1975).

The literature on strategic alliances has focused mainly on issues related to alliance formation and the reason why firms form these partnerships (Spekman et al., 1998). Within the literature on alliance formation one can distinguish between studies that have examined factors that explain the variance in alliance formation rates and studies that have focused on motivations to enter into alliances (Tsang, 1998; Hagedoorn, 1993; Hemphill and Vonortas, 2003).

Closely aligned with research on the formation of and motivation behind alliances, a great bulk of research investigating the structure under which alliances are configured has emerged. Early literature makes a distinction between equity alliances (or joint ventures) and non-equity (or contract-based) alliances. While the first employ quasi-hierarchical methods for organizing and governing the inter-firm relationship, the second are primarily based on a set of quasi-market mechanisms (i.e. legal commitments through contracts, and competition rules).

Transaction Cost Economics (TCE) constitutes the basic theory used to explain the choice between the two. Thus, much of the extant research examining why firms opt for a particular governance mode (equity vs. non-equity) argues that the optimal form of organization is primarily driven by efficiency considerations (e.g., Williamson, 1975; 1985). In contrast, research that has examined the performance implications of specific resource investments has frequently relied on Resource-based reasoning (e.g., Barney, 1991; Wernerfelt, 1984) to describe the specific characteristics of resources and investments that are most likely to provide sustainable sources of competitive advantage. While work using real option analysis has also studied the choice between organizational governance forms and overall firm performance (e.g., Bowman and Hurry, 1993; Kogut,

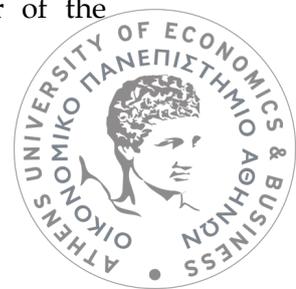


1991), little effort has been put to linking insights from Real Options with insights from Transaction Cost Economics or Resource-based View of the firm.

Whereas factors affecting alliance formation and governance have received abundant attention, the dynamic processes that underlie alliances have received relatively scant interest (Keil, 2000). Yet the large number of alliance failures suggests that there is a gap between an understanding of alliance formation and the practice of alliance management (Spekman et al., 1998). Research providing a theoretical explanation for interfirm collaboration failures uses argumentation from two major theoretical perspectives: the Transaction Cost Economics (TCE) theory and the Resource-based View (RBV) of the firm. More recent work has adopted a more integrative stance, based on the understanding that the transaction costs incurred in the exchange of resources are not independent of the nature of resources to be transacted and, similarly, the returns realized from these resources are not independent of the transaction-specific expenditures incurred in effectively combining them and maintaining their combination (Madhok and Tallman, 1998). The key premise of such work is that viability in alliances is based on the net value of the collaborative transaction. Rather than efficiency through economizing on transaction costs, the value perspective approaches the boundary-related decisions in terms of cost effectiveness with respect to value capturing capacity. There is a key distinction, however, between the potential value attainable through an alliance and the realization of such value. The former aspect has more to do with the choice of governance form and refers to the theoretical synergies arising from the ideal combination of complementary resources and capabilities, while the latter aspect reflects the realities on the ground and has more to do with the effectiveness of the actual management of the alliance. The two aspects are of course related in that value cannot be realized beyond its underlying potential.

### **1.1.2. Strategic Behavior of Firms in Technology-based Industries**

Industries where the application of technology serves a strategic rather than operational organizational goal and high competition urges firms to continuously innovate provide some of the most fascinating and complex competitive environments in which to apply the concepts and principles of strategic management. Technological evolution has penetrated and changed the structure and dynamics of almost every sector of the



economy, due to the pervasive influence of digitization, microelectronics, intelligent software, and new communication channels. Technology has achieved a key strategic role as enabler of both product/service and process innovation by firms. Hence, the management of technology, as an innovation enabler, has been a strategically important issue for almost all organizations, regardless of the sector in which they operate.

In the literature, innovation may involve many different aspects; development of new products/services (i.e. smart phone, RF-ID tags), creation of new industries (fiber-optics, biotechnology, wireless business), enhancement of existing products (i.e. driverless automobiles, laser surgery, wearable computer), and application of the technology to reengineer business processes (i.e. virtual prototyping, web-based auctions). Literature on management of technology innovation has specified a number of alternative strategies to developing and exploiting innovation, such as licensing, outsourcing agreements, strategic alliances and internal commercialization.

The research interest in studying innovation in technology-intensive industries is whether the principles of strategic management are the same or fundamentally different from other types of business environments, and thus whether companies should modify their strategy formulation and implementation processes. To do so, it is important to discuss several distinctive features of these environments. A special feature of technology-based industries is the rapid rate of change and the difficulty of forecasting change. In this research, we use the 'high velocity' term, following D'Aveni's (1994) terminology, to refer to the broader set of dynamic industries, to which most high technology industries also belong. Conditions of high velocity require that traditional approaches to strategy formulation based on forecasting are abandoned in favor of strategic management approaches that combine a clear sense of direction based on vision and mission with the flexibility to respond to and take advantage of the unexpected.

Strategic decision making is difficult in such environments, not only because change is fast and sudden, but also because it is difficult to predict the significance of a change as it is occurring. The strategic managers of firms operating in technology-based industries face several dilemmas. Successful strategies must be responsive to changing market conditions, and therefore must assure flexibility, but successful strategies also require long-term commitment. Moreover, while innovation exploitation strategies require



decisions that aim at optimizing risk management and value creation, traditional strategies involve decisions that aim at optimizing resource-allocation and cost-minimization.

## 1.2 Research Motivation and Objectives

The prime motivation firing our research interest in the above issues was provided by the increasing rate of strategic alliance formation since 1980s in almost all industries (Gulati, 1995; Pangarkar and Klein, 2001), but mainly in emerging technology-intensive industries (Hemphill and Vonortas, 2003; Vilkamo and Keil, 2003). These industries are featured by a high degree of uncertainty regarding diverse environmental aspects, such as customer requirements, competition, technology and regulations. The complexity and uncertainty of such environments requires adopting a contextual approach for investigating strategic alliances, and more particularly alliance governance decisions. Thus, our research aims at shedding light on the way firms make their governance mode choice in case of strategic technology alliances formed within high velocity industries.

To initiate research towards this direction, our work was grounded on the prime assumption, supported by prior theoretical and empirical research in the area of strategic decision processes, that strategic decision making is not the same in dynamic as in stable environments (Papadakis et al., 1995; Hough and White, 2003). Apart from context, the type of alliance is also assumed to affect the way in which strategic managers decide on a preferred governance mode. Strategic alliances that aim at producing technology innovation, and thus involve an exchange of technology component or knowledge, are more liable than marketing and manufacturing alliances to partners' opportunistic behavior. The risk of such a competitive behavior is even greater in an uncertain and dynamic environment.

Further theoretical and empirical challenges targeted by this research include:

- a) Providing an integrated theoretical perspective on the governance issue of strategic alliances by identifying factors and formulating propositions, supported by different theoretical perspectives (e.g. Transaction Cost Economics, Resource-based View, Real Options,), which are of complementary nature.



- b) Investigating the value, along with the resource and cost, aspect of alliance governance. The value aspects can be expressed by theories examining the potential for value capture, such as Game Theory and Real Options theory. The prime challenge is to specify factors sourced from these theories and incorporate them into an integrative governance decision model.
- c) Providing empirical support for the contribution of value-related factors, conceptualized under the theoretical propositions of the Real Options theory. So far, the contribution of this theory on explaining alliance formation, governance and management has been limited to a set of theoretical propositions (Barney and Lee, 1998; Leiblein, 2003; Sanchez, 2003).
- d) Extending our understanding of firm strategic behavior in emerging technology-based industries and revealing differences in the application of key strategic management concepts and principles between dynamic and stable environments. These differences are related to special features of high velocity environments, such as high competition intensity, high environment uncertainty, and formulation of growth-oriented firm strategies (e.g. diversification of products/services and vertical/ horizontal integration with customers, suppliers and partners).

### 1.3 Research Methodology

Research on any given question at any point in time falls somewhere within a cycle of inference processes, often referred to as the research cycle or the cycle of scientific methodology. The cycle may be seen as moving from grounded results (facts, observations) through *inductive logic* to general inferences (abstract generalizations, or theory), then from those general inferences (or theory) through *deductive logic* to tentative hypotheses or predictions of particular events/outcomes. There is no standard sequence of stages through which a research may pass from the inductive to deductive reasoning and vice versa. Research may start at any point in the cycle but should travel through the whole cycle at least once (Tashakkori and Teddlie, 2003).

The cycle of our research methodology starts with an attempt to build a conceptual model on the basis of related theories (deductive logic) and previous empirical findings (inductive logic). As result, a set of tentative hypotheses are formulated. The developed



theoretical model, along with its underlying propositions and hypotheses, is used to generate and test a number of predictions of particular events/outcomes using the survey method (deductive logic). The outcome of this phase includes a number of accepted and rejected hypotheses (causal and mediating relationships) providing explanations for the value of the dependent variable under the influence of certain factors. The last stage of the research cycle aims at testing the survey findings' validity, by proving its generalizability in real-world cases. To do so, the case study method is employed to collect a new set of real-world data and analyze it in-depth. The ultimately confirmed causal hypotheses are related through an inductive logic. Figure 1-1 presents a visual representation of the scientific methodology cycle followed by this research.

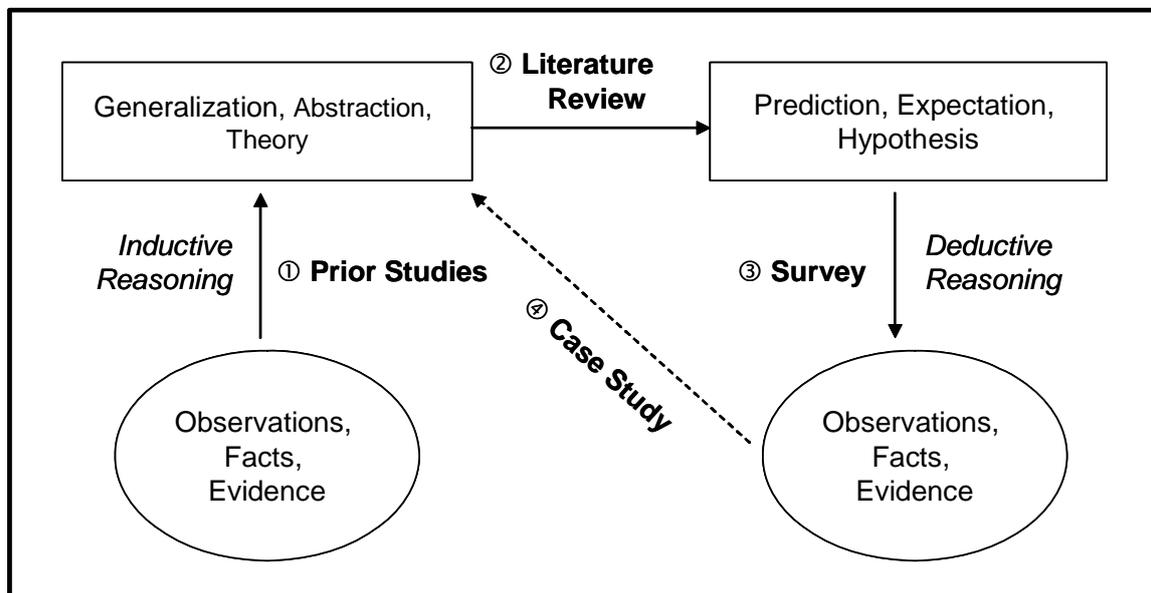


Figure 1-1. The Research Cycle of Scientific Methodology

To enable switching iteratively between deductive and inductive reasoning, as described in Figure 1-1, a *mixed-methods* research design is followed, mixing aspects of both quantitative and qualitative paradigms throughout the research process. As Creswell (1995) argues:

“This approach adds complexity to a design and uses the advantages of both the qualitative and quantitative paradigms. Moreover, the overall design perhaps best mirrors the research process of working back and forth between inductive and deductive models of thinking in a research study (p. 178).”

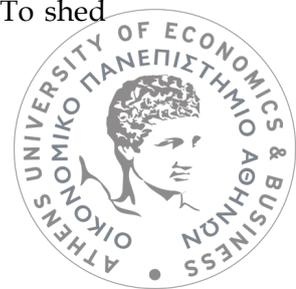
Thus, mixing the quantitative (QUAN) and qualitative (QUAL) approaches throughout several stages of a study reflects the research cycle more accurately. There are numerous ways in which researchers can combine QUAN and QUAL methods within their study. Tashakkori and Teddlie's (2003) classification of alternative mixed method strategies includes the following: 1) Concurrent mixed analysis (simultaneous analysis of QUAL and QUAN data), 2) Sequential QUAL-QUAN analysis (qualitative data analysis followed by confirmatory quantitative data collection and analysis), and 3) Sequential QUAN-QUAL analysis (quantitative data analysis followed by qualitative data collection and analysis).

Our research employs the *sequential QUAN-QUAL analysis* strategy to establish a theoretical order of relationships/causality through exploratory QUAN analysis (path analysis, structural equation modeling), and then confirm the obtained sequence through QUAL data and analysis (e.g. observations and interviews with individuals). More specifically, the research aims at exploring the mechanism through which managers raise preference over a governance mode by establishing a theoretical order of relationships/causality through exploratory quantitative data analysis (survey) and then confirming (or disconfirming) the obtained predictors and their sequence through qualitative data and analysis (case study).

## 1.4 Thesis Outline

The thesis has been structured into seven chapters each one discussing a distinct aspect of this research, and reflecting the research methodology followed for its carrying out. Thus, Chapter 1 introduces the reader to some key concepts discussed in this thesis by presenting the research background and context, and setting the motivation and the objectives pursued throughout this research.

Chapter 2 provides an in-depth analysis and critical review of the theoretical background of the research. The literature review starts with an introduction to the basic concepts investigated in this research; strategic technology alliances and alliance governance. The notion of an alliance governance continuum, based on the implied degree of partners' strategic interdependence, between the quasi-market alliances (i.e. contractual agreements) and the quasi-hierarchy alliances (i.e. joint ventures) is introduced. To shed



some light on the field of alliance governance, Chapter 2 turns to a range of theories, deriving from diverse disciplines, such as economics, strategic management, organization theory, and sociology. These theories include Transaction Cost Economics, Resource-based View of the Firm, Dynamic Capabilities View of the Firm, Knowledge-based View of the Firm, Organizational Learning, Social Exchange Theory, Game Theory, and Real Options Theory. The chapter provides a critical review of them and designates a number of factors that might inform the strategic alliance governance decision. The chapter concludes by combining all theoretical perspectives and exploiting their complementarity on several points to develop an integrated research framework.

Chapter 3 discusses the development of the primary conceptual model in detail. The model's skeleton is based on the structure of several integrative research frameworks in the strategic decision making domain. The chapter defines the research context of this thesis, which concern high velocity environments, and identifies contextual factors that affect strategic decision making in these environments. The primary conceptual model, namely the 'mediation model', includes three antecedents; two contextual (environmental and organizational) factors and one alliance-specific factor. It also includes a mediator factor, namely Expected Alliance Value (EAV), conceptualized in this research. Apart from that, two competitive models, namely a 'direct model' and a 'semi-mediation model' are also introduced.

The empirical research draws data from the Greek market of wireless products/services, as an instance of technology-based industries and high velocity environments. The strategic managers' perspective on a particular alliance of their firm is employed as unit of analysis. A first analysis of empirical data, made through descriptive statistics and one-sample t-tests, indicate a quite representative sample of strategic technology alliances, the majority of which involve a contractual agreement, as expected by strategic alliance theory. Most of them are formed within the last three-year period by firms belonging to diverse segments of the wireless market, and mainly involve collaboration of application providers or software developers with mobile network operators and content service providers, with the purpose of developing innovative products and services for the enterprise and individual customers of the wireless market.



More sophisticated outcomes of the empirical data analysis, based on the use of a Structural Equation Modeling (SEM) technique, namely the Partial Least Square (PLS) method, are discussed in Chapter 5. The data analysis starts with a set of tests aiming at examining the reliability and validity of the research's measurement model. The analysis of the path model, which involves examination of the direct, indirect and total effects of the nine identified independent variables (exogenous variables) on the governance dependent variable (endogenous variable), provides support for a sub-set of the initial hypotheses but not for the hypothesized mediating role of the Expected Alliance Value (EAV) variable. The last part of the chapter validates the 'mediation model' by comparing it to a number of competing models, which are finally rejected.

Chapter 6 presents two case studies aimed at evaluating the validity of the proposed model in understanding and explaining the two extreme alliance governance modes. The joint venture, named Uni-Nortel, between Nortel Networks and Unisystems, and the contractual agreement between Sieben and Telenavis are examined for this purpose. On the basis of these cases, the concluding chapter summarises the strengths and limitations of the proposed integrative model. An attempt is also made to set forth some preliminary theoretical ideas guiding further research on the governance field of strategic technology alliances, but also at the interface with closely related fields, such as alliance evaluation and management.

## 1.5 Summary

Chapter 1 provided an introduction to key concepts of the strategic management literature, and more specifically of the vertical integration, strategic alliances, strategic decision making and management of technology-based innovations, discussed in this research. Such an introductory discussion aimed at facilitating the definition of the primary motivation as well as disclosing the theoretical and empirical challenges that triggered the research presented in this thesis. Having specified the incentives and goals of the current research stream, the chapter went on describing the scientific cycle and methodology that enabled the carrying out of the research. The chapter ended with setting the 'roadmap' for the readers' tour through this thesis, so that they are predisposed to the story narrated within the next pages.



## CHAPTER 2

### REVIEW OF RESEARCH INTO STRATEGIC ALLIANCES

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This chapter discusses current research and understanding in the area of strategic alliances. Section 2.1 includes definition of the core concepts discussed in this thesis. Section 2.2 discusses the most popular theories from the economic, organizational, and strategic management literature that have been used to explain the formation, governance and value creation of strategic alliances. Section 2.3 raises the primary streams of research in the strategic alliance field and reviews current theory and empirical studies in each stream. Its ultimate goal is to pinpoint the literature findings that could contribute to this research as well as the research gaps that challenged the design of the conceptual model, which is presented in Chapter 3.

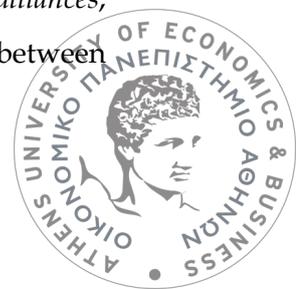
#### 2.1 Introduction

##### 2.1.1. What are Strategic Alliances?

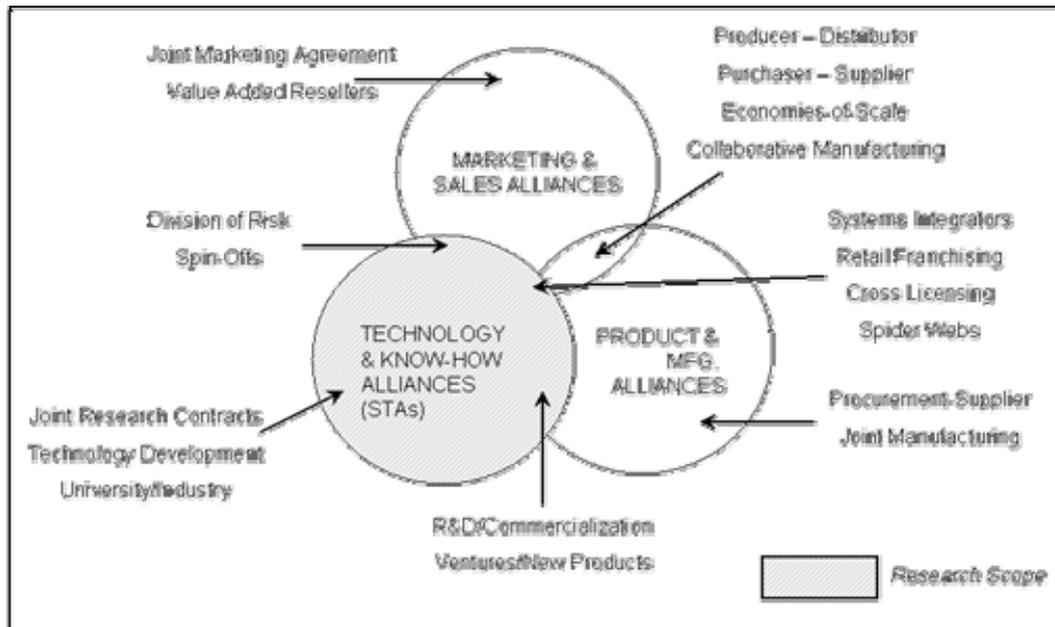
A strategic alliance is defined as a long-term cooperative arrangement between two or more independent firms that engage in business activities for mutual gain. Here, "long-term" does not refer to any specific period of time, but to the intention of the partners that the arrangement is not going to be a transient one (Tsang, 1998). A strategic alliance involves mutual exchange, sharing, or co-development, of partners' organizational assets, such as capital, technology resources, and human assets (Gulati and Singh, 1998) with the objective of enhancing the competitive position of each partner (Spekman et al., 1998).

##### 2.1.2. Strategic Alliances Types

At the functional level, strategic alliances are divided into the following groups: marketing and sales alliances, product and manufacturing alliances, and technology and know-how alliances (Lynch, 1993). While *marketing and sales alliances* are basically joint marketing agreements with value-added resellers, *product and manufacturing alliances* incorporate the functions of procurement and manufacturing and are formed between suppliers and manufacturers. The third type concerns *technology and know-how alliances*, most commonly referred in the literature as *strategic technology alliances*, between



technology providers or between technology providers and business users, aiming at exploring new technologies and exploiting technology-based products and services. Since this research focuses on technology alliances, as well as alliances that constitute a combination of the technology and the other two types of alliances, as illustrated by the inter-sections of the circles in **Figure 2-1**, they worth of a more elaborate definition.



**Figure 2-1. Basic Patterns of Alliance (Lynch, 1993)**

**Strategic Technology Alliances (STAs)** are inter-firm cooperation agreements for which a combined innovative activity or an exchange of technology is at least part of their agreement (Hagedoorn, 1993). The strategic part of their agreement relates to the expected long-term effects on the product-market positioning of at least one of the partners. We can also find them referred to as “strategic research partnerships” (Hemphill and Vonortas, 2003), since in most of them partners cooperate closely in the field of research and technology development.



### 2.1.3. Strategic Alliances Governance Modes

The term *governance* has been defined very broadly as a “mode of organizing transactions” (Williamson and Ouchi, 1981). Stated differently, alliance governance defines how an alliance is managed, how it is organized and regulated by agreements and processes, and how the partners control and influence its evolution and performance over time (Doz and Hamel, 1998).

In this research, the term *alliance governance* is used to denote mainly the degree of interdependence that partners wish to maintain via the selection of a specific governance mode. Governance modes differentiate based on the set of mechanisms that they employ for coordinating and safeguarding exchanges among the collaborating parties. Coordinating mechanisms rule how parties integrate their diverse contributions, while safeguarding mechanisms are used to ensure equity, resolve conflicts, and mitigate opportunism between partners (Jones et al., 1997).

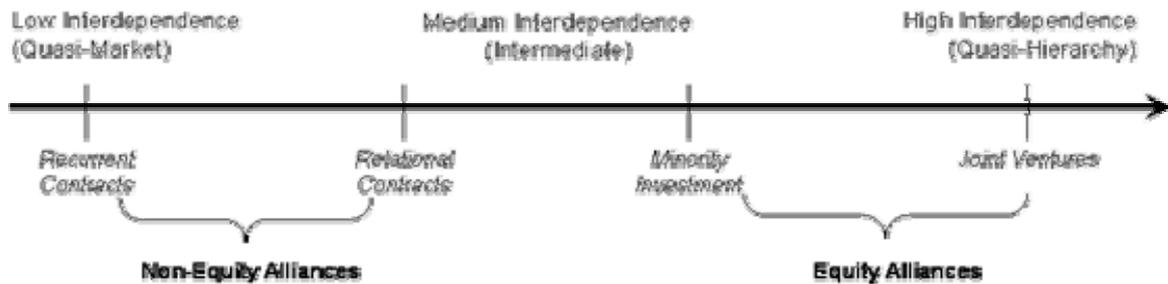
Most studies in the alliance governance literature have been based on the dichotomy of *equity* versus *non-equity* alliances (Pisano, 1989; Osborn and Baughn, 1990; Gulati, 1995; Narula and Hagedoorn, 1999; Pangarkar and Klein, 2001). Whereas equity alliances include **joint ventures** and **minority equity** alliances, non-equity alliances refer to all other **contractual arrangements** that do not involve equity exchange. Equity alliances are conceived as *quasi-hierarchies*, since they rely more on hierarchical governance mechanisms, while non-equity alliances are conceived as *quasi-markets* (Osborn and Baughn, 1990), since they rely more on arm’s-length market transactions.

While the most popular governance mode is the informal relational contract, strategic alliances may involve contractual agreements and ownership links (i.e. cross-equity holding and ownership links) (Grant and Baden-Fuller, 2004). Gulati and Singh (1998) have proposed a typology of alliance structures, differentiating them by the degree of their embedded hierarchical control, which includes; 1) joint ventures, 2) minority investment, and 3) contractual agreements. The contractual agreements are further decomposed into *relational contracts*, which imply a moderate to long-term social-embedded relationship between the collaborating parties, and *recurrent contracts*, concerning collaborative relationships of rather moderate duration (Ring and Van de Ven,



1992). The major difference between the two types of contracts refers to the existence of trust in partners' relationship, as result of their lasting contact and collaboration.

Integrating the above approaches for classifying alliance governance modes, we adopted the following typology: 1) **joint ventures**, 2) **minority investment**, 3) **relational contracts**, and 4) **recurrent contracts**. **Figure 2-2** illustrates the four alliance governance modes at a continuum of hierarchical control and partners' degree of interdependence.



**Figure 2-2. The basic governance modes in an interdependence continuum**

The following paragraphs describe these governance modes in detail, while **Table 2-1**, resulting from summarization and elaboration of several theoretical studies on alliance governance (Ring and Van de Ven, 1992; Gulati and Singh, 1998; Heide, 1994; Jones et al., 1998), lists the primary differentiating features of the aforementioned governance modes.

### **Joint Ventures**

They involve an equity agreement in which partners agree to jointly create a new entity and each of them owns a share of the entity. Each partner contributes its own relative expertise to the new entity expecting that the combination of skills will produce benefits for the parties involved (Steensma, 1996). The new entity has its own administration body that oversees its operational functions, as well as an independent command structure and authority system that defines responsibilities for each partner. Decisions are internalized, made by the management of the new entity. Also, as part of the joint venture, partners define standard operating and dispute resolution procedures. Compared to the other governance modes, joint ventures are the most instrumental in the transfer of tacit knowledge between the partners, because of the significant extent to which partners are committed and exposed to each other (Kogut, 1988; Das and Teng, 2000).



### **Minority Investment**

They include partnerships in which firms agree to share equity in each other without creating any new entity. These alliances are featured by a weaker, than in joint ventures, form of control, which is exerted by the participation of the investing firm on the administrative board of the firm that received the investment. In addition, the investor may be able to place personnel within the partner for oversight purposes (Steensma, 1996). Disputes are resolved through board member intervention, if necessary. While there may or many not be standard operating procedures, board interactions enable partners to exchange information and make decisions not only on management but also in operational level, thus coordinating day-to-day activities. In many turbulent industries, large firms invest in small innovative firms to acquire access to promising new technology or exceptional know-how (Duysters and Hagedoorn, 2000). According to Das and Teng (2000), such governance modes are preferred by firms that contribute knowledge to the alliance, and thus are subject to their partners' opportunistic behavior, but expect to get access to the other firm's property-based resources (e.g. capital or human resources).

### **Relational Contracts**

Relational contracts, also referred as bilateral contract-based alliances (Das and Teng, 2000), concern long-term relationships founded on a level of 'trust' that develops over time and reduces the propensity for partners' opportunistic behavior (Ring and Van de Ven, 1992), thus acting as a substitute for more formal (equity) governance mechanisms. Such contracts involve recurrent bargaining on the production and transfer of property rights between partners. Disputes are resolved via internal mechanisms that preserve the relationship and insure that the strategic outcomes are realized (Ring and Van de Ven, 1992). While joint ventures facilitate the process of knowledge transfer, they may be considered too risky, due to the high level of implied interdependence and interaction. Partners are likely to compete to learn more from each other, and thus drive the alliance to termination when the learning purpose is achieved. Hence, relational contracts, which are easier to dissolve but involve trust as safeguard against partners' opportunism, are preferred over joint ventures (Das and Teng, 2000).



### **Recurrent Contracts**

Recurrent contracts, also referred to as unilateral contract-based alliances (Das and Teng, 2000), concern non-equity agreements implying low engagement of partners. They usually lack any element of hierarchical control, such as shared administrative structure, incentive systems, standard operating and dispute resolution procedures. Ongoing activities are jointly coordinated and decisions are made in common when necessary. They may include bi-directional agreements, such as technology exchanges and joint contracts, or unidirectional agreements, such as licensing and outsourcing. In such alliances, the transfer of tacit knowledge is difficult (Kogut, 1988). Thus, they are preferred, when both partners intend to contribute property-based resources (e.g. capital, or patents or distribution channels) to a prospective alliance (Das and Teng, 2000).



**Table 2-1. Comparing the four governance modes of alliances**

<b>Governance Modes</b>	<b>Joint Ventures</b>	<b>Minority Investment</b>	<b>Relational Contracts</b>	<b>Recurrent Contracts</b>
<i>Strategic Intent</i>	Pursue collective advantage	Pursue collective advantage	Pursue individual advantage	Pursue individual advantage
<i>Duration</i>	Long-term	Indefinite (usually moderate to long-term)	Moderate to long-term	Short- to moderate-term
<i>Shared Ownership</i>	Each partner owns a portion of the new equity	Each partner takes a minority equity in the other	Each partner is tied with some legal commitments	Akin to arm's-length market exchanges but with certain legal commitments
<i>Command Structure &amp; Authority</i>	Independent command structure and legitimate authority system	Each partner has some form of command and authority over the other(s) by joining the board of directors	Activities are coordinated based on routine processes, decisions are ratified on a regular basis	Ongoing activities are jointly coordinated and decisions are made ad-hoc
<i>Means of Enforcement</i>	Internal to the relationship; legitimate authority	Internal to the relationship; mutuality of interest	External to the relationship; legal system/ competition/ offsetting investments	External to the relationship; legal system/ competition/ offsetting investments
<i>Incentive Systems</i>	Autonomous incentive system, as each partner is concerned about the value of its equity	Concern for the value of its equity provides incentives for the investor	Few if any official incentive mechanisms	Few if any official incentive mechanisms
<i>Operating Procedures</i>	Standard operating systems are in place	May or may not be many standard operating systems	Relation-specific routines developed from frequent interactions	Industry protocols such as accepted conventions and codified standards
<i>Mechanisms for Dispute Resolution</i>	Internal conflict resolution by fiat and authority	Through board member intervention if necessary	Endogenous designed by the parties, reliance on contracts and trust	Legal and societal norms of equity and of reciprocity, reliance on contracts



## 2.2 Theoretical Approaches to Strategic Alliances

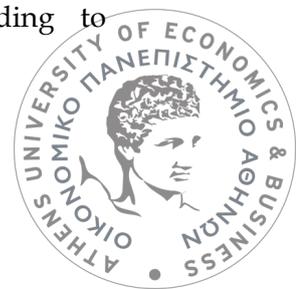
Several theories from the economic, organizational, and strategic management literature, have been proposed to explain the formation and governance of strategic alliances. Amongst them, the most widely discussed are *Transaction Cost Economics* (Williamson, 1985; 1991), *Resource-based View of the Firm* (Das and Teng, 2000; Eisenhardt and Schoonhoven, 1996), *Dynamic Capabilities View of the Firm* (Teece et al., 1997), *Knowledge-based View of the Firm* (Grant and Baden-Fuller, 2004), *Organizational Learning* (Kogut, 1988; Iyer, 2002), *Social Exchange Theory* (Gulati, 1995; Gulati and Singh, 1998), *Game Theory* (Parkhe, 1993; Rao and Reddy, 1995), and *Real Options Theory* (Leiblein, 2003). Each of them provides a different perspective on conditions that motivate or influence the formation of strategic alliances, as well as factors that affect decisions on alliance governance modes.

The following sections provide a review of the aforementioned theoretical perspectives. This review serves to provide background material on each theory as well as to identify the similarities and differences in their assumptions for the alliance governance issue. More specifically, each section starts with a reference to the key premises of each theory, then discusses the conditions that each theory identifies for alliance formation, and in some cases also the motives that drive firms to alliances, and ends with identifying a list of primary factors raised by each theory as determinants of firm preference on alliance governance mode.

### 2.2.1. Transaction Cost Economics (TCE)

Transaction cost theory was originated by Coase (1937) to explain the existence of two diverse organizational structures, markets and hierarchies, under the concern of minimizing transaction costs, raised in case of market exchanges, and production costs, raised in the event of in-house development.

TCE has arguably been the most widely used theoretical tool to predict (*ex ante* perspective) and explain (*ex post* perspective) strategic technology alliances. Within TCE, alliances are often considered as hybrid forms of governance that combine elements of two extreme forms: markets and hierarchies (Williamson, 1985). According to



Williamson's transaction cost perspective, balancing efficiency and protection leads firms to select a mix of hierarchical and market mechanisms to manage transactions. Market transactions frequently serve as efficient contracting modes. However, they may be hazardous, in case where transactions involve information asymmetries or contracts cannot adequately specify the partners' responsibilities over their duration. Thus, hierarchical internal organization will become the preferred governance mode when there is an increased need for protection, rather than efficiency, of transaction under conditions of high environmental uncertainty and complexity (Osborn and Baughn, 1990).

Under TCE, the alliance governance mode is dependent on two critical parameters: the type and degree of asset specificity involved in supplying the good or service of the alliance, and the uncertainty to which transactions are subject (Williamson, 1991).

Asset specificity can take a variety of forms, such as ownership of a rare resource, development of an advanced competence, a special privilege, or a patent. The higher the asset specificity, the higher the need for, and thus the costs of, alliance coordination. Thus, high asset specificity requires more complex institutional forms of alliance, where common administrative systems are set to govern the partner dependencies and appropriate resolution mechanisms are employed to handle possible disputes and contracting hazards (Williamson, 1991).

Uncertainty is an intrinsic feature of all transactions (Ring and Van de Ven, 1992), leading to various types of risks, such as commercial, technology, and innovation risk. In dealing with this risk, parties select a governance structure that provides appropriate safeguards against this risk. Such safeguards are usually provided by more complex hierarchical-like structures (Ring and Van de Ven, 1992).

The uncertainty factor, which becomes more relevant to high technology markets, has been emphasized in the Dynamic Transaction Cost Economics theory (Williamson, 1999). According to this theoretical perspective, in high-velocity environments, where changes in technology, customer demands, and competition are not only fast but also discontinuous, the increased need for flexibility may urge firms towards non-equity forms of collaboration (Vilkamo and Keil, 2003). Adding to that, Osborn and Baughn (1990) argue that firms might prefer contractual arrangements early in the technology lifecycle,



while as technology matures and market stabilizes, firms might quasi-internalize through joint venture agreements.

### **2.2.2. Resource-based View of the Firm (RBV)**

In contrast to the transaction cost logic, which emphasizes cost minimization, the resource-based rationale emphasizes value maximization of a firm through pooling and utilizing valuable resources (Das and Teng, 2000). According to Wernerfelt (1984), resources embrace anything that could be considered a strength or weakness of a company, whether it is physical, human, or organizational. The essence of RBV is that sustained competitive advantage for a firm comes from access to resources that have four attributes: (a) are valuable, in the sense that they exploit opportunities and/or neutralize threats in a firm's environment, (b) are rare among a firm's current and potential competitors, (c) are imperfectly imitable, and (d) there are not strategically equivalent resources that are neither rare nor imperfectly imitable (Barney, 1991).

RBV considers strategic alliances as strategies used to access partner resources for the purpose of concentrating otherwise unavailable competitive advantages and values to the firm. Thus, the overall rationale for entering into a strategic alliance is simple; to aggregate, share or exchange valuable resources with other firms, when these resources cannot be efficiently obtained through market exchanges or mergers and acquisitions (Das and Teng, 2000).

Eisenhardt and Schoonhoven (1996) found that alliances are more likely to be formed when both firms are in vulnerable strategic positions (i.e. in high need of resources) or when they are in strong social positions (i.e. possess valuable resources to share). Moreover, Das and Teng (2000) argue that the type of resources, either property-based (i.e. financial capital, physical resources, trademarks) or knowledge-based (i.e. know-how, skills), influences the firm preference over an alliance governance mode. If one or both partners contribute knowledge-based resources to the alliance, an equity alliance mode will be preferred, since contract-based alliances do not offer sufficient protection against opportunistic behavior and unintended transfer of resources (Das and Teng, 2000). Additionally, Mitchell et al. (2001) argue that resource heterogeneity is related to the choice of governance structure in alliances. Particularly, firms are more likely to choose stronger protection mechanisms for alliances in which partners contribute different or



complementary resources, since they create greater appropriation concerns, while they tend to seek lower levels of coordination in alliances in which partners contribute similar resources. Thus, the more heterogeneous resources are provided by the alliance partners, the more likely it will be an equity alliance.

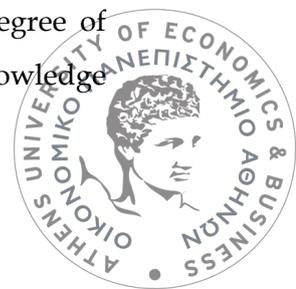
### **2.2.3. Dynamic Capabilities View of the Firm (DCV)/Knowledge-based View of the Firm (KBV)/ Organizational Learning (OL)**

DCV, KBV, and OL are considered as evolutions of the older resource-based view of the firm. These theories discuss how a firm may best exploit its resources, knowledge, and learning capabilities in a dynamic perspective in order to grow.

Teece et al. (1997) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address the challenges of technological change. Furthermore, dynamic capabilities reflect an organization's ability to achieve new and innovative forms of competitive advantage in highly competitive and volatile environments, where the rate of technological change is rapid, and the nature of future competition and market demand difficult to determine.

Under this perspective, technology and research partnerships are seen as mechanisms enabling firms to learn, enter new technological areas and deal more effectively with technological and market uncertainty (Hagedoorn et al., 2000). Firms' decisions on alliances are often driven by a strategy of expansion and diversification into related areas (Alm and McKelvey, 2000) and the focus of the theory is often on the exploitation of complementary assets for expanding in new areas (Obleros and Macdonald, 1988). Another quite important incentive leading firms to collaborate, under the dynamic capabilities theory, is saving time to market (Deeds and Hill, 1996).

For deciding the appropriate alliance governance, a number of attributes need to be taken into consideration, including 'creation versus exploitation of new capabilities', 'relative size and power of collaborators', 'availability of exploitation routes', and 'levels of uncertainty and risk' (Coombs and Metcalfe, 1998). Depending on the values of each attribute, firms may begin to analyze which type of collaborative agreement may be most beneficial. For instance, if an alliance generates risks of property rights leakage for a firm over its knowledge, then the firm will choose an institutional form of high degree of control to commit partners to the alliance and provide safeguards for knowledge



protection. According to Oxley and Sampson (2004), where the costs of knowledge leakage are deemed to be particularly high, a firm may choose between narrowing down the alliance scope to limit exposure and opting for a protective (equity-based) governance structure to control partner opportunism.

KBV emphasizes the significance of knowledge as a competitive asset to produce new products and services. It is not so much the cost of the transfer, as would be the focus of the transaction cost approach, but the effectiveness of the transfer and the ability or experience of the firm in accessing and handling new knowledge that may create the need for collaboration (Hagedoorn et al., 2000). An alliance may enable a firm to gain access to key knowledge-based capabilities of another firm without internalizing or acquiring that capability (Mowery, 1996). Especially in strategic technology alliances, where technological capabilities are frequently based on tacit knowledge, inter-firm knowledge transfer may be limited to only the codified information necessary to coordinate otherwise separable activities that draw on different knowledge domains (Hemphill and Vonortas, 2003).

Both DCV and KBV embrace the organizational learning perspective. According to this perspective, alliances are vehicles towards internalizing technology-related competences of other firms to enhance firm competitiveness (Foss, 1996). The key question posed by organizational learning scholars is whether it is better to learn in a single firm or in collaboration with other firms. Such a decision is greatly influenced by the pace of learning in the sector concerned. In sectors where learning is slower, the firm can diversify internally rather than using alliances, thereby keeping control in-house. However, if learning is rapid, technological trajectories are colliding and technology selection is tough, firms are likely to form alliances. Kogut's (1988) organizational learning model, which is part of the Resource-based View, offers a refined view of alliance formation based on firm assets, such as knowledge and technology. According to him, there are two possible reasons for firms to ally: either to acquire the other's organizational know-how, or to maintain one's own know-how and benefit from combining it with another's resources or competence.



#### 2.2.4. Social Exchange Theory (SET)

Compared to the aforementioned theories, SET emphasizes on the social context of alliances. Social context in alliances is taken to refer to the accumulation of prior direct or indirect ties that create 'social networks' (i.e. firms in a value net develop relationships with suppliers, customers, competitors, and complementors). Social networks enable their members to learn about each other's existence, needs, capabilities, and alliance requirements at a given time, and they also serve as a basis for trust building between partners (Gulati, 1995).

Social Exchange Theory (SET) constitutes the most successfully applied sociological perspective in explaining the formation of alliances under a social context. Social exchange is defined as "voluntary actions of individuals that are motivated by the returns that they are expected to bring and typically in fact bring from others" (Blau, 1964). Compared to the economic exchange, discussed by economics theories, SET is less formal, more uncertain, more dependent on the positive actions of the two parties, and typically involves a longer time frame (Das and Teng, 2002). Social exchange allows parties to exchange those resources that are difficult or risky to obtain through economic exchange.

SET is less frequently employed to understand strategic alliances. Nevertheless, Das and Tend (2002) have made an attempt to apply this theory in explaining the three perspectives of strategic alliances, formation, operation and structure. To do so, they identify three major reasons why social exchanges are part, and thus are worth of further investigation, in strategic alliances. First, most alliances are based on incomplete contracts that leave many minor issues open-ended. Therefore, there is uncertainty, which raises the need for social exchange. Second, because alliances are on-going processes, exchanges in alliances have to take place over time. During this time, parties have the opportunity to monitor the other party's behavior and thus adjust their own accordingly. Lastly, relationship and trust are critical elements in alliances, as in social exchanges.

Dodgson (1993) defines trust as "a state of mind, an expectation held by one trading partner about another that the partner will behave in a predictable and mutually acceptable manner". The SET literature suggests that two main sources of trust exist: 'reputation' and 'shared values' (Young-Ybarra and Wiersema, 1999). Reputation requires knowledge of previous relationships or may develop over time as partners continue to



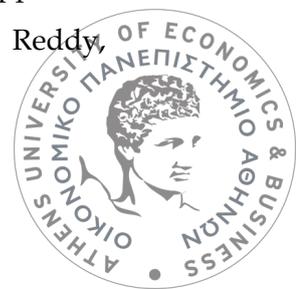
interact. Based on SET, the decisions of alliance formation and choice of governance structure depend on the 'number of past alliances', 'duration of past alliances', 'time elapsed from past alliances', 'nature of prior ties' (i.e. joint ventures, market exchanges), 'total number of partners involved' in previous alliances (Gulati, 1995; Gulati and Singh, 1998), the 'number of prior indirect ties' and the 'distance between firms', which refers to the shortest path in the relevant social network (Gulati, 1995). Other relevant factors that affect firm propensity towards alliances include the currently established level of communication between candidate partners (i.e. frequent and informal exchange of information), as well as the existence of shared values, measured through shared nationality/culture (domestic versus international alliances) and shared motives (Young-Ybarra and Wiersema, 1999).

In alliance formation, the participation of a firm in a social network can affect its proclivity to enter into strategic alliances. In alliance operation, Social Exchange Theory focuses on trust development as well as on achieving mutual dependence between the partner firms, in order to avoid inter-firm conflicts. Finally, with regards to the alliance structure, Das and Teng (2002) differentiate four types of alliances (licensing agreements, co-production, joint bidding, joint ventures) based on the relative importance of two dimensions: social exchange and strategic emphasis. Based on them, joint ventures are formed when firms rate the implied social exchange of high importance and pursue a collective, rather than an individual, strategic goal.

### 2.2.5. Game Theory (GMT)

Game theory is a theory of rational decision in conflict situations. A key assumption underlying the structure of game theory is that the players in a game are rational, and their primary objective is to maximize utility (Rao and Reddy, 1995). Game theory views strategic alliances as "relatively enduring inter-firm cooperative arrangements, involving flows and linkages that utilize resources and/or governance structures from autonomous organizations, for joint accomplishment of individual goals linked to the corporate mission of each sponsoring firm" (Parkhe, 1991).

Companies enter alliances for a wide variety of strategic motives, using diverse organizational forms and legal structures. Game theory adopts a time dynamic approach for explaining firm behavior in alliance formation and performance (Rao and Reddy,



1995). Dynamic changes in the internal and external environments of the firms may alter the initially estimated payoffs and force alteration of the alliance.

Much like Transaction Cost Economics, which emphasizes on the probability for opportunistic behavior of a partner, Game Theory analyzes the behavior of partners and their tendency to cheat in order to maximize their individual gains at the expense of others. This incentive creates high instability, which renders the selection of alliance governance structure by a firm even more critical. The risk of exposure to the other party's possible opportunistic behavior may be counterbalanced by selecting a governance mode that forces both partners to invest non-recoverable resources and promotes goal congruence (Parkhe, 1993). Under the prospective for an iterative cooperation between partners, firm estimations for the future alliance gains are affected by their current actions. This is the so-called 'shadow of the future', which prevents partners from violating an agreement under the risk of future retaliation. Thus, the firm decision over the preferred alliance governance mode is determined by the future benefits or risks that it anticipates ('shadow of the future' effects) as well as on their partner's behavior in previous iterations of the alliance ('shadow of the past' effects) (Parkhe, 1993).

### **2.2.6. Real Options Theory (ROT)**

Real Options Theory constitutes a generalization of the concepts and valuation techniques first developed for financial options. Originally developed in the context of finance (Myers, 1977), financial options have been applied to capital budgeting and issues relating to the allocation of resources for R&D purposes (Sanchez, 1993). In relation to financial options, real options have emerged to integrate more strategic-oriented aspects embedded in an investment project under conditions of uncertainty. Specifically, ROT concerns the manner in which investments create value through operating flexibility. In recent years, real options have emerged as a compelling approach to modeling and evaluating strategic opportunities created through early investments in uncertain environments (Sanchez, 1993). Then, using option-pricing models, it is possible to quantify these opportunities and indicate when these options should be optimally exercised (Botteron, 2001).

The prime application areas for real options in the strategic management field include project selection and investment expertise, evaluation of research and development investments in the early stage of research, mergers/acquisitions/alliances, shareholder



value management, and valuation of patents, licenses, and brands (Botteron, 2001). Real options analysis has been extensively used to value interorganizational partnerships and related investments in technology. Under such an application, joint ventures have been modeled as options to acquire the venture and expand in response to future technological and market developments (Kogut, 1991). Several other works (Leiblein, 2003; Barney and Lee, 1998) focus on comparing as well as identifying links between ROT and other theories used in explaining alliance-related decisions, such as TCE, RBV, and OL.

Two key assumptions underlying the real options perspective are that: a) managers are able to write contracts that provide implicit or explicit claim of partners on future, follow-on opportunities, and b) it is possible to specify a priori a distribution of expected returns associated with an alliance (Leiblein, 2003). An important implication of these assumptions is that the value that an alliance incurs may be divided into two parts: the *present value* deriving from current access to the partner's resources and skills, and the *expected value* derived from discretionary future opportunities. As such, firms may choose governance modes in a dynamic fashion in anticipation of future opportunities.

The real options logic suggests that the critical objective of firms making governance choices under conditions of uncertainty is the maintenance of their flexibility. Only by maintaining flexibility will it be possible for firms to make appropriate decisions in the future, should the uncertainty facing that firm be resolved one way or another. The maintenance of flexibility under conditions of high uncertainty becomes a governance issue, since some forms of governance are less flexible than others. In particular, it is generally assumed that it is more costly for firms to alter hierarchical forms of governance in response to the change of the uncertainty level in an exchange than it is to alter less hierarchical forms of governance (Kogut, 1991). Altering hierarchical forms of governance involves changing numerous explicit and implicit contracts that constitute this form of governance (Mahoney, 1992). Changing less hierarchical forms of governance usually involves altering a smaller number of usually explicit contracts. This reasoning suggests that, under conditions of high uncertainty in an exchange, firms will opt for less hierarchical forms of governance (Barney and Lee, 1998).



### 2.2.7. Comparison and Complementarity of Theories

Each of the aforementioned theories provides a different perspective on factors that drive alliance formation as well as determinants of alliance governance mode. All provide valuable insights and could form the basis for a unified perspective on strategic alliances. Such an integrated perspective is pursued by this research. The following paragraphs pinpoint the key conceptual differences between these theories, but also raise some points to which they complement each other.

In terms of alliance formation, TCE focuses on the economic nature of exchanges (transactions), and the governance that is required for monitoring them, while SET focuses on the social (relational) nature of exchanges, as voluntary actions that are encouraged by particular environments (high uncertainty) and existing ties between firms (high interdependence). While RBV considers one party's resource gaps as a condition for alliance formation, DCV pays attention to the firm's requirements for new capabilities/knowledge towards the strategic goal of product/ service expansion and diversification. In a more general and reciprocal strategic context, GMT views an alliance as a game in which partners try to maximize the current value that it can raise for both of them. However, ROT emphasizes on the future opportunities that the alliance investment may unveil due to obtaining access to flexible assets and skills, as well as due to the disclosure of new information that may decrease the level of environment uncertainty.

With regards to alliance operation, most theories, basically TCE, DCV, and GMT, raise the concern over the opportunistic behavior of partners. Under this strain, TCE raises the need for establishing hierarchical mechanisms to control partners' opportunistic behavior, while SET stresses the importance of trust and power-dependence symmetry as protection mechanisms. Moreover, RBV regards affective alliance operation as a result of synergistic resource alignment between partners. In a similar vein, DCV stresses the complementarity of resources, as well as the ability of the firm to integrate the differentiated knowledge provided by their partners, as critical determinants of alliance operations. Compared to the others, the Game and Real Options theories emphasize on the dynamic nature of the internal and external environments of the firms, which may alter the initially estimated payoffs and thus define the new way in which alliance should be managed and operate.



Lastly, all theories propose a different rationale under which firms make their decisions for the preferred governance mode. TCE stresses the need for more complex governance structures to safeguard firms against the opportunistic behavior of their partners. RBV bases the choice of alliance structure on the type and the similarity of exchanged resources. Thus, when knowledge-based and heterogeneous resources are exchanged, equity modes of alliances are preferred to assure safe conditions for the resource exchange. Under a similar rationale, DCV identifies the preferred governance structure based on the need for creation versus exploitation of new capabilities, the relative size and power of collaborators, and the levels of uncertainty and risk incurred by the exchange of knowledge. Adopting a value capture perspective, SET bases the choice of alliance structure on the relative importance of social exchange and strategic emphasis (individual vs. collective advantage) of the alliance, while GMT and ROT view the alliance governance decision as determined by the firm expectations for the future benefits or opportunities that may arise. Contract-based agreements imply greater level of flexibility, and thus can be considered as more value-promising than equity-based alliances.

Table 2-2 summarizes the key points to which Transaction Cost Economics, Resource-based View, Dynamic Capabilities and Knowledge-based View, Social Exchange Theory, Game Theory and Real Options Theory differentiate in explaining strategic alliances. Table 2-2 is partly adapted from Das and Teng's comparison frameworks (2000; 2002).



**Table 2-2. Comparison of Theoretical Approaches on Strategic Alliances**

<b>Criteria</b>	<b>Transaction Cost Economics</b>	<b>Resource-Based View</b>	<b>Dynamic Capabilities/ Knowledge-based View/ Organizational Learning</b>	<b>Social Exchange Theory</b>	<b>Game Theory</b>	<b>Real Options Theory</b>
<b>Logic</b>	Minimizing the sum of production and transaction costs.	Maximizing firm value through gaining access to other firms' valuable resources.	Increasing a firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments and diversifying its products into related areas.	Allowing parties to exchange those resources that are difficult to obtain through market transactions by developing trust and mutual dependence.	Maximizing utility of the alliance for both partners	Maximizing flexibility and value under conditions of high uncertainty.
<b>Strategic Alliances Formation</b>	When they minimize the sum of production and transaction costs. Specific conditions include a high degree of asset specificity, difficulty in negotiating, specifying, and monitoring performance.	When the critical inputs required to pursue a strategic opportunity are owned by different parties and when these inputs are inseparable from the other assets of their owners.	Alliances can overcome the limits of firms in encompassing highly differentiated knowledge integration processes, while offering efficiencies in knowledge utilization. Specific conditions include uncertainty, early mover advantage and pace of learning in the sector concerned.	When social exchanges of resources are essential in inter-firm relationships. Specific conditions include a high level of interdependence and environmental uncertainty.	Cooperation is important as it can ultimately lead to payoffs for the members of the alliance. Payoffs determine whether there will be an emergence of stability, as they represent an incentive to stay in the alliance; and the payoff structure can influence the shape of the game.	In dynamic (e.g. high technology) environments featured by uncertain market demand, firms should follow a strategy of internalizing, through alliances, flexible assets to maintain the opportunity of extending their array of products in the future.



Criteria	<i>Transaction Cost Economics</i>	<i>Resource-Based View</i>	<i>Dynamic Capabilities/ Knowledge-based View/ Organizational Learning</i>	<i>Social Exchange Theory</i>	<i>Game Theory</i>	<i>Real Options Theory</i>
Strategic Alliance Operation	Use of various control mechanisms (e.g. behavior control, output control, and social control) to deal with the problem of opportunism in alliances.	Inter-partner resource alignments include supplementary, complementary, surplus, and wasteful resources. The key lies in creating synergy between resources of partner firms.	The complementarity of resources and the ability to integrate the differentiated knowledge provided by partners are considered critical determinants of alliance success.	Inter-firm trust is developed in a reciprocal process; asymmetrical dependence leads to power imbalance as well as inter-firm conflict.	Dynamic changes in the internal and external environments of the firms may alter the initially estimated payoffs and force alteration of the alliance.	Upon the arrival of new information, firms are called to change the alliance form (investment plan) to claim for emerging rent generating opportunities.
Strategic Alliance Structure	Structural choices depend on the perception of opportunistic behavior. Efficiency vs. Protection	Structural choices depend on the relative importance of property-based and knowledge-based resources.	Quasi-hierarchy alliances (i.e. joint ventures) are encouraged under 2 conditions: one or both firms desire to acquire the other's organizational know-how; or one firm wishes to maintain an organizational capability, while benefiting from its partners' current knowledge or cost advantage.	Structural choices depend on the alliance's strategic emphasis and relative importance of social exchange.	The decision on alliance governance mode is greatly affected by past behavior of firms in previous iterations of the alliance.	When future value of the alliance-related investments is uncertain, more flexible forms (quasi-market) of alliances should be preferred.



## 2.3 Critical Issues in Alliance Research

The analysis of theories used to explain strategic alliances has indicated the most critical research streams in the area. These concern factors that favor alliance formation, firm motivations for alliances, critical success factors in alliance management and operation, and determinants of alliance governance structure. Nevertheless, there are several other alliance issues not covered by the above theories, and these include partner selection and assessment of compatibility, and assessment of value expected from an alliance. Following, we review the major outcomes of theoretical and empirical studies related to the areas that are most close to this research's scope; alliance motives, alliance formation, alliance governance, partner assessment and value creation and capture in alliances. The ultimate goal of this review is to identify a set of components (factors) that could contribute to the development of our principal research model.

### 2.3.1. Alliance Rationales/ Motives

A common rationale of researchers for distinguishing motives that drive formation of alliances is based on the choice of theoretical tools used to explain the formation of alliances. Therefore, the two most well-known and used groups of motives, which correspond to two distinct goals of pursuing an alliance, include (Hemphill and Vonortas, 2003): a) *Cost economizing motivations*, which aim at increasing the cost-efficiency of parties and are mainly addressed by economic theories, and b) *Strategic (long-term) positioning motivations*, which aim at reinforcing the strategic position of firms, and are mainly addressed by theories in strategic management. Further to the two extremes, firms might also pursue alliances through an intermediate strategy that involves mixed motivations of both cost-economizing and strategic positioning nature.

Although there is no strict correlation between alliance types and motivations, hierarchy-like alliance structures are considered to be more strategically motivated, while market-like collaborations tend to be more cost-economizing oriented (Hagedoorn, 1993).

The following table summarizes the main motives of alliance formation, identified by the literature review in the field of strategic alliance motivation, as well as from the theoretical analysis made in the previous section.



**Table 2-3. Strategic Motivations for Alliance Formation**

Alliance Motivations	Research
<b>Cost Economizing Motives</b>	
<ul style="list-style-type: none"> <li>▪ Minimize the sum of production and transaction costs</li> </ul>	Vilkamo & Keil (2003); Kogut, 1988
<ul style="list-style-type: none"> <li>▪ Share costs of research and development</li> </ul>	Hemphill & Vonortas, 2003; Gulati & Singh, 1998; Hagedoorn, 1993
<ul style="list-style-type: none"> <li>▪ Gain access to financial capital</li> </ul>	Hemphill & Vonortas, 2003; Gulati & Singh, 1998; Dalziel, 2001
<ul style="list-style-type: none"> <li>▪ Decrease cost of access to new markets and technologies</li> </ul>	Hamel et al., 1989; Kogut, 1988;
<b>Strategic Positioning Motives</b>	
<ul style="list-style-type: none"> <li>▪ Share risk and reduce uncertainty</li> </ul>	Vilkamo & Keil (2003); Hemphill & Vonortas, 2003; Gulati & Singh, 1998; Hagedoorn, 1993
<ul style="list-style-type: none"> <li>▪ Access valuable resources, skills, knowledge, and technology</li> </ul>	Vilkamo & Keil (2003); Tsang, 1998; Das & Teng, 2000; Grant & Baden-Fuller, 2004
<ul style="list-style-type: none"> <li>▪ Access partner's skills and competence</li> </ul>	Hamel et al., 1989; Kogut, 1988; Hemphill & Vonortas, 2003; Tsang, 1998; Dalziel, 2001
<ul style="list-style-type: none"> <li>▪ Exploit complementary assets</li> </ul>	Hemphill & Vonortas, 2003; Vilkamo & Keil (2003); Hagedoorn, 1993
<ul style="list-style-type: none"> <li>▪ Deploy new skills and knowledge</li> </ul>	Steensma, 1996; Hamel et al., 1989; Gulati & Singh, 1998; Dalziel, 2001
<ul style="list-style-type: none"> <li>▪ Put idle resources into use</li> </ul>	Tsang, 1998
<ul style="list-style-type: none"> <li>▪ Expand existing resources/competence usage into new areas (Improve capacity utilization)</li> </ul>	Parkhe, 1991; Hemphill & Vonortas, 2003; Tsang, 1998; Das & Teng, 2000
<ul style="list-style-type: none"> <li>▪ Dispose of non-core business resources</li> </ul>	Tsang, 1998
<ul style="list-style-type: none"> <li>▪ Increase strategic flexibility</li> </ul>	Hemphill & Vonortas, 2003
<ul style="list-style-type: none"> <li>▪ Reduce time to market</li> </ul>	Hamel et al., 1989; Gulati & Singh, 1998; Hagedoorn, 1993; Dalziel, 2001
<ul style="list-style-type: none"> <li>▪ Lead to lower prices of products</li> </ul>	Kogut, 1988
<ul style="list-style-type: none"> <li>▪ Improve quality of products</li> </ul>	Hamel et al., 1989; Kogut, 1988
<ul style="list-style-type: none"> <li>▪ Deter entry of competitors</li> </ul>	Hemphill & Vonortas, 2003; Kogut, 1988; Dalziel, 2001
<ul style="list-style-type: none"> <li>▪ Develop new products</li> </ul>	Parkhe, 1991; Gulati & Singh, 1998; Hagedoorn, 1993; Sanchez, 2002
<ul style="list-style-type: none"> <li>▪ Gain access to new markets</li> </ul>	Parkhe, 1991; Hemphill & Vonortas, 2003; Gulati & Singh, 1998; Hagedoorn, 1993
<ul style="list-style-type: none"> <li>▪ Obtain competitive intelligence/advantage</li> </ul>	Hemphill & Vonortas, 2003; Dalziel, 2001



The above strategic motives are not mutually exclusive. Therefore, the decision over an alliance could be triggered by multiple firm motivations.

### 2.3.2. Alliance Formation

Factors that affect the alliance formation rate have been discerned into industry and firm level (Gulati, 1998). Hereinafter, we make the distinction between environmental and organizational factors.

At the environment level of analysis, the *degree of competition* and the *development stage of the market and technology* are most commonly investigated. Eisenhardt and Schoonhoven (1996) argue that the rate of alliance formation is higher in markets with a great number of competitors and in emergent-stage markets. Dickson and Weaver (1997) link alliance formation to the perceived level of *environmental uncertainty*. Perceived environmental uncertainty is considered a multidimensional construct that can be characterized by five sources of uncertainty; general uncertainty, technological volatility, predictability of customer demand and competitor actions, growing demand for internalization, and future potential for industry's growth and profits. In their empirical analysis, Dickson and Weaver (1997) found out that alliance use is positively associated with general uncertainty, technological volatility and demands for internalization, but negatively associated with predictability of customer demands and competitor actions and strategic managers' perceptions of a strong future potential for the industry.

An even greater number of factors have been studied at the firm level (Keil, 2000). The most popular ones are *size and age of the firm, cumulative alliances, competitive position, and firm strategy*. There are quite a few more factors (e.g. product diversity, financial resources, size and quality of top management team) affecting alliance formation. However, providing an exhaustive list of such items is out of this review's scope. Instead, we intend to discuss the most commonly analyzed and validated firm-level influences.

According to Baum and Oliver (1991), young firms might show higher rates of alliance formation, as alliances with established firms might be a means towards creating legitimacy. The empirical analysis of Eisenhardt and Schoonhoven (1996) has controlled for the firm's age, size and cumulative number of alliances. The results showed that young firms and firms with more past alliances have higher rates of alliance formation, but firm size is not statistically significant.



Eisenhardt and Schoonhoven (1996) argue that firms are more likely to form alliances if they are in a vulnerable strategic position or have an innovative strategy. Stuart (1998) argues that technological crowdedness and prestige represent one way to define the strategic position of the firm. Firms that compete in crowded technology areas and firms that are technologically prestigious show higher alliance formation rates. The strategic position of a firm can also refer to the resource profile. The more firm resources are characterized by imperfect mobility, imperfect imitability, and imperfect substitutability, the more likely the firm will get involved in strategic alliances (Das and Teng, 2000).

Apart from the organizational and environmental factors, there are also some critical parameters that define the relationship of the involved parties. These are hereinafter considered as alliance-level factors, since they concern the alliance-specific rather than the internal or external environment of a particular firm. Gulati (1995) has pointed out two critical factors affecting alliance formation; strategic interdependence and social context. Strategic interdependence between firms describes a situation in which one firm has resources or capabilities beneficial to but not possessed by the other. Such firms are more likely to form an alliance than non-interdependent firms. The role of interdependence is further confirmed by partner financial diversity, estimated in terms of capital size and financial liquidity (Keil, 2000). Gulati's (1995) empirical results have also showed that firms seek out partners that differ from them in terms of size and financial resources. Moreover, Gulati (1995) has proved that social context, resulting from either direct or indirect prior ties of the alliance partners influences their proclivity to new alliances.

**Table 2-4** lists the prime factors that have been hypothesized to influence the strategic alliance formation.



**Table 2-4. Factors affecting Alliance Formation**

<b>Critical Factors for Strategic Alliance Formation</b>		<b>References</b>
<i>Organizational Factors</i>		
Size		Gomes-Casseres (1997), Eisenhardt & Schoonhoven (1996)
Age		Eisenhardt & Schoonhoven (1996)
Strategy (Level of Innovation)		Eisenhardt & Schoonhoven (1996)
Competitive Position		Das and Teng (2000)
<i>Environmental Factors</i>		
Degree of Competition (no. of competitors)		Eisenhardt & Schoonhoven (1996)
Development Stage of Market/Technology		Eisenhardt & Schoonhoven (1996)
Environmental Uncertainty		Dickson & Weaver (1997)
Benefits of Early-Mover Advantage		Grant & Badden-Fuller (2004)
<i>Alliance-Specific Factors</i>		
Strategic Interdependence		Gulati (1995)
Social Context		Gulati (1995)
Alliance History		Eisenhardt & Schoonhoven (1996)
Financial Diversity		Gulati (1995)

### 2.3.3. Alliance Governance

Most empirical studies on alliance governance ground their arguments on Transaction Cost Economics, which proposes that choosing an appropriate alliance governance structure is an important mechanism that firms employ to protect themselves from partners' opportunistic behavior. According to them, equity forms of alliances are preferred in cases where there is a need for more protection than efficiency in partners' transactions. Based on empirical results, these are alliances that involve *more than two partners* (Colombo, 1998; Oxley and Sampson, 2004) and *relation specific assets* (Chen and Chen, 2003), as well as alliances formed under conditions of high *partner behavior uncertainty* (Chen and Chen, 2003). Other conditions that were theoretically hypothesized, based on Transaction Cost theory, but empirically rejected, as drivers of equity alliances include *technological uncertainty* (Chen and Chen, 2003), *cultural and geographical distance* of partners (Colombo, 1998; Pangarkar and Klein, 2001). Instead, non-equity alliances are preferred in cases where there is a need for efficiency rather than protection, such as in industries featured by *high R&D intensity* (Osborn and Baughn, 1990; Hagedoorn and Narula, 1996).



Additional considerations from Resource-based View and Knowledge-based View are in support of governance forms that maintain a balance between allowing sufficiently open resource/knowledge/technology exchange to achieve alliance objectives, while controlling exchange flows to avoid unintended leakage of valuable resources/knowledge/technology (Oxley and Sampson, 2004; Colombo, 1998). Thus, empirical studies show that firms choose a more protective alliance structure (i.e. joint venture), when partner *strategic interdependence* is expected to be high (Gulati and Singh, 1998), or *alliance scope* (range of activities involved in the alliance) is broad and involves a *technology component* (Gulati and Singh, 1998) or *joint R&D activities* (Osborn and Baughn, 1990; Colombo, 1998; Pangarkar and Klein, 2001). Instead, non-equity alliances are favored in cases where partners have *similar capabilities* (Colombo, 1998), and *complementary resources* (Chen and Chen, 2003) and substantial *competitive overlap* in either the product or geographical market level (Oxley and Sampson, 2004).

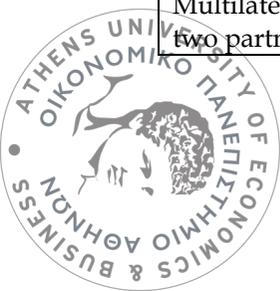
Finally, inspired by Game Theory and Social Exchange Theory, empirical work on alliance governance has shown that *previously established alliances* provide partners with more trust, thus rendering the use of more hierarchical alliance modes less compelling (Gulati and Singh, 1998; Colombo, 1998).

**Table 2-5** lists the primary factors that have been empirically shown to influence the governance form of strategic alliances. The table's cells indicate the impact of each factor on the alliance governance mode. The signs (+)/(-) mean that the correspondent variable increases/decreases the likelihood of the alliance taking an equity form. The indication 'n.s.' stands for factors that have been tested and proved statistically 'non-significant'.



Table 2-5. Main outcomes of previous empirical studies on alliance governance

Empirical Studies Factors	Base Theory	Osborn & Baughn (1990)	Hagedoorn & Narula (1996)	Gulati & Singh (1998)	Colombo (1998)	Pangarkar & Klein (2001)	Chen & Chen (2003)	Oxley & Sampson (2004)
<b>Organizational Factors</b>								
Firm Size	TCE						n.s.	
<b>Environmental Factors</b>								
R&D/Technology Intensity of the Industry	TCE	(-)	(-)				n.s.	
<b>Alliance-Specific Factors</b>								
Strategic Interdependence	RBV			(+)				
Alliance Scope	TCE				(+)			(+)
Asset Specificity	TCE						(+)	
Joint Technology/R&D Activities	TCE, KBV	(+)		(+)	(+)	(+)		
Similarity of Technology Capabilities	CBV				(-)			
Resource Complementarity	TCE, RBV, DCV						(-)	
Market and Geographic Competition	TCE, KBV							(-)
Partner Behavioral Uncertainty	TCE						(+)	
Previous Ties	SET, GMT			(-)	(-)			n.s.
International	TCE				n.s.	n.s.		
Multilateral (more than two partners)	TCE			n.s.	(+)			(+)



The aforementioned review concerned only empirical studies and not theoretical knowledge developed in the alliance governance area. Nevertheless, we considered it necessary to examine key theoretical studies, and present the influential factors that they acknowledge and propose for future empirical work. Table 2-6 summarizes the results of this targeted literature research. We should note that factors mentioned in the previous empirical analysis do not appear again in this table.

**Table 2-6. Main outcomes of theoretical studies on alliance governance**

Theoretical Studies	Ring & Van de Ven (1992)	Argyres & Liebeskind (1999)	Duysters & Hagedoorn (2000)	Das & Teng (2000)	Leiblein (2003)
Market uncertainty			X		X
Business risk	X		X		
Partners' resource types				X	
Firm's past and current governance decisions		X			
Level of tacit knowledge exchanged					X
Reliance on trust	X				X

Wishing to fill in the shortcomings of Transaction Cost Economics on alliance governance domain, Ring and Van de Ven (1992) bear two primary criteria for the choice of governance forms; *risk*, which is associated with uncertainty deriving from a wide range of factors (technology volatility, market demand, scientific uncertainty), and *trust*. Specifically, they propose that the greater the risk in a transaction, the more complex the governance structure. Trust is associated with the perceived level of risk through a converse relationship. Thus, the greater the ability to rely on trust, the less the risk inherent in transactions. A combination of high risk and low reliance on trust will lead firm decision to quasi-hierarchy alliances, in order to control for opportunism.

Empirical work using the transaction cost logic predicts that, under conditions of high *uncertainty*, firms opt for more hierarchical forms of governance (Leiblein and Miller, 2003; Sutcliffe and Zaheer, 1998). However, empirical work that is consistent with real options theory shows that firms opt for less hierarchical alliances (Balakrishnan and Wernerfelt, 1986; Kogut, 1991) in a highly uncertain environment.



Using arguments from Resource-based View, Das and Teng (2000) argue that the *type of resources* that firms could potentially contribute constitute a key dimension in predicting the partners' governance preferences in the prospective alliance. If one or both partners contribute knowledge-based resources to the alliance, an equity alliance mode will be preferred, since contract-based alliances do not offer sufficient protection against opportunistic behavior and unintended transfer of resources.

Argyres and Liebeskind (1999) raise the importance of a firm's portfolio of contemporaneous exchange relationships on firm preference for a governance mode. Thus, they argue that the firm *current governance decisions* constrain the range and types of governance mechanisms that it can adopt in subsequent collaborations.

In his attempt to integrate the Transaction Cost, the Resource-based and the Real Options theories, Leiblein (2003) has pointed out a number of factors. Specifically, he claims that firms able to identify trustworthy partners or to develop reputation for trustworthiness may mitigate concerns regarding opportunistic behavior, and therefore be more likely to utilize quasi-market governance forms. Based on Knowledge-based View, he argues that exchanges that involve highly tacit and complex knowledge, and thus require high-bandwidth communication channels and idiosyncratic communications codes, are associated with equity-based alliances. The specific nature of these same knowledge transfer mechanisms raise contracting hazards, which are emphasized by Transaction Cost Economics.

#### **2.3.4. Partner Compatibility**

The degree of compatibility among partners has been found to be an important predictor of the success or failure of joint ventures (Murray and Siehl, 1989). Interfirm diversity<sup>1</sup> can severely impede the ability of companies to work jointly and effectively (Parkhe, 1991).

Harrigan (1985) distinguishes three kinds of compatibility in the context of joint venture relationships: *strategic*, *cultural*, and *functional (operational)*. In a similar vein, Parkhe

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<sup>1</sup>In the alliance literature, and thus in this thesis, the term 'interfirm diversity' is used as the reverse concept of 'partners' compatibility'.



identifies two types of interfirm diversity: Type I Diversity, which deals with the reciprocal strengths of the partners and relates to differences in their skills, resources and capabilities, and Type II Diversity, which refers to cultural and functional differences between the social actors of the alliance (Parkhe, 1991). This research examines all types of partner compatibility, considered as a facilitator in the process of alliance coordination and execution of its strategies (Shamdasani and Sheth, 1994). Anderson and Narus (1990) argue that “compatible partners working together in pursuit of mutually agreed strategic goals develop a strong feeling of ‘chemistry’, which results in satisfaction with the alliance”.

In the alliance literature, *strategic compatibility* is interpreted in numerous ways. According to Shamdasani and Sheth (1994), strategic compatibility is defined as “the extent to which an alliance partner has complementary goals and shares similar orientations that facilitate coordination of alliance activities and execution of alliance strategies”. Giving more emphasis on the joint purpose of alliance formation, Medcof (1997) considers strategic fit between alliance partners in terms of “a shared understanding of the business rationale for the alliance.” In contrast, Das and Teng (2000) argue that the critical test is whether there is a “resource alignment” among the firms. Partner resource alignment more commonly refers to a similar or complementary pattern of resources that each partner brings to the alliance. Resource complementarity has often been conceptualized as the extent to which each partner brings in unique strengths and resources of value to the collaboration (Johnson et al., 1996).

*Cultural and operational compatibility* among partners influence the extent to which they manage to realize the primary goal for which the alliance has been contracted. Sarkar et al. (2001) define *cultural compatibility* as “the congruence in organizational philosophies, goals and values”, and *operational compatibility* as “the congruence in the partners’ procedural capabilities”. On the one hand, a kind of similarity in partners’ organizational processes and working styles may lead to a reduction of coordination and communication costs, thus raising expectation for more economic profits. On the other hand, possible incompatibilities in social norms may even cause the failure of the alliance due to the inability of the two entities to work seamlessly and come into agreement (Wilkof et al., 1995).



A minimum level of resource complementarity is considered necessary for the formation and maintenance of alliances. However, the mutual erosion of partners' complementarity may destabilize the partnership. On the contrary, cultural and operational compatibility is seldom present at the initiation of alliances, but is raised by iterative cycles of interorganizational learning. The mutual development of partners' compatibility strengthens the partnership.

The overall effect of partners' compatibility on value creation through alliances has been noted in prior research (Madhok and Tallman, 1998; Sarkar et al., 2001). More specifically, Sarkar et al. (2001) argue that value generated from alliances is enhanced when partners have different resource and capability profiles and yet share similarities in their social institutions.

### 2.3.5. Value Creation and Capture in Strategic Alliances

Compared to traditional partnerships, such as buyer-seller business relationships, strategic alliances, urge managers to take a broader view of value creation focusing on a wide range of outcomes, not only economic but also outcomes related to their initial purposes for entering an alliance. Conventional wisdom encourages managers to look for value creation potential in the initial design of the alliance and in terms of governance (Doz and Hamel, 1998). Alliances can create value in different ways depending on the growth goal that they serve. Different paths to value creation naturally affect the firm expectations for value capture, which in turn affect the ways in which alliances should be designed and managed. Thus, a first step in designing a strategic alliance is to identify the value creation logic based on the firm growth goal and its motives for entering an alliance.

Doz and Hamel (1998) group the value creation logic of alliances into three categories: 1) *co-option*, which motivates firms to join forces, and thus collaborate, for improving their competitive position in existing or new markets, 2) *co-specialization*, the synergistic value creation that results from combination of partners' resources, skills and knowledge, and 3) *learning*, which considers alliances as an avenue for internalizing new skills, and thus creating conditions for developing core competence.

It is possible that more than one value creation logics match an alliance. For instance, Deutsche Telekom and France Telekom entered into an alliance designed to merge some specialized services, avoid the rivalry between them, and counter the leader British



Telecom. Given the primary firm objective of securing and enhancing their home bases, the alliance is believed to follow the co-option value creation logic. However, given the ability that the alliance provided to the involved parties for gaining a joint 20% stake in Sprint, and thus entering the North America market, it can also be considered as following the co-specialization value creation logic.

It is rather difficult, and even risky, to assign a single value creation logic to an alliance, when the logic seen by its partner differs substantially or when a robust alliance creates value in multiple ways. In contrast, it is easier to define and discuss the value that each partner expects to capture by describing its individual strategic objectives for the alliance formation.

Following Doz and Hamel (1998), value creation is distinguished from value capture. The dual process of value creation and value extraction in alliances can be thought of in terms of baking and then sharing a pie. Stated differently, value creation is a cooperative effort of partners to maximize the value of alliances by serving the strategic imperatives that incited its formation, while value capture is the individual effort of partners to capture the greatest possible share of value created. The aforementioned distinction makes it obvious that value creation is related to the agreed (by the involved parties) purpose of alliance formation, while value capture is related to the value outcomes of the alliance for each individual partner.

Contractor and Lorange (2002) identified seven distinct rationales, also referred as strategic contributions of cooperative arrangements: 1) risk reduction, 2) economies of scale and/or rationalization, 3) complementary technologies and patents, 4) co-opting or blocking competition, 5) overcoming government mandated investment or trade barrier, 6) initial international expansion, 7) vertical quasi integration. Each of these rationales might be associated with a list of major benefits, which denote the range of opportunities for value capture.



**Table 2-7. Strategic Contributions of Alliances (Contractor and Lorange, 2002)**

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<b>Risk Reduction</b> <ul style="list-style-type: none"><li>▪ Product portfolio diversification</li><li>▪ Reduction of fixed cost</li><li>▪ Lower total capital investment</li><li>▪ Faster entry and payback</li></ul>
<b>Economies of Scale and/or Rationalization</b> <ul style="list-style-type: none"><li>▪ Lower average cost from larger volume</li><li>▪ Lower cost by using comparative advantage of each partner</li></ul>
<b>Complementary Technologies and Patents</b> <ul style="list-style-type: none"><li>▪ Technological synergy</li><li>▪ Exchange of patents and technology</li></ul>
<b>Co-opting or Blocking Competition</b> <ul style="list-style-type: none"><li>▪ Reducing competition</li><li>▪ Increase of costs and/or lower market share for a third company</li></ul>
<b>Overcoming Government-mandated Investment or Trade Barrier</b> <ul style="list-style-type: none"><li>▪ Receiving permit to operate as a “local” entity because of local partner</li><li>▪ Satisfying local content requirements</li></ul>
<b>Initial International Expansion</b> <ul style="list-style-type: none"><li>▪ Benefit from local partner’s know-how</li></ul>
<b>Vertical Quasi Integration</b> <ul style="list-style-type: none"><li>▪ Access to materials/technology/labor/capital/distribution channels</li><li>▪ Establishing links with major buyers</li><li>▪ Benefit from brand recognition</li><li>▪ Drawing on existing marketing establishment</li></ul>

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The above framework provides an exemplar but not exclusive list of strategic contributions, otherwise called as value outcomes. A different or expanded list of benefits could be assigned under each of the seven distinct rationales. Moreover, one could distribute strategic motives of [Table 2-3](#) under the seven dimensions of the above framework, assuming that each objective corresponds to firm expectations for a specific type of value to be gained.

The initial strategic objectives of partners, which are also referred in the alliance literature as motives or rationales, for the formation of an alliance constitutes an excellent indicator for the strategic interdependence that they anticipate. Each rationale suggests a distinct logic for value creation that is associated with a specific level of interdependence necessary for accomplishing it (Gulati and Singh, 1998). For instance, an alliance in which two partners create value by one of them distributing the other's products is likely to have

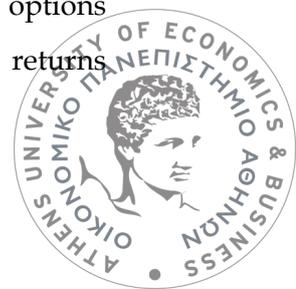


lower coordination and interdependence than another in which the logic for creating value involves both partners coming together to develop a new product.

Gulati and Singh's (1998) study focused on the decision that firms make at the outset of an alliance about its governance structure. Their research confirmed that firms entering alliances indeed make their decision over the preferred governance mode once they have agreed on the logic of value creation and the scope of activities to be included within the partnership. In other words, one of the critical parameters affecting the firm's preference for an alliance governance mode is its estimations, or even expectations, for the value that the alliance will generate, and subsequently the share of value that it will capture.

Transaction Cost Economics has been criticized for paying exclusive attention to cost minimization and neglecting value-creation in strategic alliances (Zajac and Olsen, 1993). Based on the transaction cost theory, Madhok and Tallman (1998) argue that firms might enter into collaborative relationships to minimize the expected cost of development. In contrast, the resource-based view suggests that firms might also enter relationships in the expectation to create superior value through the combination of complementary resources and capabilities (Zajac and Olsen, 1993). Critics increasingly argue for more concentration on the benefits, than on the costs, of transactions. Specifically, Zajac and Olsen (1993) argue that when expected joint gains outweigh transaction costs considerations, interorganizational strategies (options) having greater joint value will typically require the use of less efficient (from a transaction cost perspective) governance structures. Within such an approach, transaction cost arguments and resource-based reasoning might complement one another rather than compete (Williamson, 1999).

The firm expectations for value have been highlighted as determinants of an interorganizational strategy by researchers of Game theory and Real Options Theory. The game-theoretic approach (Rao and Reddy, 1995) assumes that firms make investment decisions based on expected payoffs. Moreover, adopting a dynamic approach to alliances, Rao and Reddy (1995) argue that payoffs determine not only the initial decision on the alliance governance mode but also the stability and shape of the alliance, as their fulfillment will affect firm decision on staying in or exiting the alliance, while the payoff structure (differences in the scale of payoffs and their rate of change) can influence the shape of the game (alliance). One of the primary assumptions underlying the real options perspective is that it is possible to specify a priori a distribution of expected returns



associated with an investment, such as an alliance is considered. An implication of this assumption is that firms make their decision on governance structures in anticipation of future opportunities and benefits that may arise upon either change of the environment or disclosure of strategically valuable information (Leiblein, 2003).

## 2.4 Discussion and Conclusions

The literature review in the area of strategic alliances has raised the issue of governance mode selection as one of the most investigated ones compared to research on management and evaluation of strategic alliances (Keil, 2000). Research in this area is dated since late 1980s. However, a growing body of research on alliance governance has been conducted within the last seven-year period (1998-2004).

With no doubt, the dominant theory of governance in alliances has been Transaction Cost Economics. Empirical works in the area are usually testing factors sourced from the Transaction Cost Theory or/and its most popular contradicting perspective, the Resource-based View of the Firm. One can find very few theoretical, and fewer empirical, works on alliance governance inspired by other theoretical perspectives, such as Game Theory and Real Options Theory. A review in some recent studies in the area has raised the research challenge of developing an integrative theoretical perspective for handling the alliance governance issue (Colombo, 1998; Keil, 2000; Leiblein, 2003).

This research has been motivated by the challenge of first developing a model that conceptualizes this integrative perspective and then testing it with empirical work on alliances formed in technology-based industries. Thus, the primary concern of this research involves integrating the theories on alliance governance, discussed in Section 2.2., for identifying a broader set of antecedents of the alliance governance mode.

The integration work has to address several research issues/challenges. First, there is a need to include a great spectrum of factors, identified as independent variables, sourced by each of the previously discussed theories. Second, some of them (e.g. environment uncertainty) are identified as determinant of alliance governance mode by more than one theory. Nevertheless, in some cases, the source theories of common factors do not assume the same impact on the alliance governance variable. For instance, environmental uncertainty is perceived as having a diverse impact on alliance governance mode,



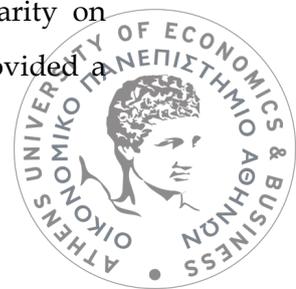
depending on the theory that it is sourced by. While Transaction Cost Economics urges in favor of equity alliances (Leiblein and Miller, 2003; Sutcliffe and Zaheer, 1998), Real Options Theory predict the formation of non-equity alliances under condition of high uncertainty (Balakrishnan and Wernerfelt, 1986; Kogut, 1991).

The first integration issue is addressed with the identification of a scientifically legitimate way to structure all antecedent factors, and thus enable their examination and analysis under a conceptual relationship model. This way is provided by research on integrative frameworks/models in the area of strategic decision process. Such research is thoroughly discussed in the next Chapter, Section 3.1. The second integration issue is addressed by adopting a value approach, which is emphasized by the GMT and ROT perspectives, for strategic decision making in technology-based industries in order to define the impact in the hypothesized relationships of independent variables with the dependent one. This issue is dealt with in Section 3.2 of the next Chapter.

## 2.5 Summary

This chapter provided a review of the prime theoretical and empirical investigations into the strategic alliances domain. The ultimate purpose of this review is to provide the background literature upon which the development of our conceptual model for the firm preference on alliance governance mode will be based.

The literature review started with an introduction to the basic concepts investigated in this research; strategic alliances, and more specifically, strategic technology alliances, and the alternative governance modes of alliances. A section analyzing the key theories, deriving from diverse scientific domains, such as Strategic Management, Industrial Organization, Finance and Sociology, that have guided research in the area of strategic alliances followed. These theories include Transaction Cost Economics, Resource-based View of the Firm, Dynamic Capabilities-based View of the Firm and Knowledge-based View of the Firm, Social Exchange Theory, Game Theory, and Real Options Theory. Their analysis involved a few words about each theory's principles and key propositions for the strategic alliance formation as well as an indication of factors that affect the strategic decision on alliance governance mode. The last part of this section is the result of an attempt to combine all theoretical perspectives and exploit their complementarity on several points to build an integrated research framework. The next section provided a



theoretical and empirical review of prior research in areas that are within this research scope. These are motivations for alliance formation, external and internal factors that affect alliance formation rates, influences of decision making on alliance governance mode, dimensions of partner compatibility, and the potential of value creation and capture in strategic alliances.

Findings of this review were discussed and analyzed in Section 2.4, which aimed at justifying the need for research in strategic decision process area, as well as setting the theoretical groundwork for the development of an integrative conceptual model, both presented in Chapter 3.



# CHAPTER 3

## A VALUE-MEDIATING MODEL ON ALLIANCE GOVERNANCE MODE

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Building on the theoretical basis of Chapter 2 and a strategic decision framework that is presented in Section 3.1, this chapter aims at discussing the set of propositions and hypotheses with which this research contributes to the alliance governance theory. Thus, Chapter 3 includes a combination of theory and research hypotheses. Specifically, Section 3.1 reviews a set of integrative models of strategic decision making processes, with the purpose of selecting a framework to integrate, group and interrelate the factors that have been hypothesized by theory as well as previous empirical research (see Chapter 2) to affect the firm preference for alliance governance mode. Based on such a framework, we develop our conceptual model in Section 3.2. The section also introduces a new concept in the alliance governance literature, the *Expected Alliance Value* concept, acting as mediator in the conceptual model. The last section defines and discusses a set of other research models that could be considered, and thus tested in Chapter 5, as competing ones.

### 3.1 A Framework of Strategic Decision Processes

#### 3.1.1. Research on Strategic Processes

Research in strategic management has been classified into two broad categories: research dealing with issues of strategy content, and research on the process by which strategy is created and implemented (Rajagopalan et al., 1993). Strategic content research primarily seeks to provide rules and guidelines on the type of strategies that lead organizations to the best performance in a competitive environment. Porter's (1980) discussion of the three generic strategies of differentiation, cost leadership, and focus follow the strategy content research stream. Strategy process research covers a broad range of issues which concern the formulation and implementation of strategic decisions, such as planning prescriptions and practices, decision aids, systematic implementation, and contextual influences (Schwenk, 1995).



This research is interested in examining existing studies regarding a specific issue of strategic process research, namely strategic decision models and contextual influences. This research stream deals with the question of which factors affect organizations in their strategic decision making process. Towards specifying a wide set of such contextual influences of strategic decisions, there has been considerable research on defining an integrative framework of strategic decision processes in the last decade (Hart, 1992; Rajagopalan et al., 1993; Papadakis et al., 1998). These frameworks differ substantially in terms of the underlying assumptions about the decision context.

Hart (1992) has developed an integrative framework, which includes five styles of strategy making processes; a) the 'command mode', in which strategy is driven by the organization's leader or by a small management team, b) the 'symbolic mode', where strategy is driven by the organization's mission and vision of the future, c) the 'rational mode', in which strategy is driven by the organization's formal structure and planning systems, d) the 'transactive mode', where strategy formulation is driven by internal processes and mutual adjustments, and e) the 'generative mode', in which strategy is most strongly influenced by organizational actors' initiatives.

In an attempt to provide an integrative strategic decision model, Rajagopalan et al. (1993) proposed the following categorization of factors expected to influence strategic decision processes: (1) **environmental factors**, (2) **organizational factors**, and (3) **decision-specific factors**. First, given that strategic decisions are made in the context of an organization's environment, the processes by which such decisions are made and their characteristics are influenced by environmental attributes, such as uncertainty and complexity. Second, organizational conditions, such as internal power structure, past performance, past strategies, and the extent of organizational slack have a significant impact on the process. Since these factors may vary across firms within an industry, strategic decisions often follow different patterns in different organizations. Third, even within a single organization, the process may vary across decisions because of differences in decision-specific factors, such as the impetus for the decision, the extent of resource commitment, and the risk that the decision involves. In other words, contextual antecedent factors (environmental, organizational), and decision-specific factors significantly influence strategic decision processes (Figure 3-1).



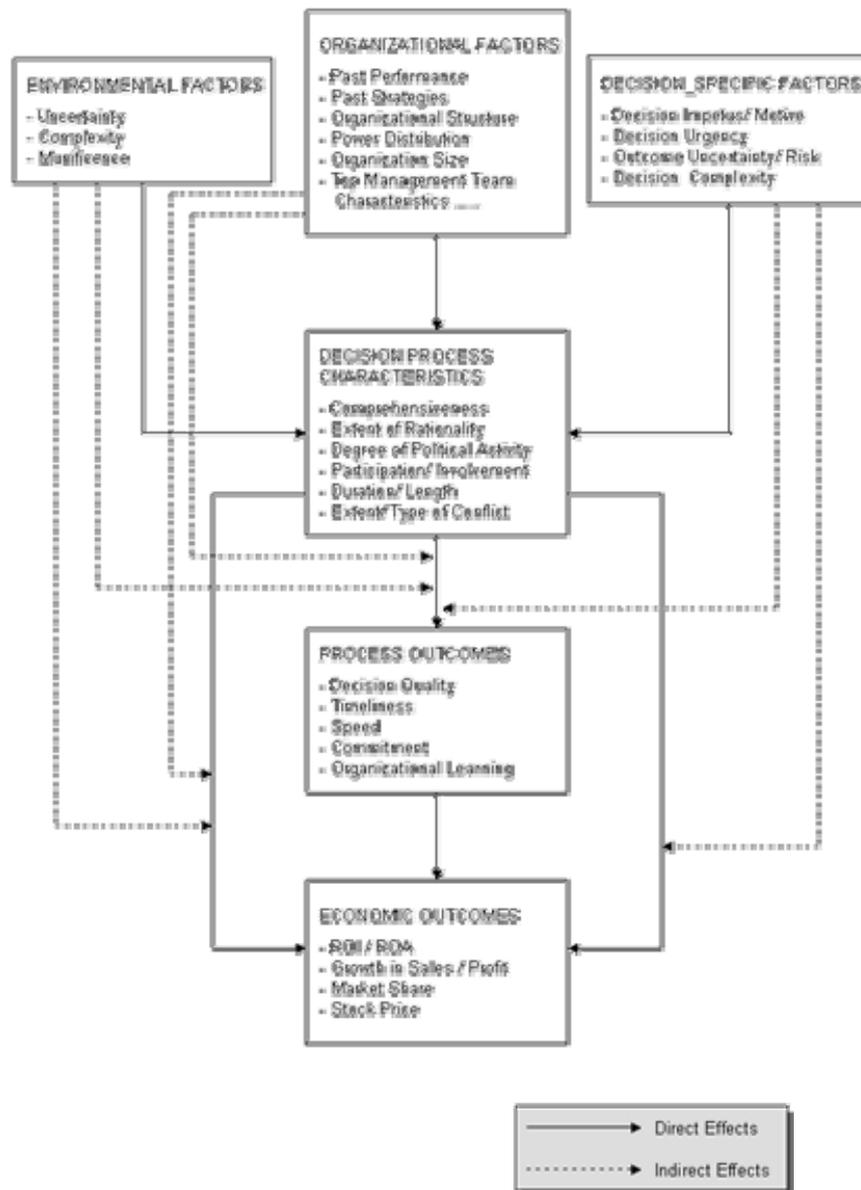


Figure 3-1. An Integrative Strategic Decision Process Framework (Rajagopalan et al., 1993)

More recently, Papadakis et al. (1998) built their own integrative research framework on strategic processes adding a new dimension, the top management characteristics. In essence, while the model of Rajagopalan et al. (1993) includes these characteristics as part of organizational influences, the model of Papadakis et al. (1998) has raised the importance of management influences (e.g. level of education, aggressive philosophy, risk propensity) on strategic decisions by analyzing their individual direct impact on both strategic processes and decision-specific characteristics.



### 3.1.2. Strategic Decision Making in High Velocity Environments

Part of the strategy development process involves collecting and processing meaningful information on the industry in which organizations operate. Numerous studies in the area of strategic processes have been conducted in settings where industrial information was available to permit in-depth analyses. However, there are some industries where either key information is difficult to obtain, or the rate of change is so extreme that the industrial information is obsolete, and thus research on strategic processes becomes difficult.

The last is the case of high velocity environments, also referred to as hypercompetitive (D'Aveni, 1994; Bogner and Barr, 2000) or dynamically-competitive (Grant, 1996) environments. According to Bourgeois and Eisenhardt (1988), high-velocity environments are “those in which there is rapid and discontinuous change in demand, competitors, technology and/or regulation, such that information is often inaccurate, unavailable, or obsolete”. Digital telecommunications, and more specifically, mobile phones industry constitute examples of high velocity environments, and have been used to test empirical research on several strategy and management aspects of these environments (Bogner and Barr, 2000; Vilkamo and Keil, 2003).

Strategic decision making is problematic in such environments, since they exhibit the following characteristics:

- Rapid changes in environmental factors, such as technology and regulation (Bogner and Barr, 2000; Bourgeois and Eisenhardt, 1988),
- Relative ease of entry and exit by rival firms (Bogner and Barr, 2000),
- Frequent launches of competitive moves by rival firms – frequent shifts of relative competitive positions (Bogner and Barr, 2000),
- Evolving and ambiguous customer requirements and expectations (Bogner and Barr, 2000; Bourgeois and Eisenhardt, 1988),
- Short product life cycles (Vilkamo and Keil, 2003).

Due to the above conditions, there are limited chances for organizations in such environments to gain long-term competitive advantage. Thus, strategies are often concerned with assuring flexibility, ability to change, and speed of response, rather than building a sustainable strategic position. In such environments, effective firms should try



new things, and thus their strategies should involve risk, while executing a safe, incremental implementation (Bourgeois and Eisenhardt, 1988).

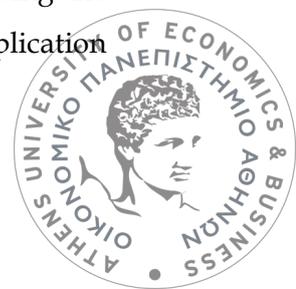
Apart from strategy content, the strategic decision process also changes. Organizations are forced to make major decisions under time pressure, but also carefully, following, if possible, a rational-comprehensive approach (Bourgeois and Eisenhardt, 1988; Eisenhardt and Bourgeois, 1988).

Finally, the firm competitive behavior changes in such settings. According to current research in the area, in high velocity environments, firms base their strategy increasingly on knowledge integration as the key organizational capability (Grant, 1996), or seek strategies that preempt competitor moves (Nault and Vandenbosch, 1996), or develop flexible organizational structures to remain competitive (Volderba, 1996).

Strategic technology alliances have received limited attention in literature focusing on high velocity environments. Recently, Vilkmam and Keil (2003) conducted case study research on strategic technology partnering in an instance of high velocity environments, namely the mobile phone industry, with the purpose of investigating how alliance management practices change in these environments. Their study concluded that, in such environments, management of strategic technology alliances is far more a management of paradoxes. Firms need to find a dynamic balance between making significant commitments, to be able to produce large volumes of products/services early in the life cycle, and keeping a flexible structure to respond to fast and discontinuous environmental changes.

### **3.2 A Strategic Decision Model on Alliance Governance Mode**

This research has been based on Rajagopalan et al.'s (1993) framework, and basically on their definition of the three antecedent factors affecting strategic processes, to build a strategic decision model describing how the strategic choice of alliance governance mode (a strategy content issue) is made under a specific decision context (a strategy process issue). The decision context is denoted through the definition of the identity as well as the interrelationship of organizational, environmental and decision-specific influences. As far as environmental influences are concerned, we specify them and their effects using the definition and research of high velocity environments, which constitutes the application



area of this research. Thus, in a more abstract analysis level, the current work is expected to contribute to multiple research fields; a) to strategic management, by defining an interrelationship between a strategy content issue and a strategy process issue, b) to strategic alliances, by building an integrative theoretical model including the major influences on firm preference for alliance governance mode, and c) to the emerging literature on high velocity environments, by analyzing strategic decisions made in this environmental context.

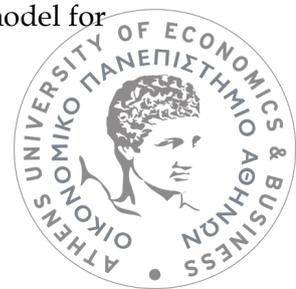
### **3.2.1. Prime Antecedents of Preferred Alliance Governance Mode**

Towards the development of a strategic decision model on alliance governance mode, we refer to research examining the primary influences of the alliance decision as Streams I, II and III respectively. Stream I pertains to the relationship between environmental factors and the strategic decision on the governance mode of an alliance. The key issue addressed in this stream is how environmental factors (e.g. environmental complexity, uncertainty, and hostility) influence towards either hierarchy-like or market-like alliances. Stream II examines a set of organizational factors (e.g. firm size, past strategies and behavior, strategic orientation) as well as their influence on alliance governance mode. Finally, Stream III investigates the relationship between a set of decision-specific, hereinafter referred as alliance-specific, factors tailored to match the special characteristics of the concerned decision, the alliance governance mode. Such alliance-specific factors involve characteristics of the partners' relationship, such as resource complementarity, alliance history, organizational and cultural compatibility, and competitive relationship.

The next three sub-sections discuss the theoretical and empirical research conducted on each stream for defining the impact of factors belonging to each group on the alliance governance preference. The analysis results in the formulation of a set of propositions and hypotheses describing the direct effects of the three antecedent factors.

#### **Stream I: Environmental Factors**

Given that strategic decisions for alliances are made in the context of a specific market, cultural and/or geographical environment, the process by which the governance preference is raised is naturally influenced by the special characteristics of this environment. There is a broad spectrum of variables that can be included in the model for



capturing the impact of the external environment, such as environment uncertainty, hostility, complexity, dynamism and predictability (Rajagopalan et al., 1993). The most important dimensions, worthy of examination in high velocity environments are environment uncertainty and competition intensity, as argued below.

Based on the Transaction Cost Theory, one of the two critical parameters on which the alliance governance preference is dependent is the uncertainty to which transactions are subject due to partners' opportunism (Williamson, 1991). Transaction Cost Economics argues in favor of more control under conditions of increased uncertainty about partners' behavior. However, uncertainty for transactions and collaborations may also derive from a number of other sources, the most well-known of which are technology uncertainty, market uncertainty and competition predictability. Technology uncertainty is of prime importance for strategic technology alliances and primarily concerns the maturity stage of the technology that partners develop or exploit. The less mature the technology employed, the more uncertainty it generates for the technology partners. Market uncertainty derives from the customers' attitude towards new technology-based products and services, while competition predictability refers to the frequency of competition shifts in the partners' industry. In markets where changes in technology are not only fast but also discontinuous, market preferences are volatile, and there are frequent shifts of relative competitive positions, the increased need for flexibility may urge firms towards market-like forms of collaboration (Hagedoorn and Narula, 1996; Osborn and Baughn, 1990; Vilkamo and Keil, 2003). This view is theoretically supported by Real Options Theory and contradicts the transaction cost-based logic.

Real options logic suggests that the critical objective of firms making governance choices under conditions of uncertainty is the maintenance of their flexibility. The maintenance of flexibility under conditions of high uncertainty becomes a governance issue because some forms of governance are less flexible than others (Barney and Lee, 1998). In particular, it is generally assumed that it is more costly for firms to alter hierarchical forms of governance in response to the change of the level of uncertainty in an exchange than it is to alter less hierarchical forms of governance (Kogut, 1991). Altering hierarchical forms of governance involves changing numerous explicit and implicit contracts that constitute this form of governance (Mahoney, 1992). Instead, changing less hierarchical forms of alliances implies altering a smaller number of usually explicit contracts. This reasoning suggests that,



under conditions of very high environment (i.e. technology, market, competition) uncertainty, firms will adopt more quasi-market alliances.

The notion of high velocity environments is highly associated with the notion of hypercompetition (D'Aveni, 1994). D'Aveni argues that in such industries, the nature of competition is shifting towards a dynamic model that is based on frequent shifts in the key bases of competition, such as from product/service price to product/service characteristics to range of distribution channels and to after-sales support. Based on the TCE argumentation, high levels of competition raises the need for efficiency rather than protection. This argument is along the lines of the Real Options theory, which supports the need for flexibility under conditions of uncertainty. Thus, the dynamic model of competition in such markets urges firms towards more flexible, quasi-market, cooperation modes that enable them to experiment with new ideas under a low risk regime.

**Proposition 1: Environmental factors affect the firm preference for an alliance governance mode.**

*H1a: The greater the environment uncertainty, the more quasi-market governance modes will be preferred for the alliance.*

*H1b: The higher the competition intensity, the more quasi-market governance modes will be preferred for the alliance.*

### **Stream II: Organizational Factors**

Strategic decision processes and outcomes are subject to a variety of organizational influences (Rajagopalan et al., 1993). Key organizational factors include structure, internal systems, current or past performance, past strategies, size, power distribution, as well as top management characteristics (Rajagopalan et al., 1993; Papadakis et al., 1998). In the context of alliance decisions, key organizational influences include firm size, age, competitive position, product diversity, financial resources, and network embeddedness. However, not all of them concern the same alliance-related decision. Some of them have an impact on the firms' propensity towards forming alliances, while others affect the decision on the governance mode.



Firm size, measured usually in number of employees, is considered of high importance in the strategic decision-making process. In the specific domain of strategic alliance decisions, the empirical evidence on firm size is far from clear or generalized. In most studies (Leiblein and Miller, 2003; Tether, 2000; Eisenhardt and Schoonhoven, 1996), firm size is used as control rather than prime independent variable of either strategy formation or governance decision. According to Grabher (1993), two main patterns of alliances can be observed: a) between large firms, which usually take the institutional form of joint ventures, and b) between large and small firms. The main incentive for large firms to enter the alliance is to gain access to new and valuable resources, while the basic incentive for small firms is to achieve economies of scale (Alm and McKelvey, 2000). Small firms usually opt towards less hierarchical governance modes from fear of losing their autonomy, while large firms wish greater interdependence to assure better control over their partners' resources (Tether, 2000). The preference of small firms for quasi-market alliances is supported by both Resource-based View and Transaction Cost Economics. From the Resource-based View, this is due to the little resource commitment required by contractual alliances (Tsang, 1998; Chen and Chen, 2002), while from the Transaction Cost perspective the reasons is that small firms pose less risk of opportunism to their larger partners, because the dominant position of the large firms carries a natural deterrent for opportunistic behavior (Chen and Chen, 2003).

The strategic or competitive position of a firm can also be defined as the resource position of a firm (Day and Wensley, 1988). Sapienza et al. (1997) argue that firms owning resources of competitive advantage are more likely to enter into alliances and are more attractive alliance partners as well. Based on argumentation of Dynamic Capabilities View, we can also argue that competitive companies are more likely to opt towards quasi-hierarchy alliances, which entail higher degree of control against property leakages, in order to protect the value of their competitive resources and skills.

Based on the strategic behavior perspective, firms enter into strategic alliances as part of their corporate strategy (Sparling and Cook, 1999). Especially large companies rely heavily on alliances to support their growth strategy (Hoffmann and Schlosser, 2001). There are six primary categories of corporate growth strategies (Papadakis, 2002; Kotler, 2000): 1) Vertical Integration, 2) Horizontal Integration, 3) Diversification (related or unrelated), 4) Market Penetration, 5) Market Development, and 6) Product Development.



Table 3-1 classifies growth strategies under the two-dimensional framework 'products/activities and markets'.

	Existing Products/ Activities	New Products/ Activities
Existing Markets	Market Penetration	Product Development
New Markets	Market Development / Expansion	<ul style="list-style-type: none"> <li>▪ Diversification (related or unrelated)</li> <li>▪ Horizontal /Vertical Integration</li> </ul>

Source: Ansoff, 1965; Kotler, 2000

**Table 3-1. Classification of Corporate Growth Strategies**

The upper left quadrant includes the most conservative strategies, those that aim at increasing share for existing products in existing markets (market penetration strategies), while the lower right quadrant contains the most forward looking strategies of differentiation, horizontal and vertical Integration, which target new markets for providing new (differentiated or integrated) product/service solutions. The strategies in the remaining two quadrants usually account for intermediate growth levels, such as increasing share in existing markets through improvement of existing or development of new products, and expanding existing activities into new market segments or totally new geographical markets.

The growth level of each strategy also determines the implied business risk. In the case that a firm decides to remain in the current market for providing its current products, the business risk is low. The implied business risk grows as the firm strategy moves away from the current market and products/activities, and reaches its highest level when the firm adopts a forward looking strategy, which involves entering new markets with differentiated/integrated products.

Strategic technology alliances' focus is often on exploitation of complementary assets for expanding in new areas (Obleros and Macdonald, 1988), as well as on saving time from product development to market exploitation (Deeds and Hill, 1996). These goals are consistent with the strategy of diversification, as well as the strategy of (vertical and horizontal) integration. Thus, alliances are usually a strategic means towards achieving the strategic goals of diversification, in either related or unrelated areas, and integration



with complementors or competitors (horizontal alliances) as well as with customers or suppliers (vertical alliances).

It is reasonable that the greater the strategies' growth level, the higher the level of the required resource commitment, but also the higher the firms' fear of their partner's actions undermining their strategic goals. Using the Transaction Cost argumentation, the increased need for protection against behavior uncertainty leads firms towards selecting more quasi-hierarchy alliances. Moreover, based on the Resource-based and the Knowledge-based Views of the Firm, the requirement for committing and integrating a large amount of resources, a large amount of which may be knowledge-based and constitute competitive advantage of the involved partners, point to the choice of more hierarchical governance modes in order to assure partner's commitment but also safeguard their current assets.

**Proposition 2: Organizational factors affect the firm preference for an alliance governance mode.**

*H2a: The larger the firm size, the more quasi-hierarchy governance modes will be preferred for the alliance.*

*H2b: The stronger the firm competitive position, the more quasi-hierarchy governance modes will be preferred for the alliance.*

*H2c: The higher importance is attributed to the growth strategies of diversification and integration, the more quasi-hierarchy governance modes will be preferred for the alliance.*

### **Stream III: Alliance-Specific Factors**

Even within the same external environment and between organizations of similar internal organizational characteristics, the governance preferences of an organization may still vary across alliances because of differences in the partners' strategic, operational, technology and cultural level.

The exchange of complementary resources, which may include complementary technologies, competence for extending a technology, or content, acts as glue for keeping partners in tight collaboration. Even large and diversified firms might lack some competence in specific technological fields, and thus may need a partner providing the



necessary complementary technology to enable them to capitalize on economies of scope through joint efforts (Hagedoorn, 1993). Mitchell et al. (2001) argue that firms are more likely to choose stronger protection mechanisms for alliances in which partners contribute different or complementary resources, since they create greater appropriation concerns, while they tend to seek lower levels of coordination in alliances in which partners contribute similar resources. Thus, the more heterogeneous resources are provided by the alliance partners, the more likely it will be an equity alliance. Opposed to Mitchell et al.' (2001) arguments, Chen and Chen' (2003) empirical research, which is based on a combination of transaction cost model with the resource-based perspective, concluded that complementarity of resources tilts the choice towards contractual alliances, presumably because there is little chance of conflicting interests, hence control gives way to flexibility.

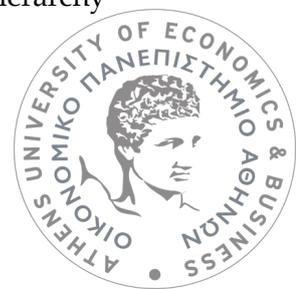
Cultural and operational compatibility among partners influence the extent to which they manage to realize the primary goal for which the alliance has been contracted, and thus raise the value they expect. On the one hand, a kind of similarity in their organizational processes and working styles may lead to a reduction of coordination costs, thus raising the quasi-hierarchy alliances as most efficient solutions. On the other hand, possible incompatibilities in social norms may even cause the failure of the alliance due to the inability of the two entities to work seamlessly and come into agreement (Wilkof et al., 1995). Under such circumstances, the risk of failure is much greater in quasi-hierarchy rather than in quasi-market alliances.

In this research, we adopt the Harrigan (1985) and Parkhe (1991) definition for conceptualizing and examining partner compatibility within the alliance governance context. Thus, resource complementarity, cultural and operational compatibility are regarded as dimensions of the partner compatibility concept. As partner compatibility increases, the coordination costs drop down, thus favoring quasi-hierarchy alliances. Moreover, given the complementarity of partners' resources and skills, quasi-hierarchy alliances are more likely than quasi-market alliances to raise opportunity for new value to emerge for the firm from interconnecting partners' similar as well as complementary resources and skills. Hence, equity alliances emerge as preferable to non-equity alliances under conditions of high partner compatibility.



Hamel et al. (1989) suggest that, when seeking collaborators for technology-related projects, firms should target partners whose “strategic goals converge while their competitive goals diverge”. The rationale behind this prescription is that, if alliance partners are competitors in end-product markets (i.e. if their competitive goals ‘converge’), then each may be so intent on internalizing the other’s knowledge – and at the same time limiting access to their own proprietary skills – that the strategic goals of the alliance will be thwarted (Oxley and Sampson, 2004). This does not mean that alliances between competitors do not occur or are damned to fail. Both the Transaction Cost Economics and the Knowledge-based View perspectives provide distinct, yet overlapping, explanations for preferring quasi-hierarchy alliances in a highly competitive environment. First, TCE argues in favor of more ‘protective’ governance structures as joint ventures, because they provide sufficient protection to induce extensive knowledge sharing among competitors. Second, KBV and OL encourage joint ventures in competitive alliances, where a firm wishes to maintain its organizational competence, but also benefiting from another firm’s current knowledge or cost advantage (Kogut, 1988).

Theoretical and empirical research has proved that alliance history regarding the frequency and mode of past alliances between partners are related to the continued use of a specific governance mode (Steensma, 1996). According to Gulati (1995), prior direct or indirect collaborations between partners increase trust. Based on literature about Social Exchange Theory and strategic flexibility (Young-Ybarra, 1999), the trust between partners has a positive impact on the desire and ability of the partners to adjust to changing environmental demands through modification of their agreement which may involve higher levels of investment. Thus, firms that currently keep a contractual agreement may mitigate to a more hierarchical governance mode, if the environment requires such a change (i.e. if the need for co-opting existing market players increases), given that they have developed trust from prior alliances. Moreover, firms persist in using a particular governance mode, because they develop skills in managing such alliances and reputation as reliable partners (Powell et al., 1996). Alliance management skills as well as reputation and trust can basically result from more hierarchical alliances, such as minority investments and joint ventures, where partners have a frequent and close contact. The more frequent the contact and the more complex the partners’ collaboration, the higher the need for coordination and conflict resolution. Thus, firms may select quasi-hierarchy



governance mode of alliances, due to trust resulting from prior alliances and mostly from persistence in quasi-hierarchy alliances in previous cycles of their alliance history.

**Proposition 3: Alliance-specific factors affect the firm preference for an alliance governance mode.**

*H3a: The greater the partner compatibility (resource complementarity, cultural and operational compatibility), the more quasi-hierarchy governance modes will be preferred for the alliance.*

*H3b: The more intense the partner competitive relationship, the more quasi-hierarchy governance modes will be preferred for the alliance.*

*H3c: The longer and the more quasi-hierarchy the prior ties of partners, the more quasi-hierarchy governance modes will be preferred for the alliance.*

Figure 3-2 provides an illustration of the primary determinants of alliance governance preference, classified under three categories of antecedent factors in the strategic decision process model of Rajagopalan et al. (1993), as well as their direct effects. The signs (+)/(-) are used to denote the positive/negative impact of a variable on the degree of strategic interdependence that a firm wishes to obtain with a candidate partner. An increase of the wished degree of interdependence means preference for a quasi-hierarchy governance mode, while a decrease means preference for a quasi-market governance mode.

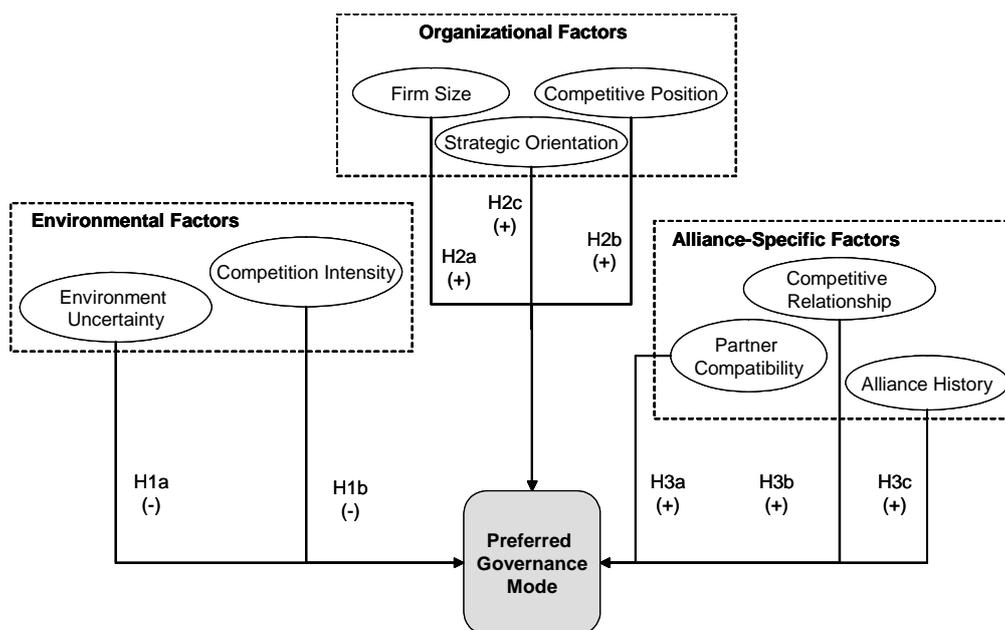


Figure 3-2. Direct Effects of Antecedent Factors of Preferred Governance Mode



### 3.2.2. Relationship between Expected Alliance Value and Preferred Alliance Governance Mode

Several studies of strategic alliances have followed the game theory principles to explain the individual behavior of partners in a strategic alliance, especially when this alliance involves some conflict of interests (Parkhe, 1993; Rao and Reddy, 1995). A key assumption underlying Game Theory is that the players (partners) are rational, and their primary objective is to maximize utility, that is the value gained from the alliance implementation. Apart from Game Theory, Real Options Theory has also underlined the influence of unveiled future opportunities on firms' expectations from strategic investments. Following the same approach, we argue that firms will make investment decisions based on expected payoffs that may arise from the choice of a specific governance mode. More specifically, we contend that the preferred governance of an alliance is primarily determined by managers' expectations for the value that their firm will capture with regards to its strategic objectives at the outset of the alliance.

The calculation of value capture in business relationships has been one of the most challenging research issues in the field of relationship marketing (Kothandaraman and Wilson, 1991; Hogan, 2001; Lapierre, 2000; Ravald and Gronroos, 1996; Ulaga, 2003; Walter et al., 2001). In the majority of these studies, the unit of analysis constitutes buyer-seller business relationships and value calculation is made from the customer (buyer) perspective (Kothandaraman and Wilson, 1991; Lapierre, 2000; Ravald and Gronroos, 1996; Ulaga, 2003). Lately, the increasing rate of alliance failures has motivated some research on alliance value in the strategic management field as well (Dalziel, 2001; Doz and Hamel, 1998; Madhok and Tallman, 1998). Such research pursues the *ex post* evaluation perspective, estimating the total value generated by the alliance or, in simpler terms, the success and failure of alliances (Hoffmann and Schlosser, 2001; Mohr and Spekman, 1994). Conversely, our research focuses on an *ex ante* perspective aiming at capturing the estimations rather than the realizations of gains from the alliance operation.

This research conceptualizes the firm's expectations on alliance value capture under the *Expected Alliance Value (EAV)* construct. This is defined as a multi-dimensional construct used to measure the expected benefits incurred for an organization from its participation in a strategic alliance. In order to set a structure in the list of expected benefits, we have



used the Contractor and Lorange (2002) framework for strategic contributions of cooperative arrangements. This framework identifies seven distinct rationales, each one implying a different set of opportunities for value capture: 1) risk reduction, 2) economies of scale and/or rationalization, 3) complementary technologies and patents, 4) co-opting or blocking competition, 5) overcoming government mandated investment or trade barrier, 6) initial international expansion, 7) vertical quasi integration.

We postulate that firm managers decide on the most efficient governance mode based on their expectations at the time of the alliance inception for the type and degree of value (net benefits) to be captured from each alternative alliance governance mode. According to Real Options theory, the first and simplest means through which organizational governance decisions may create value is through the option to defer investment. In this research, investment is used to denote partners' contribution of both capital and resources/skills to their strategic alliances. The required investment grows as partners' governance preference scales from non-equity to equity alliances, and more specifically from contractual agreements (either relational or recurrent) to joint ventures.

When investments in alliances structures are irreversible, that is they cannot be fully recovered without incurring some considerable costs, and the future value of these investments is uncertain (e.g. when forming a joint venture), Real Options theory indicates that committing prematurely may impose considerable risks. In these situations, there is value associated with the option of waiting for new information that might affect the desirability or timing of the investment. The ability to delay or defer an irreversible investment can thus be an important source of flexibility (McDonald and Siegel, 1986; Pindyck, 1991) and the economic value associated with this flexibility may suggest deferring investment even if the static net present value associated with the project is positive. Real Options theory recognizes the expected value associated with this latter flexibility and indicates that, under uncertainty, it may be optimal to utilize market-like mechanisms that provide greater flexibility. The value associated with the option to defer is greatest when uncertainty is high and the immediate cash flows lost due to postponing investment are relatively small (Leiblein, 2003). Thus, quasi-market alliances ensure flexibility, which is a necessity for firms in highly volatile environments, whereas quasi-hierarchy alliances may pose partners to considerable risk of economic or other losses.



**Proposition 4: Managers' expectations for the alliance value affect the firm preference for an alliance governance mode.**

*H4: Under conditions of uncertainty, the expected alliance value is positively related to preference for quasi-market alliance governance modes.*

### **3.2.3. The mediating role of Expected Alliance Value**

This research adopts a value approach towards providing an integrative model of preferred alliance governance mode. Such an approach has been proposed by Zajac and Olsen (1993) as an opportunity for future research towards providing a more efficient framework to explain the variety of inter-organizational strategies as a function of their expected value. The theoretical proposition of this research does not discard the impact of the antecedent factors identified in the strategic decision making and strategic alliances literature. Instead, it takes into account both their direct and indirect effects, the later being calculated through the mediating mechanism of the Expected Alliance Value (EAV).

Thus, besides the direct impact of antecedent factors on the preferred alliance governance mode, we argue that organizational, environmental and decision-specific factors can indirectly affect an alliance-related decision through managers' expectations for the alliance value at the initiation phase. Specifically, we contend that strategic managers' value expectations are formulated based on their organization's current status and vision, the conditions of the environment (industry, market) to which they operate, as well as their organization's relationship (compatibility and history) with the candidate partner.

**Proposition 5: The relationship between environmental factors and preferred alliance governance mode is mediated by the expected alliance value.**

**Proposition 6: The relationship between organizational factors and preferred alliance governance mode is mediated by the expected alliance value.**

**Proposition 7: The relationship between alliance-specific factors and preferred alliance governance mode is mediated by the expected alliance value.**

Given the 'dynamic' nature of technology-based industries, managers' strategic decisions are often challenged by high levels of uncertainty, usually regarding either the market demand or the technology evolution. To address the challenges of uncertain



environments, firms are more liable to form strategic alliances as a strategy towards sharing and thus decreasing risk for the concerned firm (Tsang, 1998). Real option analysis suggests that, under conditions of uncertainty, current investments, including commitment of resources in strategic alliances, create many valuable follow-on opportunities or growth options, which can be more or less specified a priori (Leiblein, 2003).

*H5a: Perceived environment uncertainty is positively associated with managers' expectations for the alliance value.*

In high velocity (or hyper-competitive) environments, the phenomenon of frequent launches of competitive moves by rival firms, resulting to frequent shifts of relative competitive positions, raise the need for managers to think strategically and opt for different ways in which their firm can gain competitive advantage (Bogner and Barr, 2000). Strategic alliances constitute a response to the perceived threat of hyper-competition by enabling firms to gain competitive capabilities through co-option or/and leveraging co-specialized resources or/and gaining competence through internalized learning. These options denote the three value creation logics, 'co-option', 'co-specialization' and 'learning and internalization', discussed by Doz and Hamel (1998). Thus, as the competition intensifies, managers think of strategic alliances as value-promising vehicles towards attaining their competitive strategies.

*H5b: Perceived competition intensity is positively associated with managers' expectations for the alliance value.*

There is both theoretical and empirical evidence provided by Dalziel (2001) on the type of benefits that large and small firms seek to capture through alliance formation. On the one hand, large firms are motivated to enter an alliance by expecting to decrease speed to market, and thus accelerate innovation, and increase their scope by extending either their product portfolio or their target markets. On the other hand, small firms are incited to partner with other firms under the prospect of gaining access to complementary resources and capabilities, as well as increasing their credibility. In the case of asymmetric alliance, large firms are mostly concerned on protecting their core competence and brand name from their small-sized partners' opportunistic behavior, even under the threat of possibly losing benefits provided by open exchange. However, small firms are more interested in



increasing the follow-on opportunities, provided by their investment in a strategic alliance. We hence have the following hypothesis:

*H6a: Firm size is negatively associated with managers' expectations for the alliance value.*

Eisenhardt and Schoonhoven (1996) have found that alliances are more likely to be formed when both firms are in vulnerable strategic positions (i.e. in high need for resources) or when they are in strong social positions (i.e. possess valuable resources to share). Given that this research defines strategic position in terms of the competitive advantage that a firm possesses over its rivals, competitive advantage may incur from possessing a scarce resource and capability profile, holding a superior market share, or even having an outstanding performance. The greater the firm's current competitive position, the narrower the margins of reinforcing it significantly through the alliance, and thus the lower their expectations for the alliance value.

*H6b: Firm competitive position is negatively associated with managers' expectations for the alliance value.*

The underlying motivation to enter interfirm cooperation of any form is that companies can achieve together such targets that they would not be able to achieve alone (Madhok and Tallman, 1998). Cooperation is believed to combine the advantages of vertical integration and scale economies in merging resources but keeping individual companies focused on their core competence (Vilkamo and Keil, 2003). Alliances are increasingly made not just to achieve vertical but also horizontal integration (Narula, 2003). While vertical or horizontal integration may create value by exploiting any complementary or excess valuable resource (e.g., Teece, 1980; 1982), recent conceptual (Quinn and Hilmer, 1994; Barney, 1999) and case study research (Argyres, 1996) describes situations where alliance decisions seem to be driven by a firm's ability to leverage its core competence into adjacent value chain activities, thus implementing a diversification strategy.

*H6c: Firm strategic orientation towards diversification and integration is positively associated with managers' expectations for the alliance value.*

Value generated from alliances is enhanced when partners have different resource and capability profiles, yet share similarities in their social institutions (Sarkar et al., 2001). Social incompatibility may lead to an inability on the part of the partners to develop a



harmonious relationship, and thus negatively influence their expectations for value generated from the alliance. Higher levels of stress, and thus lower expectations for value, result for managers when the partnering entities attempt to blend incompatible values, norms, and capabilities in an alliance (Das and Teng, 2000). Moreover, organizational differences hinder role socialization (Smith and Barclay, 1997), thus making it more difficult for interfacing managers to work together, which also has a negative impact on their expectations from the alliance.

*H7a: Partner compatibility (resource complementarity, operational and social compatibility) is positively associated with managers' expectations for the alliance value.*

Anderson and Narus (1990) argue that “compatible partners working together in pursuit of mutually agreed strategic goals develop a strong feeling of ‘chemistry’, which results in satisfaction with the alliance”. Instead, the existence of a competitive relationship may hinder the pursuit of a common goal and raise the perceived threat of partners’ opportunistic behavior. Doz and Hamel (1998) suggest that the more compatible the long-term strategic interests of the partners, the less likely they are to embrace unrealistic value expectations.

*H7b: Partner competitive relationship is negatively associated with managers' expectations for the alliance value.*

The existence of long cooperative history between the allying firms is one of the most commonly referred sources of inter-firm trust. Mutual trust develops as partners get involved in more partnerships, being either direct or indirect through common third-parties, and increase their level of commitment in them (i.e. share equity to each other or develop a joint equity) (Gulati, 1995). Mutual trust deters opportunistic behavior and has efficiency implications, which involve potential reduction of transaction cost and emergence of value enhancing opportunities (Madhok, 1995).

*H7c: Alliance history is positively associated with managers' expectations for the alliance value.*

The following figure illustrates the ‘mediation model’ that is theoretically developed (see Chapters 2 and 3) and empirically tested (see Chapters 4 and 5) within this research.



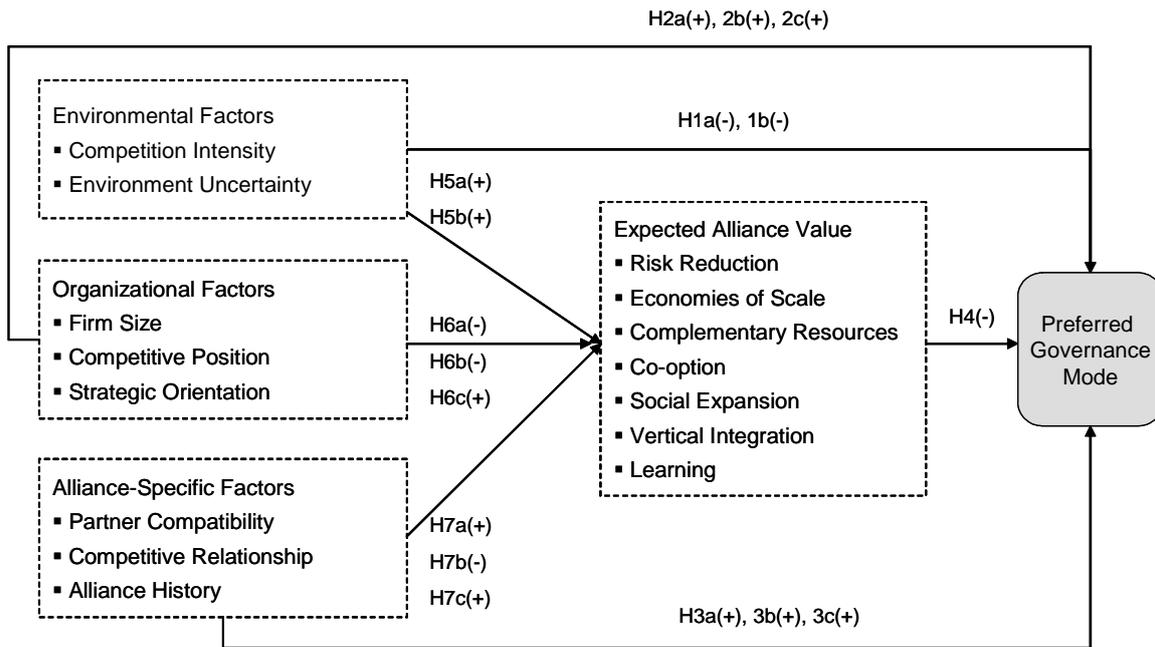


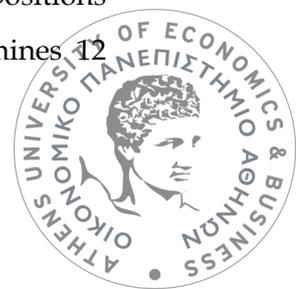
Figure 3-3. A Value-Mediation Model on Preferred Alliance Governance Mode

### 3.3 Alternative Conceptual Models

Apart from the aforementioned ‘mediation model’, this research intends to test two more alternative conceptual models, including the same set of elements (variables) but configured in different relationship schemes. In the first model, which we will call the ‘direct model’, expected alliance value is regarded as an additional antecedent factor of alliance governance mode, and thus there are only direct effects from the three antecedent factors and the value factor to the alliance governance preference. The second one, which we will call the ‘semi-mediation model’, assumes a mediating role for the expected alliance value but only for the alliance-specific group of variables. Thus, while the two contextual (organizational and environmental) factors have only direct effects on the alliance governance mode, the alliance-specific factors are believed to have also indirect effects by influencing the expected alliance value. Both alternative models are simpler than the prime one, since they include and examine a smaller set of relationships.

#### 3.3.1. Direct Model

The direct model involves the effects of four groups of antecedent factors on the preferred governance mode. These effects were described through the formulation of propositions 1, 2, 3, and 4, and the group of included hypotheses. Thus, this model examines 12



hypotheses in total. The rationale that supports this model's construction is that alliance governance mode is a strategic decision made under the combined influence of four prime antecedents; three being already identified by strategic process research, and a new one, contributed by this research, regarding the value potential of strategic alliances.

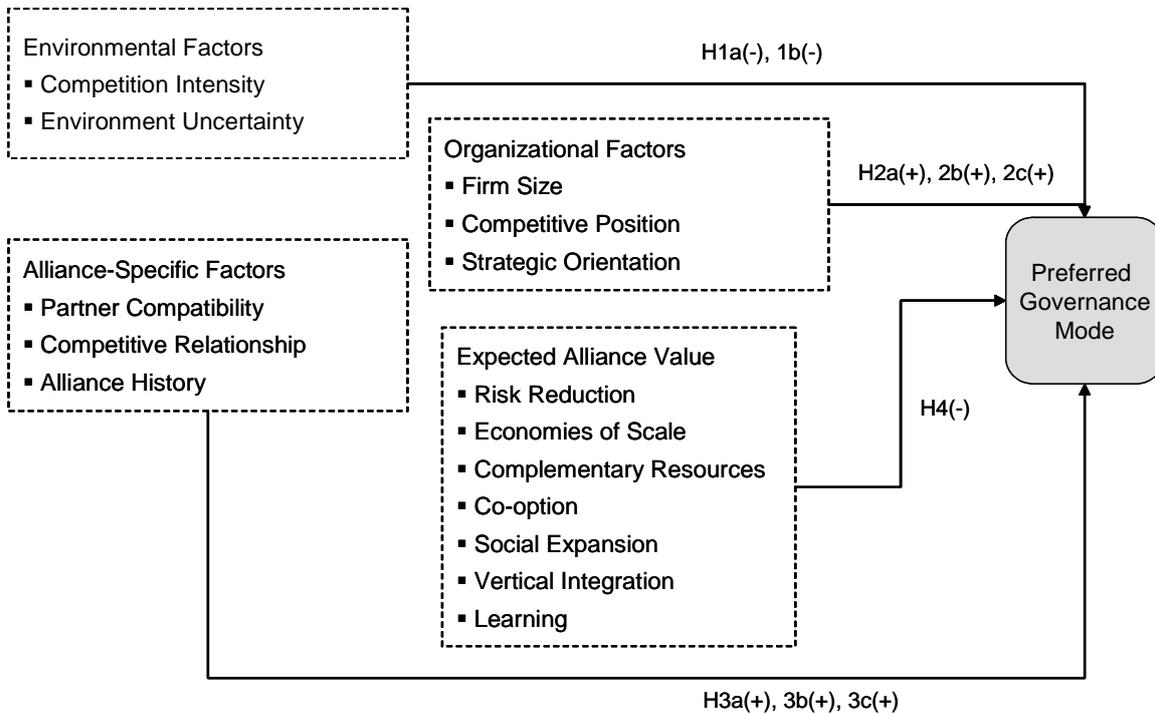


Figure 3-4. A Direct Model on Preferred Alliance Governance Mode

### 3.3.2. Semi-Mediation Model

The semi-mediation model involves the direct effects of four groups of antecedent factors on the preferred governance, as well as the indirect effects of alliance-specific factors. These effects were described through the formulation of propositions 1, 2, 3, 4, and 7, and the related hypotheses. Thus, this model examines 15 hypotheses in total.

The rationale that supports this model's construction is that alliance governance mode is a complex strategic decision made under the combined influence of four prime antecedents and a mediating factor. The direct effects of the three antecedents are identified by strategic process research, while the indirect effects of alliance-specific factors on the alliance governance mode are hypothesized based on partner assessment and compatibility (Sarkar et al., 2001; Anderson and Narus, 1990) as well as social exchange research (Gulati, 1995; Madhok, 1995).



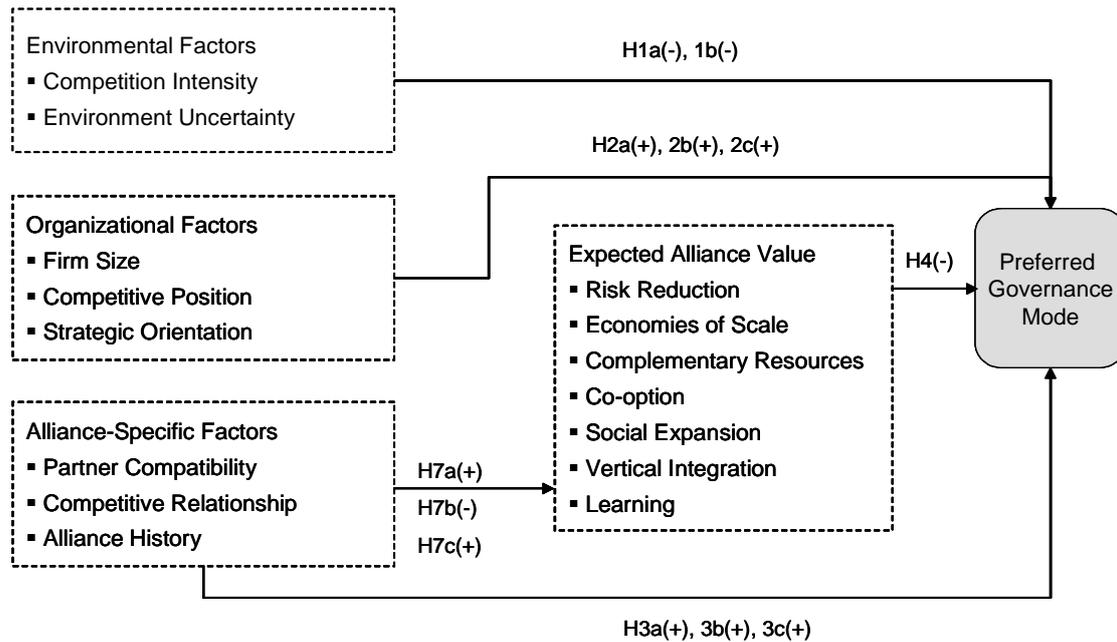
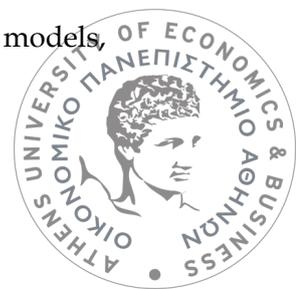


Figure 3-5. A Semi-Mediation Model on Preferred Alliance Governance Mode

### 3.4 Summary

Chapter 3 discussed the development of the prime conceptual model contributed and tested within this research. The skeleton of the model is founded on existing research in the strategic decision making and strategic process domains of the strategic management literature, discussed in the first sections of this chapter. The model's individual elements, included as independent variables, as well as their relationship with the dependent variable, were defined with the aid of the strategic alliance theory presented in Chapter 2. The third theoretical pillar of this research includes investigations regarding technology-based industries, and more specifically Information Technology and Communication environments, with the purpose of identifying factors that affect strategic alliance formation and strategic decision making in this context. Such investigations affected the choice of the environmental dimensions that were finally introduced to the conceptual model. The hypothesized conceptual model includes three antecedent factors, two contextual (environmental and organizational) factors and one alliance-specific factor, and one mediator, namely Expected Alliance Value (EAV), contributed by this research. Both the direct as well as the indirect effects of the afore-mentioned variables are specified through the formulation of seven propositions and 20 hypotheses, the full set of which is listed in Appendix A. The chapter ended with the specification of two alternative models,



namely a 'direct model' including only the direct effects of the independent and the mediating variables on the dependent one, and a 'semi-mediation model' including the direct effects of all independent variables, as well as the indirect effects of the alliance-specific factor. In Chapter 5, these models are used for testing and validating the explanatory power of the prime conceptual model. The next chapter, Chapter 4, discusses the design of the empirical research that was conducted to test the full set of research hypotheses formulated in this chapter.



# CHAPTER 4

## RESEARCH DATA AND DESIGN

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This chapter describes the empirical data and the methodology that has been used for their collection. Section 4.1 outlines the data requirements, while Section 4.2 describes the data collection process, and Section 4.3 provides a descriptive analysis of the data collected.

### 4.1 Data Requirements

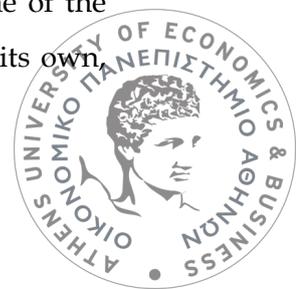
#### 4.1.1. Wireless Market Focus

To address questions relating to alliances between firms in technology-based industries, as defined in Chapter 3, this research focuses on an instance of such environments, namely the wireless business environment.

#### The Wireless Business Value Net

The wireless market constitutes the convergence of a number of industries (Wirtz, 2001), such as the telecommunication industry (for wireless networks development, configuration and operation), the information technology industry (for software development and hardware manufacturing), the consumer electronics industry (for wireless devices manufacturing), and the media industry (for content provision).

The choice of the wireless market as the empirical focus of this research has been based on several reasons. First of all, the wireless market is characterized by a number of features that not only favor, but also necessitate the formation of inter-firm collaborations. On the one hand, it is characterized by the existence of important assets under the exclusive control of one or a few firms (Camponovo and Pigneur, 2003). Such assets may for example include access to licensed air spectrum, customer data of mobile phone subscribers, the development and ownership of digital geographical maps based on which a number of location-based services can be provided, the copyrights for a published material (e.g. news, guides, etc.), and others. On the other hand, none of the firms that possess an exclusive asset or a special capability can create value on its own.



due to the complexity of the wireless business environment, and thus the amount of technologies and knowledge needed to produce a wireless service. Environment complexity and resource exclusivity thus become amongst the primary drivers for firms in the wireless market to engage into strategic technology alliances (STAs) (Giaglis, 2004).

While the focus is on a specific market, the firms that participated in the survey operate in diverse industrial environments. The type of industry to which they belong indicates more or less their role in the wireless market. Based on several recent research analyses of wireless market's value chain/net (Paavilainen, 2001; Olla and Patel, 2002; Woolfall, 2003; Rulke et al., 2003), this survey has identified the following four main segments: 1) network and access, 2) technology, 3) service and content, and 4) interface. The n-n relationships that are developed between different players and segments have motivated this research.

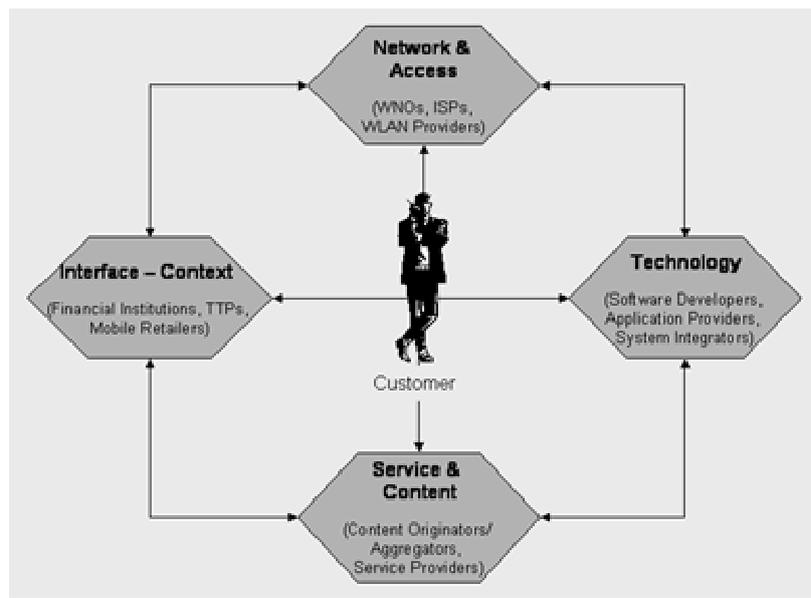


Figure 4-1. The Wireless Value Network

The *Network and Access (N&A)* component includes actors providing the infrastructure, in terms of communication channels and network equipment, required for communication and delivery of voice and data information. The primary actors in this area are Wireless Network Operators (WNOs), Internet Service Providers (ISPs), and providers of WLAN hotspots. These actors possess a rather advantageous position within the market due to their commercial (billing) relationship with customers.



The *Technology (Tech)* component includes actors providing software and applications that enable the provision of wireless services. Their primary strengths include ownership of products, such as portal platforms, as well as expertise in developing, customizing, and integrating wireless applications. The primary actors in this area are Software Developers, Positioning Technology Providers, Telematics, and System Integrators.

The *Service and Content (S&C)* component includes actors designing, producing, packaging, delivering and supporting the intrinsic forms of value – goods, services, or content – that satisfy customer needs. Their competence lies either on the ownership of content, when this is considered scarce and thus valuable, or on the expertise on service provisioning and experience of partnerships with key players in their market. The primary actors in this area are Content Originators, Content Aggregators, and Service Providers, as well as some actors of technology components, such as Telematics and Positioning Technology Providers, which offer their technology packaged with a set of value-added services.

The *Interface or Context (Inter)* component includes actors that act as a point of access for the customer's contact with the remaining partners of the wireless value chain/net. The core competence of actors playing this role is customer ownership, which includes ownership of customer relationship, data and transaction. The primary actors in this area are Financial Institutions, Trusted Third Parties (TTPs), Wireless Retailers and Support Service Providers (i.e. billing, service promotion, and advertising), and others.

Following the aforementioned analysis, we have identified twelve roles, also referred as the sectors of the wireless service provision market, and associated them with a set of examples from the Greek and international wireless market.



**Table 4-1. Specification of Wireless Market Sectors (Roles)**

No.	Role	Segment	Description	Examples
1.	Wireless Network Operator (WNO)	<i>N&amp;A</i>	Most commonly referred as Mobile Operators, they develop and operate wireless/mobile networks, usually within the geographical scope of a country.	Vodafone, TIM, Orange, Telia, O2, T-Mobile
2.	Virtual Network Operators (VNO)	<i>N&amp;A</i>	Provide a single access point to networks and services offered through multiple networks.	Financial Times, Virgin Mobile, Q-Telecom
3.	Wireless Internet Service Provider (WISP)	<i>N&amp;A</i>	Provide access to Internet information and services through mobile/wireless networks.	Otenet, Forthnet
4.	Wireless Device Manufacturer (WDM)	<i>Tech</i>	Manufacture and sell any type of handheld device (e.g. laptops, mobile phones, smart phones, PDAs), which could be used to access information and services, provided through mobile / wireless networks.	NOKIA, Sony-Ericsson, HP, Siemens, Motorola, Samsung
5.	Network Equipment Provider (NEP)	<i>Tech</i>	Manufacture, sell and install the infrastructure required for the operation of mobile/wireless networks.	Cisco, D-Link, Nortel, Alcatel Siemens,
6.	Telematics Provider (TEL)	<i>Tech / S</i>	Develop telematics solutions on an enabling technology that is the basis for wireless services delivered to the person in the car.	Telenavis, Emphasis Telematics
7.	Software Developer (SD)	<i>Tech</i>	Develop software that is used to support the delivery of wireless/mobile services by MNOs, WASPs or Content/Service Providers.	SIEBEN, IBM, Psion
8.	Positioning Technology Provider (PTP)	<i>Tech / S</i>	Develop and provide technology, and in some cases services based on that, able to disseminate information on the location of members of a mobile/wireless network.	SSF, Emphasis Telematics
9.	Wireless Application Service Provider (WASP)	<i>Tech / S</i>	Develop, administrate, and host applications of mobile/wireless communication.	Newsphone, SpaceNet

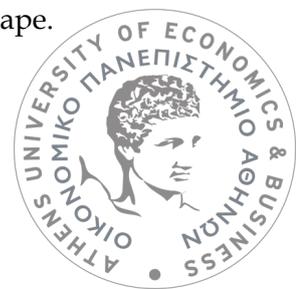


10.	Content/ Service Provider (CSP)	S&C	Create or/and package content of added value in order to provide it through mobile/wireless networks.	NAVI NGI, Newsphone, CNN
11.	Mobile Portal (M-PORT)	S&C	Provide a single access point to a wide variety of content and services delivered through mobile/wireless networks.	i-mode, VodafoneLive!, TIM Imagine
12.	Wireless Device Retailer (WDR)	Inter	Sell and support the operation of handheld devices produced by WDMs. Usually, they also promote service packages of WNOS.	Germanos, Plaisio

### Strategic Alliances in the Wireless Business market

We can distinguish between two types of STAs, those between partners of the same industry (e.g. telecommunications, consumer electronics, etc), and those between partners belonging to different industries. Examples of the first type of collaborations include the establishment of Symbian, a joint venture between Nokia, Sony-Ericson, Motorola, Matsushita, Siemens, and Psion (Ancarani and Shankar, 2003) to develop the operating system for current and future mobile devices, or the cooperation between wireless network operators in Europe (for example, the FreeMove alliance among T-Mobile, Telecom Italia, Telefonica Moviles, and Orange), which have joined forces to develop homogeneous services for their customers across their countries of operation, so that they can effectively compete with global competitors like Vodafone. The second type of alliances involves firms belonging to different industries, or different segments of the wireless value chain/net, are collaborating with the purpose of developing and exploiting wireless solutions, rather than components. For instance, wireless network operators may partner with wireless device manufacturers for customizing the device interface and functionality to the service portfolio that the operators provide. A real case study of such an alliance is the collaboration of Ericsson with Telia Mobile (Hakaanson and Lind, 2004).

In the very recent time period, as the capabilities of mobile and wireless technologies (e.g. 3G networks, Wi-Fi networks, RF-IDs, indoor GPS) enhance, the formation of strategic alliances has been a rather frequent phenomenon in the global wireless market. Some of these alliances involve multinational firms and thus have an international impact on the wireless business. Hereinafter, we discuss key strategic alliances, which have already caused or are expected to cause significant changes in the wireless business landscape.



Symbian was founded in June 1998 as joint venture of Ericsson, Matsushita (Panasonic), Motorola, Nokia and Psion (a British software company). Currently, it is owned by six major shareholders, four of them with big shares (Psion, 26.6%; Nokia, Sony Ericsson, and Motorola, each with 20%), and two with smaller shares (Matsushita, 8.4%; Siemens, 5%). The Symbian coalition aimed at developing an open standard operating system for 'intelligent' mobile telephones and 3G devices that will function as an electronic diary, manage the mail, and access the Web and the worlds of m-commerce and m-entertainment (Ancarani and Shankar, 2003). Until recently, Symbian was in favored position, while Microsoft was still focused on PC-based operating systems. However, Microsoft, having developed a great number of alliances in the mobile telecommunications sector (e.g. Vodafone, HP, Siemens, NTT DoCoMo, Philips), has gained considerable ground. Thus, Symbian has now repositioned as a mobile phone operating system from its previous position of a mobile device operating system.

HP and Cisco first forged their alliance in early 1977, signing an agreement that focused on technology collaboration, product integration, professional services, and customer support. In February 2002, the two companies decided to further formalize and expand their alliance by signing a contract that would outline in greater detail both how they would work together and the six strategic initiatives on which the alliance would focus; optical technologies, storage solutions, utility data center, mobility and wireless infrastructure, IP telephony, and service and network management (Casciaro and Darwall, 2003). Regarding the mobility and wireless infrastructure, the HP-Cisco alliance aimed at developing broad range of flexible IP communications solutions that maximize employee productivity and deliver significant return on investment. HP Services would develop and deliver joint mobility solutions incorporating Cisco technologies like wireless LAN and Aironet cards. HP also uses these technologies in the next-generation HP WLAN products.

On 14<sup>th</sup> October 2005, Nokia and China Putian announced that they have signed an agreement to set up a joint venture to focus on R&D, manufacturing and sales of 3G network solutions for TD-SCDMA and WDMA technologies. The joint venture will be located in Wuhan, the capital city of China's Hubei Province. The total investment in the joint venture is approximately 90 million euros (The 3G Portal, 2005). China Putian and



Nokia will have 51% and 49% shares respectively in the joint venture. Before this alliance, the two companies have cooperated in GSM technology for over ten years.

### The Greek Wireless Business Market

This research collects data on wireless alliances that operate in the **Greek market**. This does not necessarily mean that the participating firms - partners of these alliances - are founded in Greece. We have also included a great number of alliances between foreign and Greek firms. Nevertheless, only alliances the result of which constitutes a wireless product or service provided in the Greek market, are participating in the sample. To enhance understanding as well as interpretation ability regarding this empirical research's results, it is important to specify and discuss in brief the special features of the Greek wireless market.

*High level of mobile penetration.* Till August 2005, the number of mobile telephony users reached at 11.659.665, 66,17% of which are users of mobile card telephony, while the rest are mobile subscribers. Compared to the rest countries of the Western Europe, Greece is quite above the average in terms of mobile penetration. Specifically, mobile penetration in Greece reaches at 90%, while the average rate is 85% (see Table 4-2).

**Table 4-2. Mobile Penetration in Western Europe (Netweek, 2005)**

Country	2004
France	69%
Germany	78%
Italy	101%
Spain	91%
Britain	91%
Greece	90%
Finland	90%
Luxembourg	119%
The Netherlands	76%
EE-15	85%

Source: [www.itu.org](http://www.itu.org)

*High competition intensity.* Using as criterion the sales volume, Vodafone holds the leading position, while Cosmote, TIM and Q-Telecom follow in order (Netweek, 2005)



Nevertheless, Cosmote is the leader in terms of market share (37,56%), while Vodafone is keeping on decreasing their difference within the last few years (Table 4-3). Thus, the competition between these two leading companies is ever increasing. The rest two companies, TIM and Q-Telecom, are holding inferior and thus more stable positions in the wireless market. Yet, Q-Telecom has appeared a really surprising rate of increase, despite its short life span (Netweek, 2005).

**Table 4-3. Market Shares of Mobile Operators in the Greek market**

Mobile Operators	No. of Customers	Subscriptions		Card Telephony	
		%	%	%	%
Cosmote	4.379.517	37,56	42,89	2.687.224	34,83
Vodafone	4.168.400	35,75	35,92	2.751.144	35,66
TIM	2.257.312	19,36	20,34	1.454.584	18,85
Q-Telecom	854.436	7,33	0,85	821.914	10,66
<b>TOTAL</b>	<b>11.659.665</b>		<b>33,83</b>	<b>7.714.866</b>	<b>66,17</b>

Source: Mobile Operators' Press Releases, August 2005

*Low margins for revenue increase.* The mobile business industry is in maturation phase, which means that the margins for increase of mobile phone users and mobile connections have been rather exhausted (Netweek, 2005). Mobile operators' expectations for market expansion and revenue increase rest on the gradual implementation and operation of 3G networks, which will enable the provision of innovative mobile voice and data services. Hence, the earlier years' pessimism on average revenue per user (ARPU) has now been surpassed in a great degree, and companies have focused their attention on strategy planning, in order to mine added value out of the 3G networks' operation.

**Table 4-4. Greek Mobile Operators' ARPU**

ARPU	A' Semester 2005
Subscriptions	50-60 €
Card Telephony	10-14 €

Source: Estimations based on Mobile Operators' Press Releases



### 4.1.2. Unit of Analysis

The wireless alliance, under the perspective of each partner, was selected as the unit of analysis. That means that each wireless alliance could potentially provide the empirical research with two - rather than one - cases, each describing a partner's perspective on the alliance.

Other possible approaches would have involved focusing on the alliance itself - rather than a partner's perspective for it (Dalziel, 2001; Gulati and Singh, 1998; Oxley and Sampson, 2004). Such data is usually extracted by research databases, such as the Cooperative Agreement and Technology Indicators (CATI) database developed by researchers at the University of Limburg (Gulati and Singh, 1998; Duysters and Hagedoorn, 2000), the Securities Data Company (SDC) Database on Alliances and Joint Ventures (Oxley and Sampson, 2004) or the ARPA database developed at Politecnico di Milano and containing agreements in Information Technology industries, such as semiconductor, data processing, and telecommunications (Colombo, 1998). Using the firm (partner) perspective of alliance as the unit of analysis has several advantages over the other possible approaches and some downsides.

The first advantage is the availability of data. The primary downside of using the alliance as the unit of analysis is the difficulty of obtaining objective information - sourcing from external data sources (i.e. press announcements). Data on such alliances is difficult to obtain due to the following reasons: 1) there is no legal requirement to announce them, 2) they may be considered insufficiently newsworthy to announce, 3) they may be considered too risky to announce, and 4) they may constitute specializations of global partnership contracts, and thus it may be not so easy to find data on them. Other researchers report similar challenges (Hagedoorn, 1993).

Similar studies that have sourced their primary data through either interviews or questionnaires have also focused on the firm rather than the alliance level, receiving the required information from the senior executive of the firm that has formed an alliance (Parkhe, 1993).

The primary disadvantage of using firm data on alliances is that the availability of empirical data depends on the willingness of firms to participate in the research.



Especially large firms, which have much more alliances to exhibit than small firms, are also more difficult to engage in such research studies. The reason is that such alliances often comprise a crucial part of firms' strategy, and in some cases they may provide them with significant advantage over their competitors. Even if they agree to participate, several firms in the telecommunications industry, the IT industry, the consumer electronics industry or the media industry are extremely large, and thus it is difficult to get a comprehensive and non-contradictory understanding of their inter-firm collaborative activities.

### 4.1.3. Sample Size and Selection Methods

This research seeks an understanding of the governance decision for a broad spectrum of alliances. Thus, it includes both symmetrical and asymmetrical<sup>2</sup> alliances, local and global alliances, business-to-business alliances that usually aim at vertical or horizontal integration, as well as business-to-consumer alliances that aim at producing new products/ services, and finally exclusive and non-exclusive alliances. The breadth of the approach and the decision to rely upon the firm perspective on an alliance as unit of analysis increases the sample size requirements.

The statistical analysis also imposes requirements on the size and nature of the data sample. The major statistical undertaking of this research is the prediction of a firm's preference for the alliance governance mode, when a great number of determinants are taken into consideration. Since prediction constitutes the main objective of this research, a regression-based analysis method should be selected. For a number of reasons explained in Section 5.1, we opted in favor of the Partial Least Squares (PLS) method, which belongs to the group of Structural Equation Modeling (SEM) techniques.

The PLS model includes eight independent variables, one intermediate variable (mediator), and one dependent variable. PLS models require sample sizes of either ten times the scale with the largest number of formative indicators, or ten times the largest

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<sup>2</sup>Symmetry of partners in an alliance may refer to a number of measures, the most common of which are market shares, firm sizes (Oxley, 1997), and resource complementarity (Harrigan, 1988).

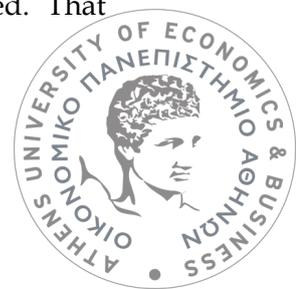


number of structural paths directed at a particular construct in the structural model (Chin and Newsted, 1999). The first condition raises the requirements for at least 20 observations, since the largest formative-mode scale is COMPT\_REL with 2 indicators. The second condition generates much higher requirements, namely 90 observations, since the model includes nine structural paths, eight from the independent variables and one from the intermediate variable, directed to the GOV construct.

However, for a more accurate assessment, Chin and Newsted (1999) suggest conducting power analysis on the proportion of the model with the largest number of predictors. In our research model, the power analysis was conducted on the part of the model that includes the nine determinants of the governance mode. As explained in Section 5.2, based on the results of this power analysis, 54 cases were required (Green, 1991). However, based on Green's (1991) rule of thumb, an even smaller sample of 49 cases suffice to meet the requirements of PLS analysis.

Aside the requirements for size, data needs to be sufficiently rich to ensure a full understanding of the phenomenon and the context in which it takes place. Since the governance mode variable can take four values (recurrent contracts, relational contracts, minority investments, and joint ventures), the sample should include a representative sub-sample of each governance mode. Thus, a diverse and balanced data sample was sought. Nevertheless, given the market restrictions explained in Section 4.1.1, this was not easy to achieve. Due to the technological nature of wireless business environment, the great majority of partnership agreements are contract-based, while only a few involve equity sharing or owning. Taking this into account, we considered it rational to combine minority equity alliances and joint ventures under the category of 'equity alliances'. Thus, the requirements for representative sample refers to the new three governance structures.

Also, it is desirable that the sample reflects the actual distribution of firms' roles (sectors) in the wireless market. Since most wireless alliances in the Greek market aim at providing an innovative product/service, the great majority of the sample firms should belong to the software development or application service provision sector. Furthermore, given that the wireless operators hold a dominant position in the wireless market, most alliances should involve them as partners. While the industry of wireless carriers is rather consolidated, the industry of application development is certainly fragmented. That



means that there is a large pool of small firms, mostly belonging to the information technology industry, that claim a share in the emerging wireless market. To do so, they have to form collaborations with one or even all the operators.

To satisfy the aforementioned requirements, we had to choose a sample selection method that assures a representative sample of the population, but also guides the whole data collection, so that an adequate number of cases are examined for all the three governance modes and for the most populated wireless sectors. The sampling design was finally based on the multistage cluster sampling method employing stratification techniques. Cluster sampling is recommended when it is either impossible or impractical to compile an exhaustive list of the elements comprising the target population (Babbie, 1990). Moreover, stratification is suggested when researchers wish to divide a population into two or more segments and sample a different proportion of each (Alreck and Settle, 1995).

Multistage cluster sampling involves two basic steps; listing and sampling. The list of primary sampling units was compiled to include first the industries (i.e. media, telecommunications, information technology), and then the firms belonging to each of them, that are involved in the wireless environment. Further investigations in this list of industries and firms led to a catalogue of Greek wireless alliances. Since non-equity alliances (recurrent and relational contracts) outnumbered the population of equity alliances (minority investment and joint ventures), we used stratified sampling to obtain an adequate sample of the last stratum.

## 4.2 Data Collection

In order to fully understand the nature of wireless alliances, the required data should be collected through in-person interviews with executives that were either responsible for the external business relationships (partnerships) of their company or actively participated in the corporate strategic decision making process. On the one hand, the interviews should involve open-ended questions regarding the partner firms and the motivations, nature, and impact of the partnership, so that as much information as possible was captured. On the other hand, to ensure that the required data was collected, a structured questionnaire was developed and administered during the interview. The questionnaire that was finally used to collect data is quoted in Appendix B.



This research yielded 60 interviews with executives. Five were conducted for the purpose of questionnaire testing, and the remaining 55 were conducted for data collection.

### 4.2.1. Data Collection Process

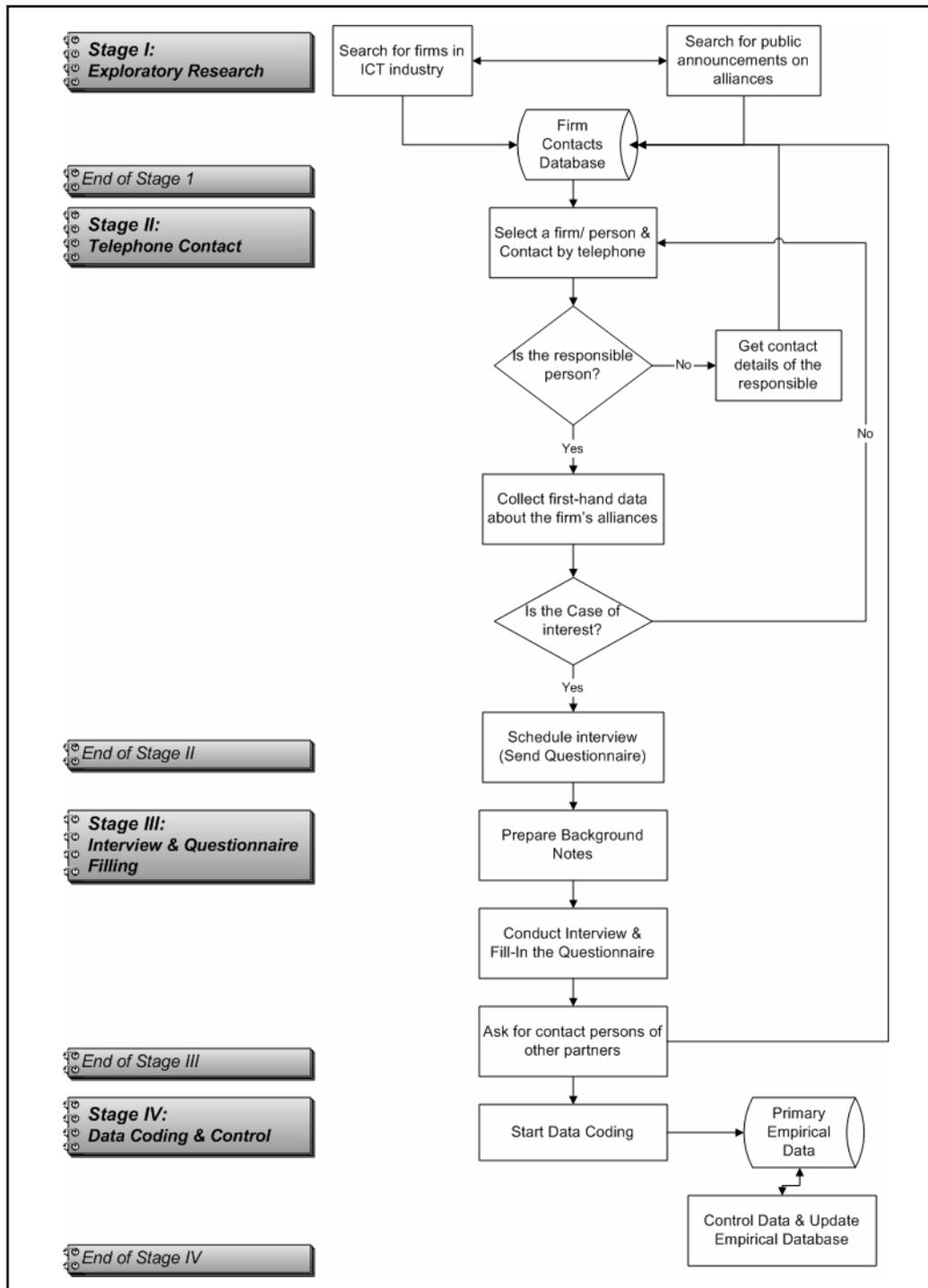


Figure 4-2. Data Collection Process



The primary data collection process started in October 2004 and ended in January 2005. The activities conducted during this four-month period are described in **Figure 4-2**.

#### Stage I: Exploratory research

This stage involved searching for information on current or newly formed alliances in the Greek wireless market. This exploratory activity was conducted via two diverse routes. Firstly, we sought for alliance information via firms' web sites. We visited all web sites of the firms that were recorded in the Greek Telecoms, IT, Internet and New Media Observatory 2003 (Observatory, 2003). Secondly, we sought for public announcements of wireless alliances, involving at least one Greek partner, via a great number of sources, including press releases in general business or wireless-focused magazines, portals, and newsletters. Following this way, we spotted a great number of alliances. Further information on the partners of this alliance (e.g. role of each partner, contact persons, etc) were obtained from considerable web searching, which finally resulted in collecting partial contact information for over 40 firms. This information was entered into a contacts database.

#### Stage II: Telephone contact with candidate firms and executives

Those people for whom first contact information was available were contacted by telephone. We explained the objectives of the research and asked for the appropriate person that could contribute. In case this was not the same person, we obtained new contact information for that person, and repeated the communication. The discussion with the responsible executive aimed at the collection of first-hand data on the number and type of alliances that the firm has formed. As soon as we received such information, we made our decision on either continuing with the interview, if the case was of interest to the research (quota sampling), or rejecting the case if it did not serve the sampling requirements. For those firms related, the process continued by scheduling the interview, and in some cases sending the questionnaire in advance, so that the executive could be prepared.

#### Stage III: Interview and questionnaire filling

In preparation for the interviews, background notes were made including information on the company, its partner, the partnership, and even the person being interviewed.



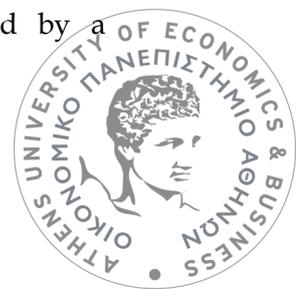
Interviews started with a discussion on the firm's role in the Greek wireless market (e.g. WASP, portal, content provider, device retailer, etc.). Then, the executive was asked to outline the number and type of alliances that the firm has formed with regards to wireless market positioning. The interview focused on a thorough discussion of one or more (maximum three) alliances, the most important ones, that the firm had contracted within the last few years. To facilitate collection of data on them, a questionnaire was filled for each alliance. The whole interview lasted an average of about one hour. Forty-two interviews were conducted in person, while 18 were conducted by telephone and with the use of a web site including the online version of the questionnaire (<http://wmds.eltrun.gr>). The interview ended by asking the executive to provide, if possible, contact information on either its partners or other companies of its industry that have formed a wireless alliance. This mechanism enabled the rapid growth of the contacts' database.

#### Stage IV: Data coding and control

Interview notes were typed and questionnaire data was coded into the primary empirical database. A total of 60 questionnaires were coded during the data collection phase. A first checking of the data yielded **57 acceptable cases**. One case concerned a market-based exchange, rather than alliance, the second referred to a partnership of a global company with a local reseller, and the third was not considered of strategic significance (i.e. non strategic objective was pursued via the alliance) for the firm participating in the interview. As the survey focused on the firm perspective for the alliance, rather than the alliance itself, as unit of analysis, we could collect data on the same alliance from the perspective of diverse partners, given that they were located in Greece and agreed to participate in the survey. This raised an excellent chance to provide a context for the comments of interviewees by comparing them to the perspectives of others. Nevertheless, this was finally implemented only for a small proportion of the sample (about 4 out of the 48 total recorded alliances).

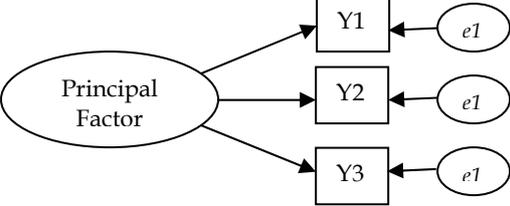
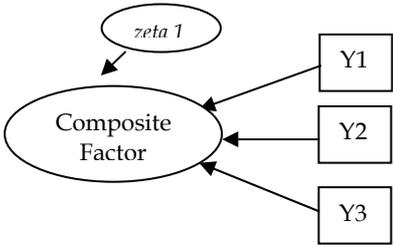
#### **4.2.2. Data Operationalization (Constructs)**

Since a great number of the variables used in this research were unobservable, a 'latent variable design' with multiple indicators for measuring most constructs (variables) should be adopted (Hoyle, 1999). This design allows constructs to be represented by a



combination of *reflective indicators* that can be empirically measured, plus a measurement error. Consequently, indicators are viewed as underlying dimensions or facets of the focal construct, and thus are strongly correlated (Bollen & Lennox, 1991). However, the research also includes some unobservable constructs that can be viewed as indices produced by a set of observable variables, called *formative indicators*. In this case, constructs are considered as a perfect linear combination of their measures, which need not be highly correlated with each other.

Figure 4-3 summarizes the differences between the two measurement models (principal factor model and composite latent variable model), thus distinguishing between reflective and formative indicators (Jarvis et al., 2003).

Principal Factor (Reflective) Model	Composite Latent Variable (Formative) Model
	
<p>Direction of causality is from construct to measure</p> <p>Measures expected to be correlated (Measures should possess internal consistency reliability)</p> <p>Dropping an indicator from the model does not alter the meaning of the construct</p> <p>Takes measurement error into account at the item level</p>	<p>Direction of causality is from measure to construct</p> <p>No reason to expect the measures are correlated (Internal consistency is not implied)</p> <p>Dropping an indicator from the model may alter the meaning of the construct</p> <p>Takes measurement error into account at the construct level</p>

**Figure 4-3. Differences between Reflective and Formative Indicators**

Both the latent variable (reflective indicators) and the principal factor (formative indicators) measurement models have been used in a number of recent studies in the strategic management area (Cool et al., 1989; Birkinshaw et al., 1995; Johansson and Yip, 1994), and more specifically in the domain of strategic alliances (Robins et al., 2002; Fornell et al., 1990; Doz et al., 2000).



The constructs and the indicators used to measure the independent, the dependent and the mediator variables of our research model are described below and summarized in Table 4-5.

### **Independent Variables**

#### *Firm Size*

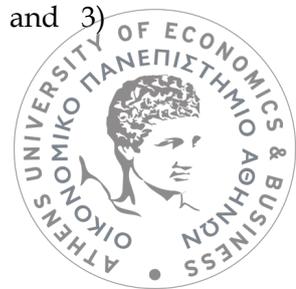
Firm size is operationalized as an observable variable assessing the size of the firm in terms of its number of employees. This is a common approach in prior research work in the strategic management field (Goerzen and Beamish, 2005; Colombo, 1995; Spanos and Lioukas, 2003). The scale development has been based on European Commission's index for small (0-9), small-to-medium (10-49), medium (50-249) and large (250+) firms (European Commission, 2003).

#### *Strategic Orientation*

Strategic orientation is conceptualized to refer to the growth strategy that a firm plans to implement in order to achieve its company mission. There are six primary categories of corporate growth strategies (Papadakis, 2002; Kotler, 2000): 1) Vertical Integration, 2) Horizontal Integration, 3) Diversification (related or unrelated), 4) Market Penetration, 5) Market Development, and 6) Product Development. Based on theory discussed in Chapter 3 (Ansoff, 1965; Kotler, 2000), the two most forward looking growth strategies, which are usually sought after by firms involved in strategic technology alliances, are diversification (related or unrelated) and integration (horizontal and vertical). The four implied strategies are conceptualized as reflective indicators of the strategic orientation construct.

#### *Competitive Position*

In prior research, competitive position, often also referred to as strategic position, has been defined in a number of different ways, such as in terms of unique resources and relationships that a firm holds (Sapienza, 1997), technological prestige (Stuart, 1998), or strategy of the firm. In this research, we adopted Day and Wensley's (1988) perspective on competitive position. According to them, there are three elements of competitive advantage, assuring a competitive position for a firm: 1) sources of advantages (resources and skills), 2) market positional advantages (customer value and costs), and 3)



performance outcomes (market share and profitability). Thus, competitive position is considered as a high-order construct related to the three elements (latent constructs) under a formative relationship. To identify the indicators that reflect the 'sources of advantage', hereinafter referred to as resource position, we have followed the Das and Teng (2000) classification of resources and skills. For the remaining two latent constructs, market and performance positions, we have selected to include a number of measures identified by Day and Wensley (1988). Due to the large number of these items, we have listed them in detail in **Table 4-5**.

### ***Environment Uncertainty***

To measure the environment uncertainty latent construct, we followed Dickson and Weaver's (1997) operationalization for this construct, used in an alliance setting. The empirically tested environment perception scale of Dickson and Weaver's (1997), also adapted from Covin and Slevin (1989), includes 10-items aiming at assessing strategic managers' perceptions for diverse dimensions of the external environment that raise uncertainty for an alliance, such as technological demand and volatility, general market volatility, and predictability of customer demands and competitor actions.

### ***Competition Intensity***

The perception of strategic managers for the competition rivalry in their market sector was gauged by four items used by Spanos and Lioukas (2001), adapted by Achrol and Stern (1988). In essence, these four items measure the competition rivalry from four perspectives: a) product/service characteristics, b) promotional activities, c) access to distribution channels, and d) after sales support.

### ***Compatibility (Diversity)***

Partner compatibility has been conceptualized as the reverse of the inter-firm diversity concept, defined by Parkhe (1991). Drawing on this conceptualization, partner compatibility is defined in terms of Type I compatibility (resource complementarity) and Type II compatibility (cultural and operational dimensions). Thus, partner compatibility is operationalized as a high-order construct caused by three factors, resource complementarity, cultural compatibility and operational compatibility. Resource complementarity was measured through a three-item scale (Anderson and Narus, 1990),



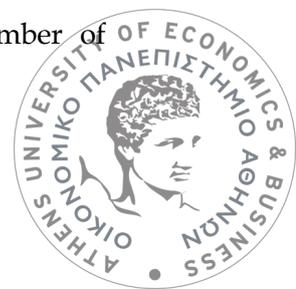
also used by Sarkar et al. (2001) in an alliance setting. The items tap the level of resource interdependence in the relationship by measuring the extent to which each partner perceives the value of resources and capabilities that the other brings to the alliance. Cultural compatibility was operationalized through a three-item scale that measured the perceived levels of similarity and congruence in organizational norms and values, and mutual appreciation of each other's objectives (Sarkar et al., 2001; Heide and John, 1992; Morgan and Hunt, 1994). Finally, operational compatibility was measured by a three-item scale assessing the level of congruence in partners' managerial skills, organizational procedures, and technical capabilities (Sarkar et al., 2001; Wilson, 1995).

### *Competitive Relationship*

To capture the extent to which partners may be direct competitors, we used two complementary measures of competitive overlap (Oxley and Sampson, 2004); product market and geographic market competition. Product market competition refers to whether the partners of the alliance belong to the same industry, and thus offer similar products/services. This is measured via two questions that specify the wireless sector to which each partner belongs (from the list of [Table 4-1](#)). By comparing this data, we provide value to a dummy variable, namely market overlap (MARK\_OVER), which is set to either 1 if both partner firms have their primary business in the same sector, or zero otherwise. For multilateral alliances, MARK\_OVER is set to 1, if at least two of the partner firms belong to the same sector. In order to provide value for the second measure, geographic market competition, we asked whether the partner is established in the same country, the same continent, another continent, or is a multinational firm. In the first and last case (same country and multinational firm), a dummy variable, the location overlap (LOC\_OVER) was set to 1. This measure was used to proxy for geographic market competition based on the assumption that firms having their premises in the same country perceive each other to be more direct competitors when compared with firms operating in different countries.

### *Alliance History*

The operationalization of the alliance history has been primarily based on Parkhe's (1993) construct for the cooperative history of two partners. It includes three questions, capturing data on the possibility of having previously collaborated, the number of



alliances into which they have participated, and the number of years of their collaboration. If there were no prior alliances between the partners, a variable called 'previous alliance duration' (PREV\_DUR) was set to zero; otherwise, its value was the product of the number of alliances the two firms had participated in and the number of years the two firms had been partners for. An additional variable, measured via a fourth question, called 'previous alliance governance' (PREV\_GOV) was added to capture data on the type of partnerships to which the partners were previously involved. This variable was set to take three values; zero for alliances with no prior history, 1 for non-equity (contract-based) previous alliances, and 2 for equity (basically minority investments) alliances.

### **Mediating Variable**

#### *Expected Alliance Value*

Expected Alliance Value (EAV) is operationalized as a second-order model caused by a number of first-order latent constructs. As it has already been explained in Chapter 3, EAV is conceptualized to include a range of strategic contributions raised from an alliance for the parties involved. From another perspective, EAV items can also be considered as strategic motives towards alliance formation. We selected to include a list of 20 items, derived from the literature review, which are presented in Chapter 2. While some of the identified motives (contributions) seem to be highly correlated, they mostly differ on the source of value, namely whether it is of financial, operational, or strategic nature.

To enable grouping of these items, we adapted Contractor and Lorange's (2002) classification framework of strategic contributions, developed for joint ventures, to strategic alliances. As a result, we identified the following seven principal sources of strategic benefits; 1) risk reduction, 2) economies of scale, 3) complementary resources, 4) co-option, 5) social expansion, 6) vertical integration, and 7) learning. The only significant change from the original classification is on the exclusion of the 'trade barriers' category, and the addition of a 'learning' category of strategic contributions. Such changes are implicitly indicated by the literature on strategic motives for alliances, where there is no reference to trade barriers. Instead, research is devoted to the firms' motivation for learning partners' capabilities via an alliance (Buckley and Glaister, 2002; Steensma, 1996; Grant and Baden-Fuller, 2004). With the aid of Contractor and Lorange's (2002)



framework, we classified the 20 strategic motives of the literature review (Table 2-3) under the seven groups. Since strategic motives are expected to highly inter-correlate, they were conceptualized as reflective indicators, causing variance for the first-order factors of the EAV construct.

## Dependent Variable

### *Governance Mode*

The dependent variable was handled as an observable (single-item) variable capturing the governance mode that constitutes respondents' preference for the alliance under consideration. While such variables are usually handled as categorical variables, in this research we chose to transform 'governance mode' into a numeric variable. To do that, we listed the alliance governance modes into a continuum of values, indicating an increasing degree of interdependence between partners. Thus, the survey's respondents were asked to choose the mode that best describes the level of interdependence that they wish to obtain with their partners; 1) recurrent contracts (very low interdependence), 2) relational contracts (low interdependence), 3) minority investment (medium interdependence), and 4) joint venture (high interdependence).

**Table 4-5. Constructs and Items (Questions)**

Constructs and Items Description	Item Code
Firm Size (Single Item)	
<i>Indicate firm's size in no. of employees: [0-9, 10-49, 50-249, 250+ empl.]</i>	SIZE1
Governance Mode(Single Item)	
<i>Select from the list the type of alliance that your firm has preferred, based on level of wished interdependence with the partner:</i>	GOV1
<i>[Recurrent Contract, Relational Contract, Minority Investment, Joint Venture]</i>	
Strategic Orientation (4 Items)	
(Scale: 1=extremely low to null ... 7=extremely high)	
1. <i>Indicate degree of importance that the firm's corporate strategy provides to the strategic goal of related diversification (differentiation on existing products/services)</i>	STRAT_OR1
2. <i>Indicate degree of importance that the firm's corporate strategy provides to the strategic goal of unrelated diversification (differentiation on new products/services)</i>	STRAT_OR2
3. <i>Indicate degree of importance that the firm's corporate strategy provides to the strategic goal of vertical integration</i>	STRAT_OR3
4. <i>Indicate degree of importance that the firm's corporate strategy provides to the strategic goal of horizontal integration</i>	STRAT_OR4
Competitive Position	



(Scale: 1=much below the average...7=much above the average)

1. Resource Position (9 Items)

Rate firm's competitive strength in terms of the following resources:

- *Financial Resources (e.g. capital, investments)* RES\_POS1
- *Human Resources (e.g. employees' experience, interfirm contracts)* RES\_POS2
- *Physical Resources (e.g. geographic location, equipment, access to raw materials)* RES\_POS3
- *Technological Resources (e.g. equipment, networks, devices, standards)* RES\_POS4
- *Organizational Resources (e.g. patents, copyrights, registered designs)* RES\_POS5
- *Tacit Know-How (e.g. efficient organizational processes, managers' insight)* RES\_POS6
- *Market Knowledge (e.g. market info, customers' installed base)* RES\_POS7
- *Technological Knowledge (e.g. capabilities in technology usage/ development)* RES\_POS8
- *Management Systems (e.g. control and coordination systems, strategic planning)* RES\_POS9

2. Market Position (8 Items)

Rate firm's competitive strength in terms of the following market position advantages:

- *Low production costs* MARK\_POS1
- *Time-to-market* MARK\_POS2
- *Product/ service quality* MARK\_POS3
- *Low prices* MARK\_POS4
- *Quality of after-sales support* MARK\_POS5
- *Product/service delivery* MARK\_POS6
- *Promotion/ advertising* MARK\_POS7
- *Technological superiority of products/ services* MARK\_POS8

3. Performance Position (4 Items)

Rate firm's competitive strength in terms of the following performance-related advantages:

- *Brand name* PERF\_POS1
- *Differentiated products/services* PERF\_POS2
- *Market share* PERF\_POS3
- *Return on Assets* PERF\_POS4

Environment Uncertainty (10 Items) (Scale: 1=strongly disagree ... 7=strongly agree)

1. *The environment is very risky, one false step can mean my company's undoing.* ENV\_UNC1
2. *The environment is rich in investment and marketing opportunities.* ENV\_UNC2
3. *It is an environment that the company can control and manipulate to its own advantage.* ENV\_UNC3
4. *Technologically, a very sophisticated and complex environment.* ENV\_UNC4
5. *The rate in which products and services are getting obsolete is very high.* ENV\_UNC5
6. *Our firm must change its marketing practices frequently.* ENV\_UNC6
7. *Demand and consumer tastes are almost unpredictable.* ENV\_UNC7
8. *The technology used for production and delivery of our products/services change often and in a major way.* ENV\_UNC8
9. *There is intense R&D activity in our sector.* ENV\_UNC9
10. *Actions of competitors are almost unpredictable.* ENV\_UNC10



**Competition Intensity (4 Items) (Scale: 1=strongly disagree ... 7=strongly agree)**

- |   |            |
|---|------------|
| 1. The competitive intensity regarding product/service characteristics (e.g. quality, package, etc.) in our sector is extremely high. | COMPT_INT1 |
| 2. The competitive intensity regarding advertising/promotional activities in our sector is extremely high.                            | COMPT_INT2 |
| 3. The competitive intensity regarding access to distribution channels in our sector is extremely high.                               | COMPT_INT3 |
| 4. The competitive intensity regarding after-sales support to customers in our sector is extremely high.                              | COMPT_INT4 |

**Compatibility (Scale: 1=strongly disagree ... 7=strongly agree)**

Cultural Compatibility (3 Items)

- |   |            |
|---|------------|
| 1. Our partner's organizational values and social norms resemble with ours.   | CULT_COMP1 |
| 2. Our executives' philosophies/ approaches to business dealings are consistent with those of our partner's executives. | CULT_COMP2 |
| 3. Our partner's strategic goals and objectives do not hinder ours.   | CULT_COMP3 |

Operational Compatibility (3 Items)

- |   |            |
|---|------------|
| 4. Technical capabilities/solutions of our partner and our firm are compatible with each other.   | OPER_COMP1 |
| 5. The organizational procedures of our partner and our firm are compatible.                      | OPER_COMP2 |
| 6. Employees of our partner have similar professional or technological skills with our employees. | OPER_COMP3 |

Resource Complementarity (3 Items)

- |   |           |
|---|-----------|
| 7. Both companies need each other's resources to accomplish their strategic goals.  | RES_COMP1 |
| 8. The resources contributed by both firms are significant for serving the principal purpose for which this alliance is formed (specified in A6). | RES_COMP2 |
| 9. Resources brought into the alliance by each firm were very valuable for the other.   | RES_COMP3 |

Competitive Relationship (2 Items)

- |   |           |
|---|-----------|
| Please choose from the list your partner's relative geographic position:<br>[Same Country, European Country, Other Country] | LOC_OVER  |
| Please choose from the list [Table 4-1] your firm's & your partner's market sector:   | MARK_OVER |

Alliance History (4 Items – 2 factors)

- |   |          |
|---|----------|
| 1. Has your firm been engaged with your partner in alliances other than the present one?<br>[yes, no] | PREV_DUR |
| 2. How many other alliances?  |          |
| 3. For how many years do you know each other?   | PREV_GOV |
| 4. What type of alliance(s) did you have? [Contract-based, Equity-based]                              |          |

**Expected Alliance Value (EAV)**

(Scale: 1=extremely low expected ... 7=extremely high expected)

Risk Reduction (3 Items)

- |   |           |
|---|-----------|
| 1. Share market risk (i.e. production of new or differentiated products/services)             | RISK_RED1 |
| 2. Share technological risk (i.e. development of technologically advanced products/ services) | RISK_RED2 |
| 3. Increase flexibility to rapid market and technological changes                             | RISK_RED3 |

Vertical Integration (5 Items)

- |   |           |
|---|-----------|
| 4. Enable provision of products/ services in lower prices | VERT_INT1 |
|---|-----------|



5. <i>Improve quality of after sales support</i>	VERT_INT2
6. <i>Expand service delivery in new channels</i>	VERT_INT3
7. <i>Benefit from partner's strong brand name</i>	VERT_INT4
8. <i>Reduce time-to-market</i>	VERT_INT5
<b>Complementarity (2 Items)</b>	
9. <i>Exploit complementary resources</i>	COMPLEM1
10. <i>Extend products/services range (new products/services)</i>	COMPLEM2
<b>Learning (4 Items)</b>	
11. <i>Gain access to the partner's resources</i>	LEARN1
12. <i>Internalize partners' capabilities (e.g. technological, production, marketing)</i>	LEARN2
13. <i>Deploy new skills and knowledge</i>	LEARN3
14. <i>Improve quality of products/ services</i>	LEARN4
<b>Co-option (2 Items)</b>	
15. <i>Differentiate existing product/services (new features)</i>	CO_OPTION1
16. <i>Deter entry of competitors</i>	CO_OPTION2
<b>Economics (3 Items)</b>	
17. <i>Economize on the sum of production and transaction costs</i>	ECONOMIES1
18. <i>Increase Return On Asset (ROA)</i>	ECONOMIES2
19. <i>Increase market share</i>	ECONOMIES3
<b>Expansion (1 Item)</b>	
20. <i>Increase knowledge about the partner and its social network (e.g. suppliers, complementors) for formation of new alliances in the future</i>	EXPANSION1

### 4.3 Data Description

This section presents summary information about the sample of respondents, firms and alliances that this survey investigated. This information will be used in Chapter 7 to improve interpretation of the research findings, discuss the limitations of the survey, and motivate further research in the future.

#### 4.3.1. Interviewee Profiles

Table 4-6 describes the interviewees in terms of the level of their role, and thus their responsibilities, in the company. Most interviewees held very senior positions; 48% of them were either CEOs or CIOs. In each case, the interviewee was selected on the basis of being: a) centrally involved in the strategic decision making process for one of the firm's alliances, and b) willing and available to be interviewed during the data collection time period.

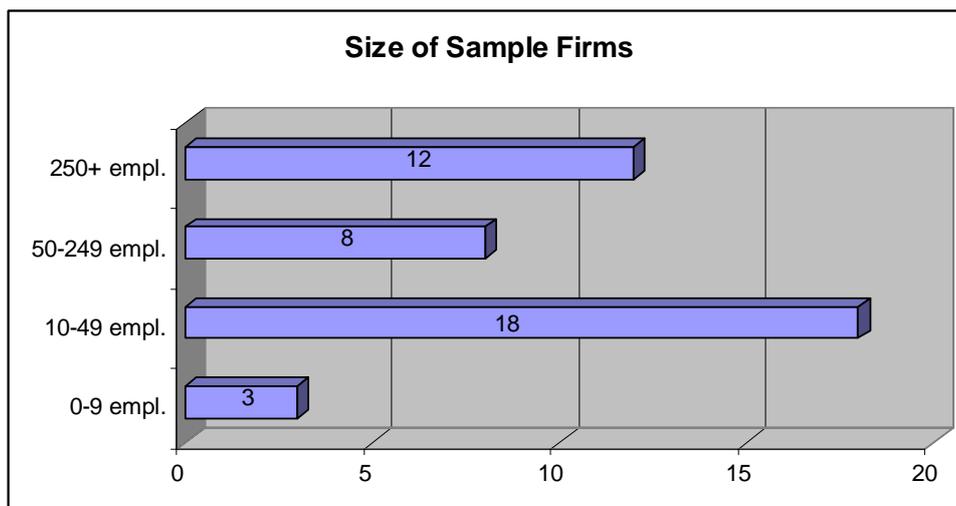


**Table 4-6. Company Position of Interviewees**

Position	No. of Interviewees
Managing Director (CEO)	11
ICT Manager (CIO)	10
Marketing Manager	7
Business Development Manager	4
Sales Manager	4
Service Manager	3
Strategy Planning Manager	2
R&D Manager	2
Account Manager	1
<b>Total Interviewees</b>	<b>44</b>

### 4.3.2. Firm Profiles

Chart 4-1 illustrates the distribution of sample companies using the European Commission’s scale of small, small-to-medium, medium and large firms. Based on this, the majority of the participating companies (44%) belong to the group of small-to-medium (SMEs) firms. The second most frequent category is that of large firms (30%), and the third is that of medium-sized firms (20%). The differences in the percentages of each group are rather small, and thus we can assume that we have a quite representative, from the firm size perspective, sample of company-participants in the survey.



**Chart 4-1. No. of Sample Firms per Size**



A great part of the participating companies have their business operations in the 'application providers' sector (28%). The second most popular sector of the survey is that of 'content/service providers' (18%), while the less popular sectors of this survey include 'wireless network operators', 'virtual network operators', 'wireless device manufacturers', 'wireless device retailers', 'positioning technology providers', and 'telematics'. Thus, in our sample of firms interrogated, we have basically captured the perspective of application or content/service providers on wireless alliances. Adding to that, since we included three out of the four wireless operators of the Greek market, it is sensible to say that we have managed to capture an overall perspective of the Greek wireless operators market.

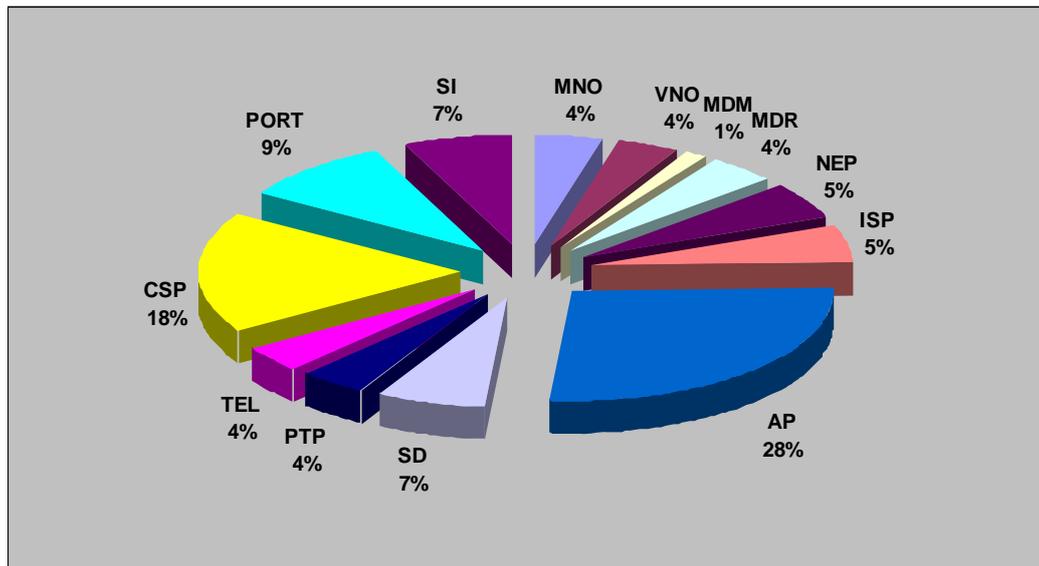


Chart 4-2. Market Sector of Sample Firms

From the partner perspective (Chart 4-3), the most highly represented sectors are that of 'network equipment providers' (17%) and 'application providers' (15%). On the contrary, we had a limited sample of 'telematics', 'portals', 'virtual network operators' and 'wireless device retailers' companies as partners of the investigated wireless alliances.

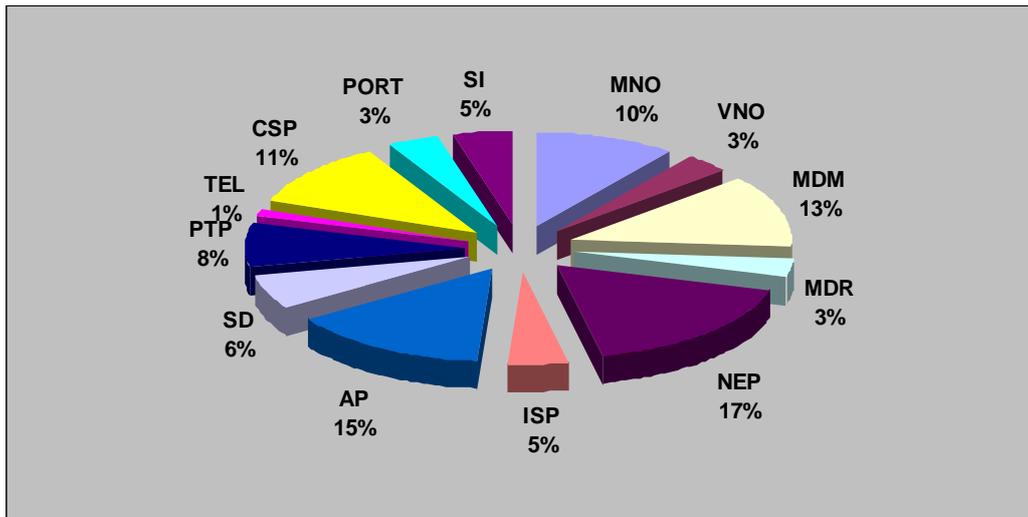
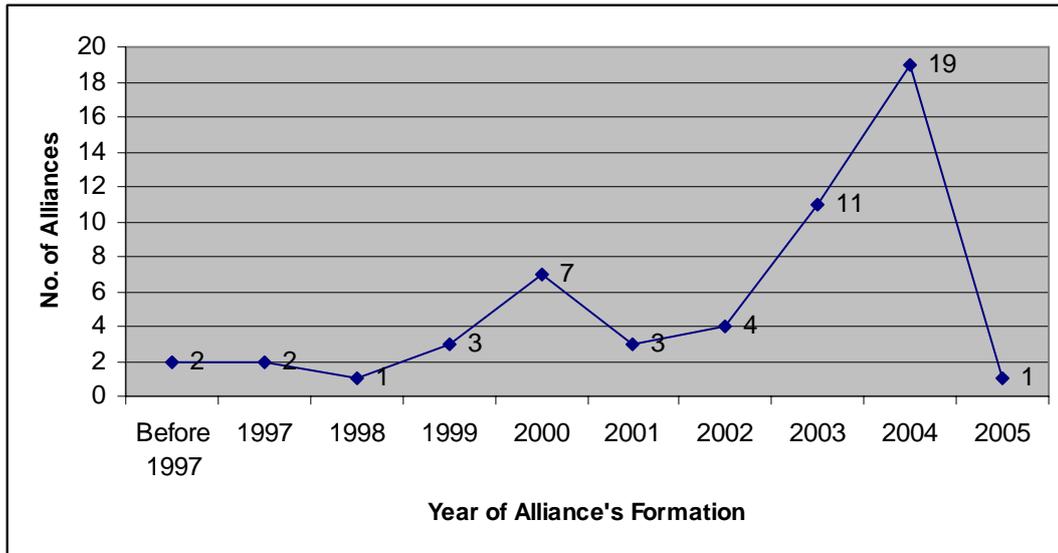


Chart 4-3. Market Sector of Partner-Firms

### 4.3.3. Alliance Characteristics

The survey has investigated the perspectives of strategic managers on 57 alliances in total. However, as already explained, for some alliances (4 in total) we have obtained the perspectives of both partners. As a result, we had eight questionnaires capturing data for four alliances, thus our empirical data concerned 53 discrete alliances in total. In what follows, we present descriptive data on the formation, structure and scope of these alliances.

The survey certifies the recent explosion of inter-firm collaborative agreements as a means towards several Greek companies' goal for wireless market development and exploitation. As shown in Chart 4-4, the great majority (85%) of the investigated wireless alliances have been established within the last five years (from 2000 to date), while the peak years were 2003 and 2004, with over half of the alliances formed at this two-year period. Out of 53 alliances, only five have already been terminated; three in 2005, one in 2003 and one in 2002. The reasons that drove those alliances' termination are outside the scope of this research.



**Chart 4-4. Time Distribution of Alliance Formation Year**

In the previous section, we described the distribution of both respondent firms and their partners along the twelve wireless market sectors of [Table 4-1](#). Further to this information, we wished to analyze the pattern of each alliance in terms of the involved collaborating sectors. Towards this aim, we made a distinction between alliances that bring together partners of diverse sectors, called cross-sector alliances, and alliances that join partners belonging to the same sector, called intra-sector alliances. Taking another perspective, we considered the former aiming at vertical integration, along the wireless value chain/net ([Figure 4-1](#)), and the latter addressing the strategic goal of horizontal integration. [Table 4-7](#) constitutes a classification matrix of the investigated cases across the dominant patterns (collaborating sectors) of both intra- and cross-sector alliances.



**Table 4-7. Dominating Alliance Patterns**

	<b>Alliance Pattern</b>	<b>Quantity</b>	<b>Percentage</b>
<i>Intra-Sector Alliances (Horizontal Integration)</i>	AP & AP	4	45%
	MNO & MNO	2	22%
	NEP & NEP	3	33%
<b>Sub-Total A</b>		<b>9</b>	<b>100</b>
<i>Cross-Sector Alliances (Vertical Integration)</i>	AP/SD/PTP & MNO	8	18.20%
	AP/SD & CSP	7	15.90%
	MNO & CSP	6	13.63%
	ISP & CSP	4	9.10%
	AP/SD & MDM/MDR	5	11.40%
	NEP & SI/CONS	6	13.63%
	MDM & MDR	2	4.50%
	Others	6	13.63%
<b>Sub-Total B</b>		<b>44</b>	<b>100</b>

Table 4-7 makes it evident that this empirical research has focused on cross-sector alliances (83% of the sample), according to the initial investigation goal (see Section 4.1.1). In an attempt to portray the above alliance patterns into the wireless value net (Figure 4-1), we realized that our sample partnerships are mostly developed between firms from the network (i.e. WNOs, NEP) and technology (i.e. APs, SIs) components (8+6) as well as among firms from the network (i.e. WNOs, ISPs) and the content (i.e. CSP) components (6+4). This means that the members of the network components are more liable to alliance formation. This is due to the widely acknowledged dominant position of network operators in the wireless market (Rulke et al., 2003) and their efforts to reinforce this position and thus increase their market share and Average Revenue Per User (ARPU). Nevertheless, a number of alliances are also initiated by or just involve members of the technology components (i.e. APs/SDs, MDMs) with firms belonging to the interface component (i.e. MDRs) (5+2), as well as with providers of content (7). Such alliances usually aim at developing a wireless service solution for network operators.

Since most alliances aim at vertical integration, their collaborating parties are mainly working on bringing together complementary resources, skills, and products in order to



jointly develop a service or technological innovation. This explains why ‘develop new products and services’ is ranked as the first priority in firms’ purposes for alliance formation. Other well-established alliance purposes include ‘join forces to compete dominant players’ and ‘globalize/expand into new markets’, whether this means new geographical areas or new areas of product/service provision.

**Table 4-8. Alliances' Formation Purpose**

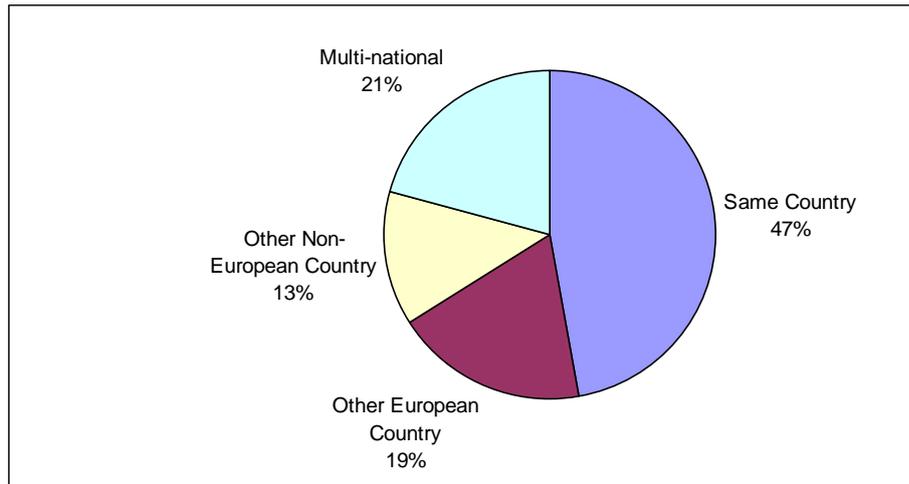
Purpose	Frequency in Alliances
Develop new products/ services	43%
Join forces to compete dominant players	22%
Globalize/ expand into new markets	18%
Obtain new competence	11%
Develop and promote standards	6%

Useful information is also collected on the country-level distance of the examined partners. Country-level variables, which are mostly related to the cultural distance of firms, are also claimed to influence the selection of the governance mode (Kogut, 1988). **Chart 4-5** presents the percentages of local (same country), european (other European country), international (other non-European country) and multi-national<sup>3</sup> alliances of the sample. Over half (68%) of the examined cases involve partners located at Greece, while a large percentage (19%) concerns alliances of European-wide scale.

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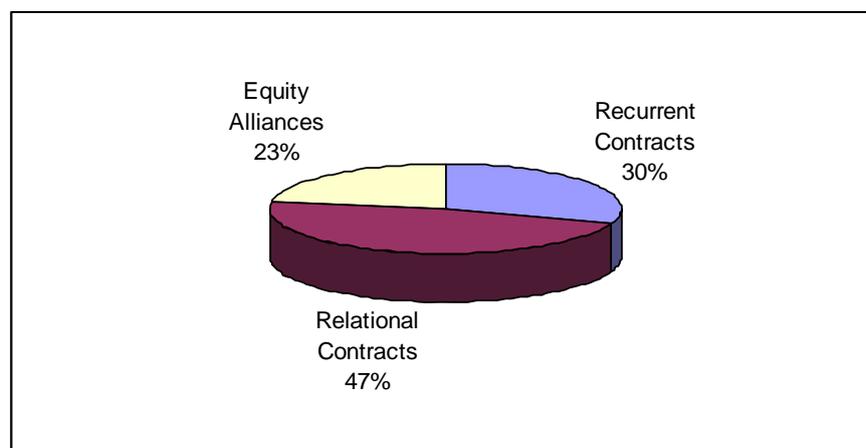
<sup>3</sup> The term ‘international alliances’ is used to denote alliances between partners located in different countries and different continents, while the term ‘multinational alliances’ refers to alliances signed among multinational firms, and thus being valid for all the national branches of the partners.





**Chart 4-5. Geographical Diversity of Partners**

Finally, it is important to examine the distribution of the alliances along the four examined governance modes; recurrent contracts (very low interdependence), relational contracts (low interdependence), minority investment (medium interdependence), and joint venture (high interdependence). As the percentages of the last two groups (minority investment and joint ventures) are rather low, namely 9% and 14% respectively, we coupled them under the category of equity alliances to facilitate analysis of results. This is in accordance with theory that makes a principal distinction between non-equity and equity alliances (Gulati, 1995; Pisano, 1989; Narula and Hagedoorn, 1999). Treating joint ventures and minority equity alliances as a single category can be justified, since “a direct equity investment by one firm into another essentially creates an equity joint venture between one firm's existing shareholders and the new corporate investor” (Gulati, 1995).



**Chart 4-6. Governance Mode of Alliances**



According to Chapter 4-6, almost half of the alliances examined are contract-based agreements of relational nature. That means that the great majority of the respondent firms have signed a contract of indeterminate duration, which involves continuous collaboration for joint development in the wireless market. The remaining alliances are almost equally allocated to the two extreme forms of strategic alliances, namely recurrent contracts, and equity alliances.

#### 4.3.4. Environment Mapping

The final set of descriptive results concern the respondents' perceptions for the environment in which their firm operates, and the environmental conditions under which the alliance was formed. From the very beginning of this research, we focused on investigating, both theoretically and empirically, strategic technology alliances formed within high velocity environments. The prime feature of such environments is the rapid and discontinuous change in demand, competitors, technology and/or regulation (Bourgeois and Eisenhardt, 1988).

We have therefore assumed that the competition intensity and the uncertainty of the wireless market were perceived high by our sample of strategic managers. To test these hypotheses (that competition intensity and environment uncertainty are rated higher than average in our sample), we applied a One Sample t-test. Table 4-9 displays the sample size, mean, standard deviation, and standard error for each of the two parameters; competition intensity and environment uncertainty, while Table 4-10 shows the results of the one-sample t test

**Table 4-9. Descriptive Table of Competition Intensity and Environment Uncertainty**

One-Sample Statistics				
	Sample Size	Mean	Std. Deviation	Std. Error Mean
Environment Uncertainty	57	3.3947	.39660	.05253
Competition Intensity	57	3.5965	.87851	.11636



**Table 4-10. T-Test Statistics Table**

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	99% Confidence Interval of the Difference	
					Lower	Upper
Environment Uncertainty	7.514	56	.000	.39474	.2547	.5348
Competition Intensity	5.126	56	.000	.59649	.2862	.9068

Since their confidence intervals lay entirely above 0.01, one can safely say that both parameters, competition intensity and environment uncertainty, are rated higher than the average value. Thus, the dual hypothesis that our sample alliances are set in an environment perceived as rather competitive and uncertain is supported.

#### 4.4 Summary

This chapter aimed at describing both the requirements for and the nature of the empirical data that was used to test the conceptual model presented in Chapter 3. The first section specified the target population, which involves wireless alliances in the Greek market, the unit of analysis, which is the strategic managers' perspective on a particular alliance of their firm, as well as the theoretically- and statistically-imposed requirements for the nature and size of the sample. The second section described in detail the process that we used to collect our data and argued for the use of specific constructs to measure each of the dependent, independent, and mediating variables of our research. This section is of particular importance since it ends up with a table listing all items (questions) included in our survey questionnaire, which was filled in during the semi-structured interview sessions with the sample firms. The last sections provided some basic information, in terms of descriptive statistics, as well as results of one-sample t-tests, that permits an initial analysis of the empirical data. Further and more sophisticated analyses that permit testing of our research hypotheses, as they were formulated in Chapter 3, are described in the next chapter.



# CHAPTER 5

## DATA ANALYSIS AND RESULTS

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Chapter 5 discusses thoroughly the outcomes of the empirical data statistical analysis and identifies the hypotheses for which the empirical study provides support. Section 5.1 argues for the use of a Structural Equation Modeling technique, as most appropriate for achieving the testing objectives of this research. The next section defines the sample size requirements, as they emerge from the use of SEM, and more specifically from the PLS variance based approach. Sections 5.3, 5.4 and 5.5 are the most important ones, since they describe the tests conducted for testing the conceptual model of Chapter 3. The last section includes testing of the competing models, also defined in Chapter 3, and comparison with the primary one.

### 5.1 Data Analysis Methodology

#### 5.1.1. Structural Equation Modeling Approaches

Research on complex phenomena of the strategic management literature is often featured by variables that are not directly observable, meaning that there are a number of different dimensions that should be measured for providing them with a value, and thus introduce much noise and complexity to the research model. Such data is usually significant source of measurement errors, thus making standard statistical techniques, such as factor analysis, discriminant analysis, or multiple regression analysis, difficult but also inappropriate to apply.

Advances in multivariate analysis have made it possible to simultaneously examine both theory and data with the aid of **Structural Equation Modeling (SEM)** techniques. Such techniques can be thought of as superior to the traditional ones in that they permit: (1) the explicit inclusion of measurement error, and (2) an ability to incorporate abstract and unobservable constructs, named Latent Variables (LVs) (Fornell, 1982). Moreover, Structural Equation Modeling (SEM) enables researchers to model the relationships among multiple independent and dependent constructs simultaneously in a single,

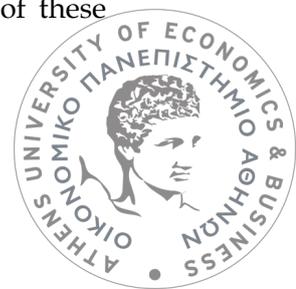


systematic and comprehensive analysis (Hair et al., 1998). The best-known SEM technique is LISREL, following the *covariance-based (CV-SEM) approach* for testing theory (Hulland, 1999). However, the use of covariance-based SEM involves numerous constraints in the form of parametric assumptions (i.e. normal distribution of the observed variables, independent observations), sample size (no less than 200), model complexity (e.g. less than 100 indicators), identification (need for 3 or more indicators per latent variable), and factor indeterminacy (not possible to estimate scores of the latent variables in order to predict the observed indicators) (Chin and Newsted, 1999). Moreover, co-variance based SEM analysis typically requires indicators that are in a *reflective* mode, which means that “indicators are viewed as being influenced or affected by the underlying latent variable” (Chin and Newsted, 1999).

### 5.1.2. The Partial Least Squares (PLS) Method

As an alternative to covariance-based SEM analysis, the *variance or component-based approach* of PLS shifts the orientation from causal model/ theory testing to component-based predictive modeling. A PLS approach is more suitable to predictive applications. According to Jöreskog and Wold (1985), “LISREL is theory-oriented, and emphasizes the transition from exploratory to confirmatory analysis. PLS is primarily intended for causal-predictive analysis in situations of high complexity but low theoretical information.”

Using the iterative estimation technique, PLS provides a general model which encompasses a mix of dependence and multivariate techniques; canonical correlation, redundancy analysis, multiple regression, multivariate analysis of variance, and principal components (Chin and Newsted, 1999). PLS can be a powerful method of analysis because of the minimal demands on measurement scales (i.e. categorical to ratio level indicators can be used in the same model), sample size, and variable distributions (Wold, 1985). Compared to the covariance-based SEM analysis, PLS avoids the problems of inadmissible solutions and factor indeterminacy. It also avoids the problem of factor identification in cases where the model includes indicators not only in *reflective* but in *formative* mode as well. In such situations, “indicators are viewed as causing rather than being caused by the latent variable” (Chin and Newsted, 1999). A typical example of formative indicator is the Socio-Economic Status (SES) construct, which is conceptualized as combination of education, income, and residence. Potential increase in any of these



three measures leads to SES's increase. Conversely, if a person's SES increases, this would not necessarily be accompanied by an increase in all three measures. Thus, the choice of a formative over a reflective measurement structure for a construct depends on the existing causal priority between the indicator and the latent variable. Formative measurement, though potentially applicable to the measurement of individual characteristics, such as SES, is particularly relevant for dealing with organizational and social constructs – that is when the unit of analysis is the firm or the group (Diamantopoulos and Winklhofer, 2001).

The computational efficiency of the PLS algorithm lends itself to estimating large complex models in the order of hundreds of latent variables and thousands of indicators. Second order factors modeled as being caused by first order latent variables cannot be analyzed by SEM techniques such as LISREL. In PLS, second-order factors can be approximated using various approaches. The most well-known, which is also followed in this research, is the approach of repeated indicators, known as the hierarchical component model suggested by Wold (1989). In essence, a second-order factor is directly measured by observed variables for all the first order factors. This procedure works well with equal number of indicators per construct.

Last, but not least, sample size requirements can be quite minimal compared to LISREL. A quite strong rule of thumb suggests that the sample size should be equal to the larger of either ten times the scale with the largest number of formative indicators, or ten times the largest number of structural paths directed at a particular construct in the structural model (Chin and Newsted, 1999). A weak rule of thumb similar to the heuristic for multiple regressions would be to use a multiplier of five instead of ten for the preceding formulae (Chin, 1997; Green, 1991). Minimal recommendations range from 30 to 100 cases (Chin and Newsted, 1999; Gefen et al., 2000). For a more accurate assessment, one should conduct power analysis on the proportion of the model with the largest number of predictors (Chin and Newsted, 1999; Green, 1991). Nevertheless, we can find some extreme examples of using PLS to analyze 27 variables using 2 latent constructs with a data set consisting of 10 cases (Wold, 1989), as well as analyze 18 indicators and 8 latent constructs with a sample of 21 cases (Cool et al., 1989).



Table 5-1 provides a summary of the key differences between PLS and other covariance-based SEM techniques (i.e. LISREL).

Table 5-1. Comparison of PLS and CV-SEM (Chin and Newsted, 1999; Gefen et al., 2000)

Criteria	PLS	CV-SEM (LISREL)
<b>Objective</b>	Predictor-oriented	Parameter-oriented
<b>Approach</b>	Variance-based	Covariance-based
<b>Objective of Variance Analysis</b>	Variance Explanation (high R <sup>2</sup> )	Overall model fit, such as insignificant $\chi^2$ or high AGFI.
<b>Assumed Distribution</b>	Relatively robust to deviations from a multivariate distribution.	Multivariate normal, if estimation is through ML. Deviations are supported with other estimation techniques.
<b>Required Theory Base</b>	Does not necessarily require sound theory base. Supports both exploratory and confirmatory research.	Requires sound theory base. Supports confirmatory research.
<b>Parameter Estimates</b>	Consistent as indicators and sample size increase	Consistent
<b>Epistemic Relationship between construct and items</b>	Can be modeled as either reflective or formative	Typically only with reflective indicators
<b>Model Complexity</b>	Large complexity (e.g. 100 constructs and 1.000 indicators)	Small-to-moderate complexity (e.g. less than 100 indicators)
<b>Sample Size</b>	Power analysis based on the proportion of the model with the largest number of predictors. Minimal recommendations range from 30 to 100 cases.	Ideally based on power analysis of specific model. Minimal recommendations range from 200 to 800.

The reasons for selecting the Partial Least Squares (PLS) method over a covariance-based method (e.g. LISREL) in this research are:

- The objective is prediction,
- The research model is not based on a sound theoretical base; instead it aims at creating a sound governance theory by incorporating different theoretical perspectives,



- The relationships between the latent variables and their indicators are in different modes (i.e. formative and reflective measures),
- There are several second-order factors, which are caused by first order factors and thus can be modeled only using the PLS approach,
- The data conditions relating to normal distribution, independence, and sample size of covariance-based approach are not met.

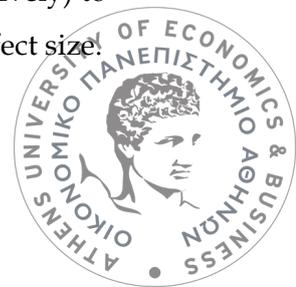
Although PLS estimates both factor loadings and structural estimates simultaneously, a PLS model is analyzed and interpreted in two stages: a) assessment of the measurement model, and b) testing of the structural model. Three general sets of methodological considerations are relevant to the application of PLS in a strategic management research context (Hulland, 1999): (1) assessing the reliability and validity of measures; (2) determining the appropriate nature of the relationships between measures and constructs; and (3) interpreting path coefficients, determining model adequacy, and selecting a final model from the available set of alternatives. Each of these is dealt with in the following sections.

## 5.2 Sample Size Requirements

Before proceeding to the analysis of the measurement and the structural models of this research, it is necessary to argue over the validity of the results given the sample size restrictions, which were set in the previous chapter.

Following Chin and Newsted's (1999) suggestions, we have conducted power analysis on the part of the model with the largest number of predictors in order to determine the minimum number of required cases. To conduct power analyses, choices of values for alpha, power, and effect size were made (Green, 1991):

1. Alpha (Type I error) was set at .05, the traditional level of significance,
2. Power (Type II error) was set at .80, a value proposed by Cohen (1988) as appropriate for a wider range of research areas,
3. Cohen (1988) stresses two indexes of effect size for regression analysis,  $f^2$  and the better known  $R^2$ . The two indexes are directly related:  $f^2 = R^2 / (1 - R^2)$ . Cohen proposed, as a convention,  $R^2$ s of .02, .13, and .26 ( $f^2$  of .02, .15, and .35 respectively) to serve as operational definitions for describing the small, medium and large effect size!



In this research, assuming a large effect size ( $R^2$  equal to or greater than .26) and using 9 predictors (6 first-order and 3 second-order factors) to determine the value of the ultimate dependent variable (GOV), a minimum sample size of **54 cases** is required (Green 1991). Based on the new rule of thumb that Green (1991) proposes, an even smaller sample of **49 cases** is needed for the same assumed value of alpha, power and  $R^2$ . The remaining part of the model, which is used to explain the variance of the EAV dependent variable, has even fewer requirements on sample size, since the number of predictors is decreased from 9 to 8.

### 5.3 Analysis of Measurement Model

The adequacy of the measurement model has been assessed through the following tests: 1) individual item reliabilities, 2) convergent validity of all items expected to measure a construct, and 3) discriminant validity between constructs.

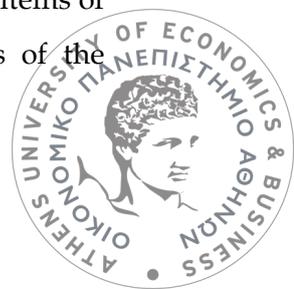
The model includes 18 first-order latent variables. The great majority of them are measured through a reflective variable model. However, three of them, Governance (GOV), Size (SIZE) and Social Expansion (EXPANSION), are handled as observed variables (1 item), while Competitive Relationship (COMPT\_REL) is measured through a composite latent (formative) variable model. Nevertheless, traditionally used methods for assessing construct reliability and validity are not appropriate for formative constructs, where the direction of causality is posited to flow from the measures to the construct (Jarvis et al., 2003; Diamantopoulos and Winklhofer, 2001). Hence, Section 5.3.1 concerns solely the reflective-mode latent variables of this research.

#### 5.3.1. Reliability and Validity of Reflective-Mode Latent Variables

##### Individual Item Reliabilities

To evaluate the reliability of individual items, we inspected the loadings of all measures on their corresponding constructs. In all cases, we maintained a high degree of individual item reliability by checking for factor loadings greater than .50, and in most cases greater than .70, as recommended by Hulland (1999).

An examination of the initial measurement model revealed that out of the 72 total items of reflective latent variables, 19 items had loadings less than .50; two (2) items of the



VERT\_INT construct, one (1) item of the LEARN construct, three (3) items of the MARK\_POS construct, three (3) items of the RES\_POS construct, two (2) items of the OPER\_COMP construct, two (2) items of the STRAT\_ORIENT construct, six (6) items of the ENV\_UNC construct. From the remaining 53 items involved in reflective-mode models, 23 had loadings less than .7, the criterion for satisfactory indicator reliability proposed by Fornell and Larcker (1981), but greater than .50, the less demanding standard posed by Falk and Miller (1992). These were finally retained along with the remaining 30 items that had loadings greater than .70.

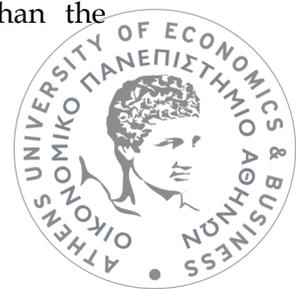
After dropping the 19 unreliable items, the new measurement model was quite improved, and thus was considered sound for the purposes of this research.

### **Convergent Validity**

When multiple measures are used for an individual construct, the researcher should be concerned not only with individual measurement item reliability, but also with the extent to which the measures demonstrate internal consistency. Traditionally, researchers using PLS have generally reported two measures of internal consistency (Hulland, 1999): Cronbach's alpha, and the composite reliability measure developed by Fornell and Larcker (1981).

In our research, we tested for internal consistency using the composite reliability measure recommended by Fornell and Larcker (1981) that is similar to Cronbach's alpha, but preferred in this context, because it estimates consistency on the basis of actual construct loadings. The internal consistency values for all the reflective constructs of our model exceeded the .70 guideline suggested by Nunnally (1978).

Establishing convergent validity requires that the Average Variance Extracted (AVE) - that is the average indicators' variance explained by the assigned latent construct - should be greater than .50 (Fornell and Larcker, 1981). Some of the reflective constructs had AVE less than .50. These were RES\_POS, MARK\_POS, ENV\_UNC, RES\_COMP, and ECONOMIES. After deleting items (5 in total) of these constructs with factor loadings greater than .50 but less than .60, the values for the AVE measure of all reflective constructs were above .50, thus establishing convergent validity. The only exception stood for the RES\_COMP construct, the AVE of which was marginally lower than the



established .50 cut-off point (.49). All items of this construct had item reliabilities greater than .60, and thus were not dropped. Table 5-2 contains the PLS parameter estimates for the improved measurement model.

**Table 5-2. Final Measurement Model (Reflective Indicators)**

Construct & Items	Item Loadings	Composite Reliability	AVE	Root AVE
<i>Governance (GOV)</i>		1.000	1.000	1.000
GOV1	1.000			
<i>Performance Position (PERF_POS)</i>		.889	.667	.817
PERF_POS1	.8385			
PERF_POS2	.7748			
PERF_POS3	.7575			
PERF_POS4	.8902			
<i>Market Position (MARK_POS)</i>		.779	.468	.684
MARK_POS2	.6842			
MARK_POS3	.6723			
MARK_POS5	.7274			
MARK_POS7	.6517			
<i>Resource Position (RES_POS)</i>		.840	.513	.716
RES_POS1	.7973			
RES_POS3	.7663			
RES_POS4	.6508			
RES_POS7	.6420			
RES_POS9	.7126			
<i>Strategic Orientation (STRAT_ORIENT)</i>		.777	.637	.798
STRAT_OR2	.7328			
STRAT_OR4	.8584			
<i>Size (SIZE)</i>		1.000	1.000	1.000
SIZE1	1.000			
<i>Competition Intensity (COMPT_INT)</i>		.875	.638	.799
COMPT_INT1	.7640			
COMPT_INT2	.8903			
COMPT_INT3	.7588			
COMPT_INT4	.7753			
<i>Environment Uncertainty (ENV UNC)</i>		.801	.573	.757



ENV_UNC4	.7135		
ENV_UNC8	.7298		
ENV_UNC9	.8235		
<i>Alliance History (ALL_HIST)</i>		.916	.844
PRE_DUR	.8932		
PRE_GOV	.9439		
<i>Cultural Compatibility (CULT_COMP)</i>		.801	.582
CULT_COMP1	.8071		
CULT_COMP2	.8869		
CULT_COMP3	.5555		
<i>Operational Compatibility (OPER_COMP)</i>		1.000	1.000
OPER_COMP1	1.000		
<i>Resource Complementarity (RES_COMP)</i>		.742	.490
RES_COMP1	.6688		
RES_COMP2	.6859		
RES_COMP3	.7420		
<i>Risk Reduction (RISK_RED)</i>		.868	.686
RISK_RED1	.8799		
RISK_RED2	.8027		
RISK_RED3	.8002		
<i>Learning (LEARN)</i>		.780	.545
LEARN2	.7168		
LEARN3	.8562		
LEARN4	.6236		
<i>Vertical Integration (VERT_INT)</i>		.776	.538
VERT_INT1	.6562		
VERT_INT2	.8354		
VERT_INT5	.6973		
<i>Co-option (CO-OPTION)</i>		.851	.741
CO_OPTION1	.8718		
CO_OPTION2	.8494		
<i>Economies of Scale (ECONOMIES)</i>		1.000	1.000
ECONOMIES1	1.000		
<i>Social Expansion (EXPANSION)</i>		1.000	1.000
EXPANSION1	1.000		
<i>Complementarity (COMPLEM)</i>		.746	.601



COMPLEM1	.8874
COMPLEM2	.6439

---

### **Discriminant Validity**

The traditional methodological complement to convergent validity is discriminant validity, which represents the extent to which measures of a given construct differ from measures of other constructs in the same model. In the PLS context, one criterion for adequate discriminant validity is that a construct should share more variance with its measures than it shares with other constructs in a given model (i.e. the squared correlation between constructs). This can be demonstrated in a correlation matrix which includes the correlations between different constructs in the lower left off-diagonal elements of the matrix, and the square roots of the average variance extracted values calculated for each of the construct along the diagonal. We tested for discriminant validity of all latent constructs with reflective indicators. Nevertheless, the square root of the AVE for these constructs was examined against correlations with all latent constructs (including formative and observed ones) of this research. As it is evident in [Table 5-3](#), the square root of all constructs' Average Variance Extracted (diagonal elements of the correlation matrix) is greater than all corresponding correlations (off-diagonal elements), providing clear evidence of discriminant validity (Fornell and Larcker, 1981).

A second measure of discriminate validity in PLS modeling can be evaluated by examining the outer residual covariance matrix, and more specifically the covariances between residuals of the reflective indicators of the latent constructs. Falk and Miller (1992) suggest that discrimination between constructs is questionable if several residual covariances are greater than .20. In this model, all interblock residuals were less than .19 and most were close to zero. An exception stood for the covariance between one item of the LEARN construct and one item of the CULT\_COMP construct, which exceeded .20 (.266). Thus, the Falk and Miller's (1992) test also suggests quite good discriminant validity.



Table 5-3. Correlation Matrices of Reflective-Mode Constructs

Constructs	PERF_ POS	MARK_ POS	RES_ POS	STRAT_ ORIENT	COMPT _INT	ENV_ UNC	ALL_ HIST
PERF_POS	<b>.817</b>						
MARK_POS	.598	<b>.684</b>					
RES_POS	.721	.579	<b>.716</b>				
STRAT_ORIENT	.532	.550	.446	<b>.798</b>			
COMPT_INT	-.008	.080	.054	.134	<b>.799</b>		
ENV_UNC	.507	.291	.250	.435	.128	<b>.757</b>	
ALL_HISTORY	.056	-.093	.107	.011	.043	.075	<b>.919</b>
CULT_COMP	.106	.232	.117	.199	-.005	.216	.036
RES_COMP	.106	.037	.069	.115	-.012	.171	.022
RISK_RED	.094	.083	.288	.165	.206	.170	.316
LEARN	.415	.288	.388	.380	.172	.433	.055
VERT_INT	.237	.080	.113	.323	.240	.410	-.006
CO-OPTION	.353	.277	.430	.351	.396	.367	.010
ECONOMIES	.260	.212	.191	.325	.048	.465	.075
COMPLEM	.133	.048	.149	.013	.095	.079	.119
EXPANSION	.402	.284	.389	.249	.128	.454	.150
COMPT_REL	-.396	-.196	-.316	-.273	.055	-.478	-.229
OPER_COMP	.062	.111	.118	-.185	-.055	.245	-.150
GOV	.094	.160	.058	.259	-.009	.135	.383
SIZE	.344	.218	.318	.255	.169	.180	.202

Constructs	CULT_ COMP	RES_ COMP	RISK_ RED	LEARN	VERT_ INT	CO- OPTION	COMP LEM
CULT_COMP	<b>.763</b>						
RES_COMP	.330	<b>.700</b>					
RISK_RED	.173	.112	<b>.828</b>				
LEARN	.282	.300	.485	<b>.738</b>			
VERT_INT	.246	.322	.345	.646	<b>.733</b>		
CO-OPTION	.233	.393	.353	.554	.535	<b>.861</b>	
COMPLEM	-.158	.225	.242	.344	.300	.446	<b>.775</b>
ECONOMIES	.186	.216	.509	.441	.397	.305	.097
EXPANSION	.206	.168	.342	.717	.254	.270	.111



Constructs	CULT_ COMP	RES_ COMP	RISK_ RED	LEARN	VERT_ INT	CO- OPTION	COMP LEM
STRAT_ORIENT	.199	.115	.165	.380	.323	.351	.013
COMPT_REL	-.166	-.289	-.457	-.535	-.379	-.455	-.304
OPER_COMP	.388	.158	.025	.154	.075	.201	-.032
GOV	.212	.095	.122	.006	-.008	.078	.117
SIZE	-.055	.042	.158	.149	-.034	.272	.268

### 5.3.2. Reliability and Validity of Formative-Mode Latent Variables

While reliability of reflective constructs is measured by assessing items' loadings, reliability of constructs using formative measures is assessed using their weights instead of loadings (Mathieson et al., 2001). The weights of the MARK\_OVER and LOC\_OVER, the two items of the COMPT\_REL formative latent variable, are 0.8961 and 0.2580, respectively. Both items are statistical significant; MARK\_OVER at 0.01 level and LOC\_OVER at 0.05 level. Thus, the COMPT\_REL latent variable is considered reliable.

As already mentioned, the very nature of formative measurement renders a reliability test from an internal consistency perspective inappropriate for assessing the suitability of indicators. Therefore, "the best we can do ... is to examine how well the index (formative-mode construct) relates to measures of other variables" (Bagozzi, 1994). To this end, Diamantopoulos and Winklhofer (2001) specify a number of tests aiming at examining the 'external validity' of formative indicators. The test that we have employed hereinafter involves linking the index to other constructs with which it would be expected to be linked and then estimate the strength of this relationship. Validation along these lines requires that the construct to which the index is linked is measured by reflective indicators and that a theoretical relationship can be postulated to exist between the two constructs.

In our case, the COMPT\_REL index was linked with the GOV construct, the dependent variable, as well as with EAV, the mediating variable. To assure external validity, we expected that path coefficients, indicated by the parameter 'b' of the respective equations  $[Y = a + b \cdot x]$ , from the COMPT\_REL index to GOV and EAV will be greater than zero and statistically significant. An initial execution of the empirical model (based on the improved measurement model that resulted from the item reliabilities and the convergent



validity tests) showed that the COMPT\_REL construct is related to GOV with a path loading of (-0.319), which is statistically significant at the 0.05 level, and to EAV with a path of (-0.461), which is statistically significant at the 0.01 level

## 5.4 Validity of Second-Order Factors

The full structural model, illustrated in Figure 5-1, includes three second order factor sub-models; one for the competitive position (COMPT\_POS) latent construct, one for the expected alliance value (EAV) construct, and one for the inter-firm compatibility (COMPATIBILITY) construct. These second order factors are not directly connected to any measured items, but are connected through a reflective or formative relationship to a number of first order latent constructs, which are considered as their indicators.

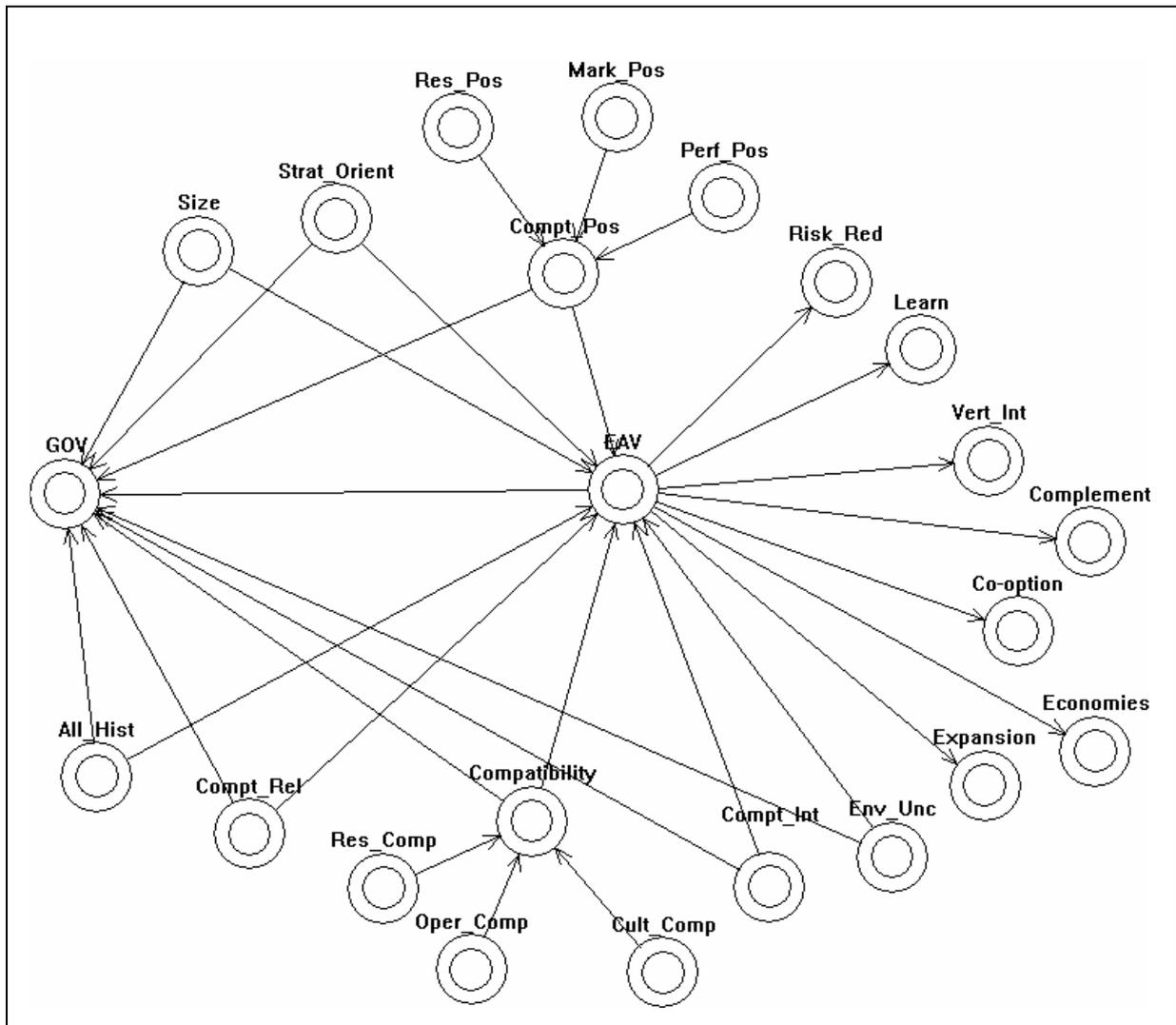


Figure 5-1. The Full Structural Model



The test of validity for a second order factor model follows the same process to examine the validity of first order factors (Chin, 1998). The first step is to apply the formative/reflective question for the latent constructs in this higher abstraction level. In essence, one asks whether the first order factors actually tap into the same underlying second order latent variable (reflective) or are factors that form the latent variable (formative).

In our research, competitive position (COMPT\_POS), which actually stands for sources of competitive advantage, is by definition formed by factors relating to resources that a firm possesses, its current market position, as well as its performance (Day et al., 1988). Therefore, the competitive position latent variable is modeled as a second order factor sub-model with three (3) formative indicators; the resource position (RES\_POS), the market position (MARK\_POS), and the performance position (PERF\_POS).

In our conceptualization of the inter-firm compatibility (COMPATIBILITY) construct, we draw on Parkhe's (1991) definition of inter-firm compatibility. He identifies two different types of inter-firm diversity, the opposite of partners' compatibility; Type I diversity (complementary resources and capability profiles) and Type II diversity, which is further decomposed into operational and cultural compatibility. Based on this definition, we have introduced the inter-firm compatibility latent construct as a second order factor sub-model that is caused by the following three indicators under a formative-mode relationship; resource complementarity, operational compatibility, and cultural compatibility.

The expected alliance value (EAV) construct has been conceptualized to include 20 principal strategic contributions of alliances. Using Contractor's (1986) classification, these have been grouped into the following seven (7) first order factors: risk reduction, economies of scale, complementary technologies and skills, co-option, expansion, vertical integration, and learning. Since, these groups work as potential classifiers and not as distinct well-established categories, they may be greatly correlated. Thus, the seven (7) first order factors have been modeled as reflective rather than formative indicators of the expected alliance value second-order sub-model.



As explained in the previous section, traditional tests of validity and reliability are not appropriate for formative indicators. Thus, reliability assessments, such as Cronbach's alpha or composite reliability, are not applicable for testing reliability of the two formative-mode second-order factors. Instead, the weight of each first-order factor is used to assess how much it contributes to the higher level latent construct. Thus, the reliability of the two second-order factor models (COMPT\_POS and COMPATIBILITY) is assessed using the weights of their first-order factors, while the reliability of the reflective factor EAV is examined by testing the loadings of its first order factors. The first column of Table 5-4 lists the first order factors' weights/loadings of each second-order model, while the second column indicates their significance based on the T-statistic values extracted from the bootstrap process.

**Table 5-4. Contribution of the (Formative) Second-Order Factor Sub-Models**

Second-Order & their First-Order Factors	First-Order Factor Weights/Loadings	T- Values
<i>Competitive Position (COMPT_POS)</i>		
RES_POS	.439	9.9780
MARK_POS	.230	2.8301
PERF_POS	.462	8.8783
<i>Inter-firm Compatibility (COMPATIBILITY)</i>		
RES_COMP	.441	2.6927
OPER_COMP	.231	3.0581
CULT_COMP	.645	6.4324
<i>Expected Alliance Value (EAV)</i>		
RISK_RED	.756	9.3937
LEARN	.842	17.4784
VERT_INT	.729	6.0077
COMPLEM	.389	2.8907
CO-OPTION	.729	8.4845
ECONOMIES	.670	5.9268
EXPANSION	.598	5.8397



According to **Table 5-4**, the weights for the first order factors of COMP\_POS and COMPATIBILITY are all statistically significant. Especially for the reflective first order factors, we tested the convergent validity of the EAV second-order factor requiring for the seven first-factors to have loadings of 0.70 or greater (Chin, 1998). Besides the COMPLEM first-order factor, which had a loading much lower than 0.7 - even lower than the weaker threshold of 0.5 - the remaining reflective first order factors had loadings either greater than 0.50 but lower than 0.70 (EXPANSION) or marginally equal to 0.70 (ECONOMIES) or greater than 0.70 (RISK\_RED, LEARN, VERT\_INT, CO\_OPTION). Thus, while the COMPLEM first order factor was finally excluded from the structural model, the EXPANSION and ECONOMIES factors with loadings lower than 0.70 but greater than 0.50 were finally retained, since their T-value rated them of high statistical significance.

Another requirement to test convergent validity is for the number of first order factors to be four or greater. Three are considered as statistically adequate but represent a just identified model (Chin, 1998). Chin (1998) does not clarify if this requirement stands for both formative- and reflective-mode second-order factors. Nevertheless, in our case, the two formative-mode second order factors have three first order factors, while the reflective-mode EAV model has seven first order factors, much greater than the required number.

## 5.5 Analysis of the Structural Model

### 5.5.1. Path Model

**Figure 5-2** illustrates the final structural model including path coefficients for all latent constructs.



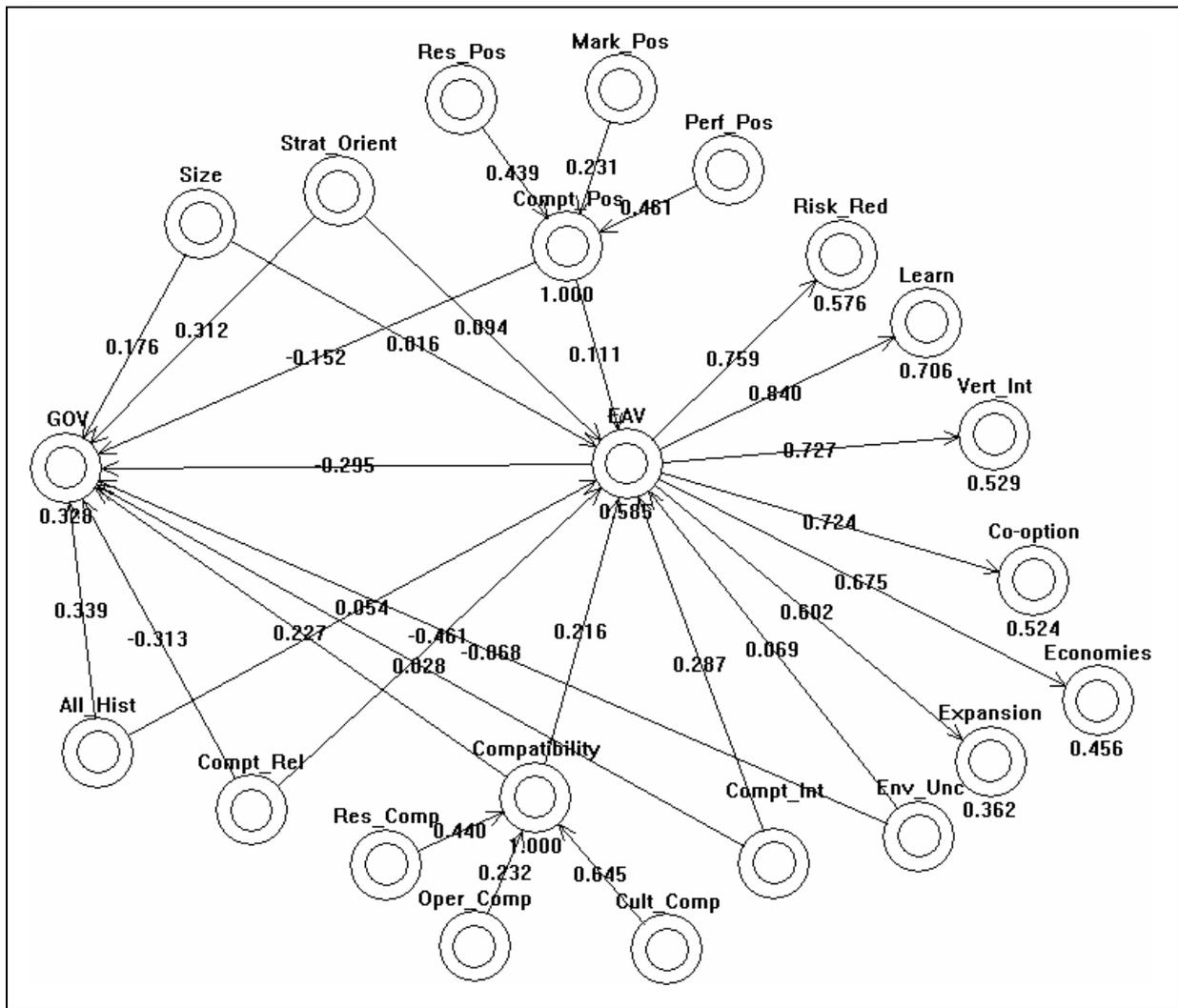


Figure 5-2. Structural Model: Path Coefficients

In Table 5-5, we report the beta coefficients and t-values for the model, along with the  $R^2$  for each endogenous construct, as indicated by the PLS analysis. The ‘soft’ assumptions about distributions employed in PLS modeling preclude traditional parametric methods of significance testing (e.g. chi-square analysis). Instead, we have employed the bootstrapping method (i.e. sampling with replacement method) to ascertain the stability and significance of the parameter estimates. The t-values of Table 5-5 are calculated on the basis of 500 bootstrapping runs. The Variance Explained for the two endogenous constructs, GOV and EAV, is .328 and .585 respectively. Both measures imply a large effect size ( $R^2 > .26$ ).



**Table 5-5. Structural Model Estimates: Beta Weights and T-Values**

Dependent Var Independent Vars	GOV	EAV
SIZE	.176 (1.2802)*	.016 (0.1529)
STRAT_ORIENT	.312 (2.5798)***	.094 (0.7439)
COMPT_POS	-.152 (1.0188)	.111 (0.9813)
ENV_UNC	-.068 (0.4136)	.069 (0.5151)
COMPT_INT	.028 (0.1239)	.287 (1.9628)**
COMPATIBILITY	.227 (1.7937)**	.216 (2.1652)**
COMPT_REL	-.313 (1.6828)**	-.461 (3.2319)***
ALL_HISTORY	.339 (2.9302)***	.054 (0.4726)
EAV	-.295 (1.3020)*	-
R <sup>2</sup>	.328	.585
* p<0.10, ** p<0.05, *** p<0.01		

### 5.5.2. Test of Hypotheses

#### Direct Effects

Out of the eight hypothesized predictors of the Expected Alliance Value (EAV) latent variable, three are statistically significant; Competition Intensity (COMPT\_INT), Inter-firm compatibility (COMPATIBILITY) and Competitive Relationship (COMPT\_REL), quoted in an order of increasing t-value. Thus, hypotheses H5b, H7a, and H7b are accepted, hypotheses H6a and H6b are rejected, and hypotheses H5a, H6c, and H7c have proved statistical non-significant.

The above analysis indicates that the expectations of strategic managers for the value that their firm will capture from an alliance are directly influenced by their perceptions for both the environment competition in which the firm operates as well as the degree of partners' compatibility. However, these expectations are not affected by internal environment factors. Specifically, the Expected Alliance Value, a concept introduced in Chapters 2 and 3 and operationalized in Chapter 4, is increasing as the degree of the



perceived competition intensity and the degree of the overall (resource, operational and cultural) partners' compatibility grows. However, this value decreases as the perceived degree of competition that exists between the collaborating parties increases.

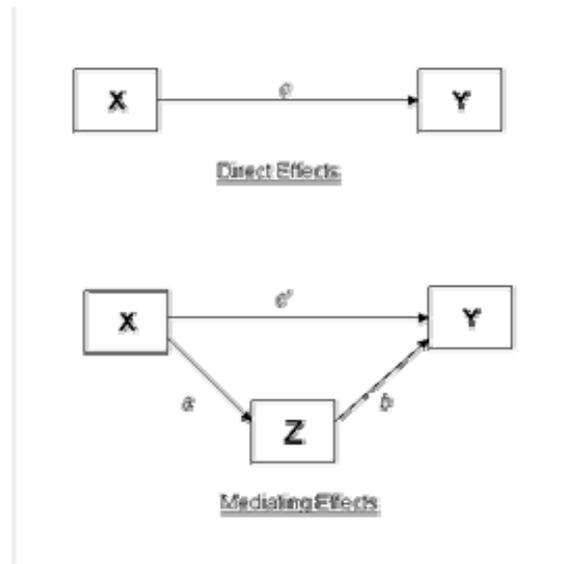
Out of the nine hypothesized predictors of the Governance (GOV) ultimate dependent variable, six are statistically significant; Expected Alliance Value (EAV), Firm Size (SIZE), Competitive Relationship (COMPT\_REL), Inter-firm Compatibility (COMPATIBILITY), Strategic Orientation (STRAT\_ORIENT), and Alliance History (ALL\_HISTORY), presented in an order of increasing t-value. Thus, hypotheses H2a, H2c, H3a, H3c and H4 are accepted, hypotheses H1b, H2b, and H3b are rejected, and hypothesis H1a has proved non-significant.

Thus, support is found that the governance decision is directly and positively affected by two firm characteristics; size, and strategic orientation, but is not significantly affected by any environment feature. This means that strategic managers drive their firms towards more quasi-hierarchy (equity-based) alliances, when their firms are large-sized and the goals of differentiation and integration become of higher importance for their firm strategic mission. Also, such forms of alliances are preferred as partners' historical relationship gets longer, their compatibility in terms of resource complementarity, cultural and operational compatibility rises, and the degree of the current competition between the two partners is low.

### **Mediating Effects**

We tested the extent to which the Expected Alliance Value (EAV) mediates the relationships between the prime predictors of the governance decision based on guidelines of Hoyle and Kenny (1999). According to them, statistical evidence of mediation between the independent variable X and the dependent outcome Y via the mediator Z requires the following (Figure 5-3): (1) evidence of a causal influence of X on Y, reflected statistically as a nonzero value for the direct path coefficient  $c$ ; and (2) a significant indirect effect of X on Y, reflected statistically as a nonzero value for the indirect path  $ab$ , indicative of a decline in the direct effect of X on Y when the mediator is accounted for. If  $ab$  is significant but  $c'$  remains significant, then there is evidence of both direct and indirect effects of X on Y and, therefore, Z only partially mediates the effect. If  $ab$  is significant and  $c'$  is not, then Z fully mediates the effect of X on Y.





**Figure 5-3. Mediation Effects**

The significance of all indirect effects in our model was calculated based on Sobel's (1982) formula. Thus, the standard error of indirect effects ( $ab$ ) was computed from the following equation:  $SE_{ab} = \sqrt{S_a^2 * b^2 + S_b^2 * a^2}$ . Then, the t-value is the ratio of the indirect path coefficient to the respective SE value ( $t\text{-value} = ab / SE_{ab}$ ). After following this computation procedure for all possible indirect paths, we concluded that none of them are statistically significant. The indirect effects of each exogenous construct on the GOV construct, as well as the statistical significance of these effects are presented in [Table 5-6](#).

### Total Effects

The total impact of an exogenous construct on an endogenous construct is the sum of its direct and indirect (mediating) effects. The last column of [Table 5-6](#) lists the total effects of the various constructs.

**Table 5-6. Indirect and Total Effects on the Dependent Variable**

Independent Vars	Indirect Effects	SE	T-Value	Total Effects (Direct + Indirect)
SIZE	-.0047	.0312	.1513	.171
STRAT_ORIENT	-.0277	.0429	.6457	.284
COMPT_POS	-.0327	.0418	.7823	-.185
ENV_UNC	-.0204	.0425	.4800	-.088
COMPT_INT	-.0847	.0785	1.0790	-.057
COMPATIBILITY	-.0637	.0571	1.1159	.163
COMPT_REL	.1360	.1126	1.2080	-.177
ALL_HISTORY	-.0159	.0358	.4450	.323

An important observation is that none of the significant relationships commented on in the direct effects section changes in sign. The only change appears in the effects of the COMPT\_INT construct, which are positive when direct but negative when total effects are computed. Nevertheless, both direct and indirect effects are non-significant, since this change in sign is not considered worthy of further analysis. For the remaining constructs, while some effects change in absolute size, the established relationships among the constructs still hold, suggesting that indirect effects are in general less important than the direct effects.

However, some interesting changes in magnitude are to be noted. On the one hand, the total effects of all the statistically significant predictors of the governance level (size, alliance history, strategic orientation, inter-firm compatibility and competitive relationship) are lower than the direct effects. This is due to the change of sign between direct and indirect effects. After all, when total instead than direct only effects are taken into consideration, the statistically significant latent constructs may be decreased, since only two (alliance history and strategic orientation) seem to have a strong total effect (>.20). On the other hand, the total effects of non-significant (based on Table 5-5) predictors are greater than their direct effects. This is result of having indirect effects with the same sign. Nevertheless, these indirect effects are negligible and thus do not manage to increase the total effect enough, so that the corresponding factors may be commented as meaningful determinants of the governance decision.



The following table presents the total set of research hypotheses, as formulated in Chapter 3, and indicates the sub-set that is supported by the analysis made on the empirical data. Totally, eight hypotheses have been accepted, eight hypotheses relate to statistically non-significant factors, and one hypothesis has been rejected.

**Table 5-7. Test Results of Research Hypotheses**

ID	Research Hypotheses	Accepted (A) Rejected (R) Non-signif. (n.s.)
H1a.	<i>The greater the environment uncertainty, the more quasi-market governance modes will be preferred for the alliance.</i>	n.s.
H1b.	<i>The higher the competition intensity, the more quasi-market governance modes will be preferred for the alliance.</i>	n.s.
H2a.	<i>The larger the firm size, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	<b>A</b>
H2b.	<i>The stronger the firm competitive position, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	n.s.
H2c.	<i>The higher importance is attributed to the growth strategies of diversification and integration, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	<b>A</b>
H3a.	<i>The greater the partner compatibility (resource complementarity, cultural and operational compatibility), the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	<b>A</b>
H3b.	<i>The more intense the partner competitive relationship, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	R
H3c.	<i>The longer and the more quasi-hierarchy the prior ties of partners, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>	<b>A</b>
H4.	<i>Under conditions of uncertainty, the expected alliance value is positively related to preference for quasi-market alliance governance modes.</i>	<b>A</b>
H5a.	<i>Perceived environment uncertainty is positively associated with managers' expectations for the alliance value.</i>	n.s.
H5b.	<i>Perceived competition intensity is positively associated with managers' expectations for the alliance value.</i>	<b>A</b>
H6a.	<i>Firm size is negatively associated with managers' expectations for the alliance value.</i>	n.s.



H6b.	<i>Firm competitive position is negatively associated with managers' expectations for the alliance value.</i>	n.s.
H6c.	<i>Firm strategic orientation towards diversification and integration is positively associated with managers' expectations for the alliance value.</i>	n.s.
H7a.	<i>Partner compatibility (resource complementarity, operational and social compatibility) is positively associated with managers' expectations for the alliance value.</i>	<b>A</b>
H7b.	<i>Partner competitive relationship is negatively associated with managers' expectations for the alliance value.</i>	<b>A</b>
H7c.	<i>Alliance history is positively associated with managers' expectations for the alliance value.</i>	n.s.

## 5.6 Analysis of Competing Nested Models

### Direct Model

The above discussion of mediating effects has made it apparent that the expected alliance value does not operate as mediator in the dependence relationship of the remaining eight predictors with the dependent variable GOV. To this end, it would be of interest to test alternative models in which the expected alliance value is conceptualized as direct predictor rather than mediator in the research model.

To further test the relative importance of several factors regarding the firm, the external environment, and the partners' relationship on the governance decision, we followed the procedure of Chin and Gopal (1995) and conceptualized the concept of expected alliance value as "a multidimensional entity of a higher second order attitude" using the molar and molecular approaches.

### Molar Model

The molar model represents a superordinate construct which connects the expected alliance value items with other constructs in the model (i.e. governance) (Chin and Gopal, 1995). In this case, the expected alliance value is conceptualized as an emergent construct that is formed from a set of first order factors. Due to the formative relationship of the first order factors with the superordinate construct, no attempt is made to examine their interdependencies. The EXPANSION first order factor is excluded, since its weight is too



low (0.057), and its t-value (1.3589) proves its non-significance to the model. Figure 5-4 illustrates the expected alliance value as a molar attitude in the direct model.

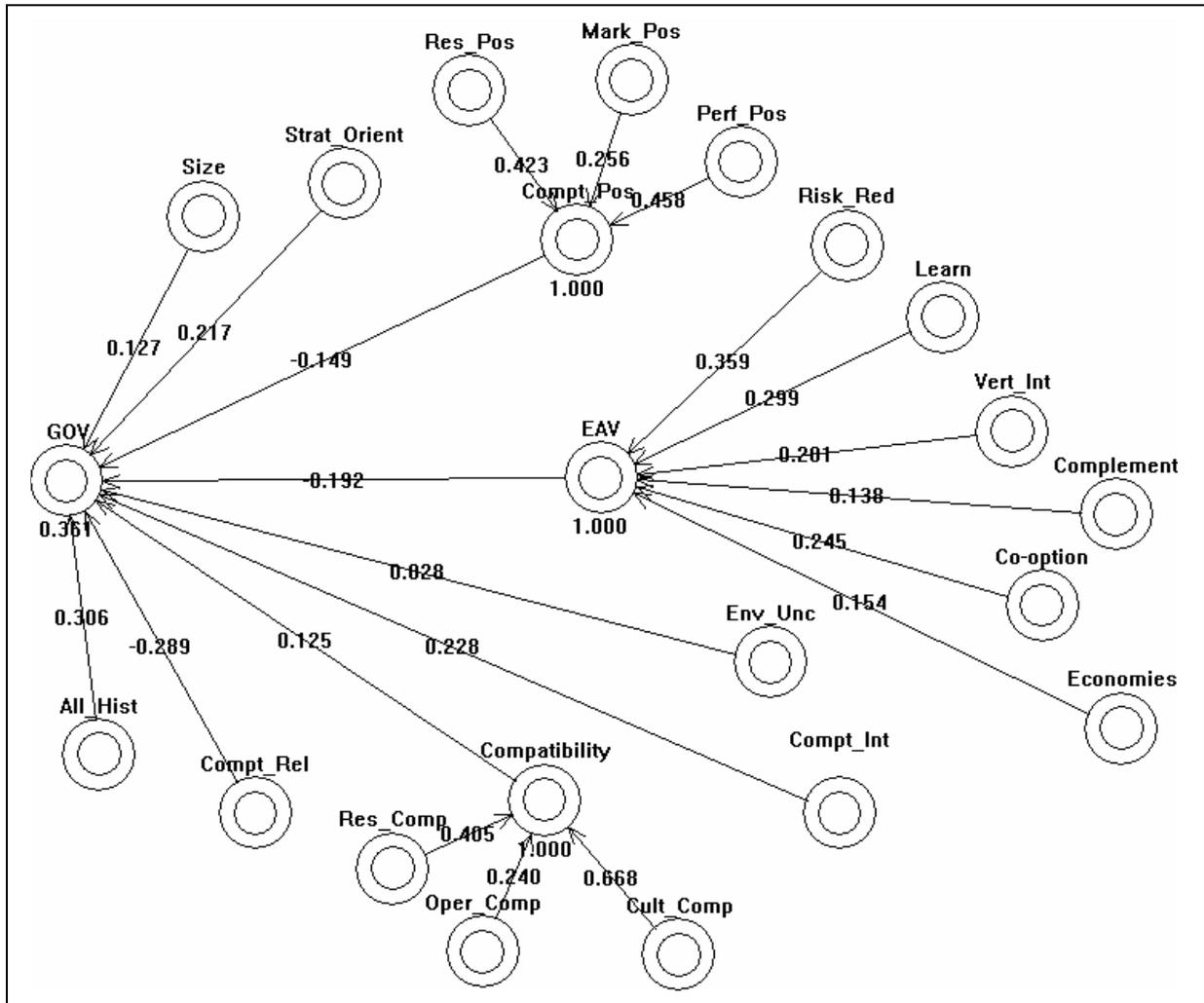


Figure 5-4. Molar Model

**Molecular Model**

In the molecular approach, each first order factor represents a separate dimension which reflects an existing overall attitude (Chin and Gopal, 1995). Compared to the molar approach, the expected alliance value construct, rather than being constructed from the seven factors, is hypothesized to be an overall latent construct that is indicated by these first-order factors. Figure 5-5 illustrates the expected alliance value as a molecular attitude in the direct model. In the molecular model, we have applied the test of validity in reflective second-order factors (see Section 5.4), and thus have excluded the EXPANSION



and the COMPLEM first-order factors that have loadings much lower than the cut-off value of 0.70 (Chin, 1998).

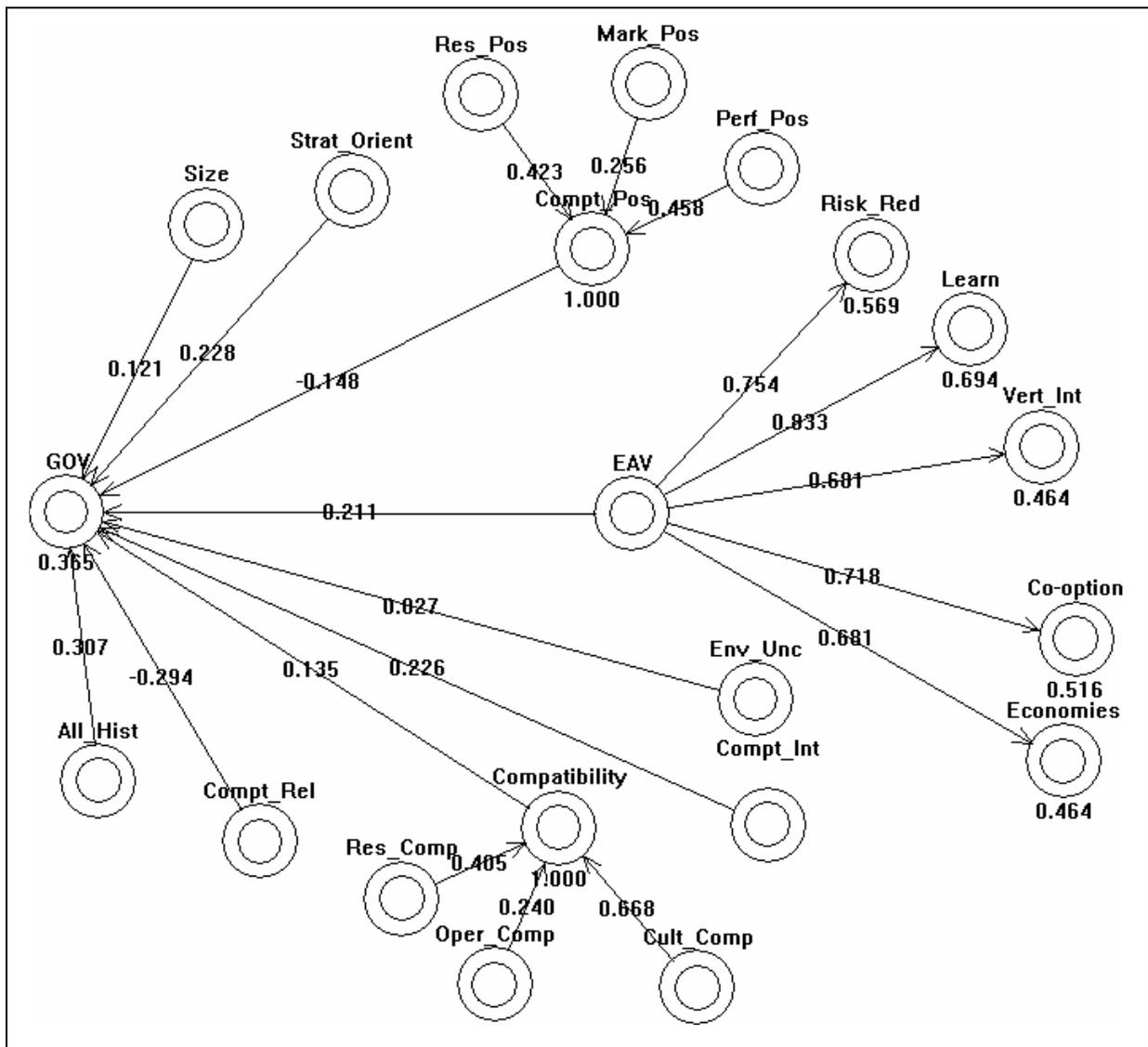
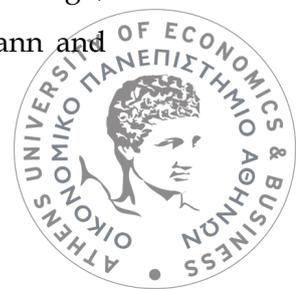


Figure 5-5. Molecular Model

### Semi-Mediation Model

An alternative nested model is one including all the previous direct relationships as well as mediating relationships only for the three alliance-related factors; alliance history, competitive relationship, and inter-firm compatibility. The reason for selecting this set of exogenous constructs, rather than any of the remaining firm-related or environment-related constructs, is that these features are related with the decision over the partner selection, which traditionally proceeds and provides input to the phase of alliance design, when the decision over the appropriate governance structure is made (Hoffmann and



Schlosser, 2001). Although it is quite possible that partner selection decisions are based on some of the same firm and environment features that we have identified as antecedents of the governance preference, we are forced to ignore such indirect effects in order to render the problem analytically and empirically tractable.

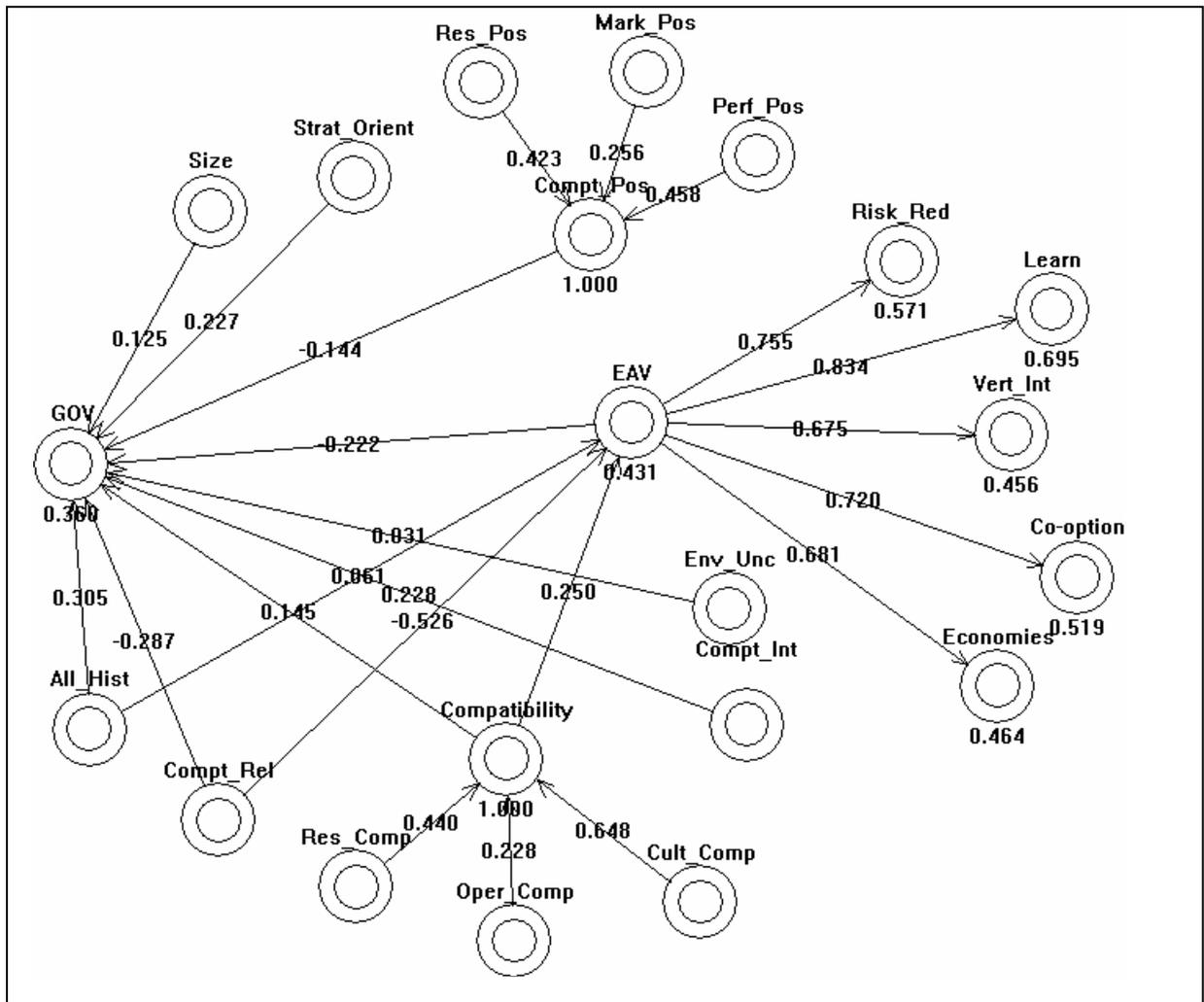


Figure 5-6. Semi-Mediation Model

Table 5-8 correlates the results of structural analysis made on the two direct models (molar and molecular) with the principal research model, which is a mediation model, as well as the semi-mediation model on the basis of the variance explained for the dependent variable GOV. The comparison of the three competing nested models with the primary research model has been based on the difference of  $R^2$  values, which is indicative of the predictive power of the model, for the two endogenous variables, GOV but also EAV. The difference is examined through computation of the effect size  $f^2$  using the following formula:  $(R^2_{\text{revised}} - R^2_{\text{original}}) / (1 - R^2_{\text{original}})$  (Gefen et al., 2000). Cohen proposes  $f^2$ s of .02, .15,



and .35 to serve as operational definitions for the small, medium, and large effect size, respectively. Multiplying  $f^2$  by  $(n-k-1)$  provides a Pseudo-F value that can be used to test the significance of  $f^2$  with 1 and  $n-k$  degrees of freedom, where  $n$  stands for the sample size and  $k$  for the number of exogenous constructs in the model (Mathieson et al., 2001).

**Table 5-8. Comparison of the Competing Models in terms of GOV prediction**

Competing Models Constructs	Mediation Model	Molar Model	Molecular Model	Semi-Mediation Model
SIZE	.176 (1.2802)*	.127 (0.9040)	.121 (0.8763)	.125 (0.9186)
STRAT_ORIENT	.312 (2.5798)***	.217 (1.6547)**	.228 (1.7162)**	.227 (1.7482)**
COMPT_POS	-.152 (1.0188)	-.149 (1.0286)	-.148 (1.0515)	-.144 (1.0485)
ENV_UNC	-.068 (0.4136)	.028 (0.1541)	.027 (0.1555)	.031 (0.1767)
COMPT_INT	.028 (0.1239)	.228 (0.9463)	.226 (0.9250)	.228 (0.9192)
COMPATIBILITY	.227 (1.7937)**	.125 (1.0731)	.135 (1.0625)	.145 (1.0841)
COMPT_REL	-.313 (1.6828)**	-.289 (1.6814)**	-.294 (1.6724)**	-.287 (1.4776)*
ALL_HISTORY	.339 (2.9302)***	.306 (2.6288)***	.307 (2.6312)***	.305 (2.7002)***
EAV	-.295 (1.3020)*	-.192 (1.0244)	-.211 (1.1178)	-.222 (1.0349)
R <sup>2</sup> (GOV)	<b>.328</b>	<b>.361</b>	<b>.365</b>	<b>.360</b>
$f^2$		<b>.049</b>	<b>.055</b>	<b>.048</b>
Pseudo-F		<b>2.303</b>	<b>2.585</b>	<b>2.304</b>
(F-Critical Value = 6.83)				
<b>* p&lt;0.10, ** p&lt;0.05, *** p&lt;0.01</b>				

The three competing models demonstrate high convergence. They identify the same three significant determinants of the GOV dependent variable; STRAT\_ORIENT, COMPT\_REL and ALL\_HISTORY. Also, the predictive power of both models is almost the same. While the two direct models as well as the semi-mediation model seem to have greater predictive ability ( $R^2$ ) compared with the principal research model, the difference in  $R^2$  is not statistically significant, as it is indicated by the  $f^2$  and Pseudo-F values of the table. Nevertheless, there is a difference in the number of identified significant predictors of the GOV dependent variable. The principal research model identifies another three predictors of the governance decision, which are SIZE, COMPATIBILITY and EAV. Although they are not considered of high significance ( $p<0.10$ ) in this research, we have included them as



candidate determinants of the governance decision for future research studies testing a revised research model. Also, the compatibility second-order factor is identified in the mediation model, thus adding three more sub-factors (resource complementarity, operational compatibility, cultural compatibility) to the list of alliance governance's influences.

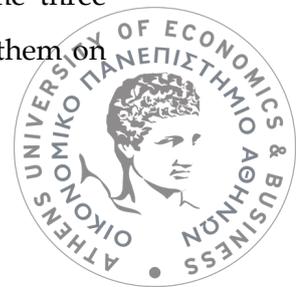
Table 5-9 provides the results of comparison between the mediation and the semi-mediation model on the basis of the variance explained for the mediator variable EAV.

**Table 5-9. Comparison of the Competing Models in terms of EAV prediction**

Competing Models Constructs	Mediation Model	Semi-Mediation Model
SIZE	.016 (0.1529)	-
STRAT_ORIENT	.094 (0.7439)	-
COMPT_POS	.111 (0.9813)	-
ENV_UNC	.069 (0.5151)	-
COMPT_INT	.287 (1.9628)**	-
COMPATIBILITY	.216 (2.1652)**	.250 (2.3342)**
COMPT_REL	-.461 (3.2319)***	-.526 (3.8592)***
ALL_HISTORY	.054 (0.4726)	.061 (0.5049)
R <sup>2</sup> (EAV)	<b>.585</b>	<b>.431</b>
f <sup>2</sup>		<b>.371</b>
Pseudo-F		<b>17.808***</b>
* p<0.10, ** p<0.05, *** p<0.01		

The two mediation models demonstrate poor convergence as far as prediction of EAV is concerned. The results of this analysis in Table 5-9, and more specifically of R<sup>2</sup>, f<sup>2</sup> and Pseudo-F measures, suggest that the 'mediation model' explains significantly more variance of EAV in comparison with the 'semi-mediation model'. This may be due to the identification of an additional factor, COMPT\_INT, which seems to have a significant impact (p<0.05) on the EAV mediation variable.

The overall comparison between the prime research (mediation) model and the three competing models has indicated that there is no significant difference between them on



the basis of variance explained for the key dependent variable (GOV). Since none of the competing model yields a significant  $f^2$  for the prediction of the GOV variable, they are rejected (Chin and Todd, 1995). From the viewpoint of the intermediate EAV construct, the semi-mediation model presents a significant  $f^2$ . However, this difference of effect size is in favor of the mediation model, which seems to explain much more variance for the EAV latent variable than the semi-mediation model does (.585 instead of .431).

## 5.7 Summary

The chapter discussed the methodology as well as the outcomes of the empirical data analysis with the use of Structural Equation Modeling (SEM) techniques. The chapter opened with a short introduction to the special features and capabilities of SEM, which is considered as the second generation of multivariate analysis techniques, and discussion of its two diverse analysis approaches, the covariance-based (i.e. LISREL) and the component-based (i.e. PLS) approach. The chapter continued with specification of the prime criteria that guided the selection of the Partial Least Squares (PLS) method over its counterpart (LISREL), as well as discussion on the sample size requirements posed by PLS and met by this research. The PLS methodology includes a separate set of tests for examining first the measures employed (measurement model) and then the dependence-relationships of constructs (structural model). The data analysis started with a set of tests aiming at examining the reliability and validity of the research's measurement model. After making the required revisions and thus improving the measurement model, the analysis continued with the path model, and more specifically with the examination of the direct, indirect and total effects of the nine identified independent variables (exogenous variables) on the GOV dependent (endogenous) variable. Since the proposed research model is a mediation-model, a significant part of the discussion concerned the support for the hypothesized mediating role of the Expected Alliance Value (EAV) variable. The section of path analysis also indicated the sub-set of initial research hypotheses (Chapter 3) for which the empirical data provided support. The last section of the chapter aimed at validating the research model by comparing it to a set of competing nested models, which were finally rejected.



# CHAPTER 6

## VALIDATION OF THE VALUE MEDIATING MODEL

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This chapter aims at validating the empirical research results, presented in the previous chapter with the aid of two case studies. Section 6.1 argues on the suitability of the case study method as a technique for the validation of the survey's findings. Sections 6.2 and 6.3 discuss two strategic alliances within the mobile and wireless Greek market of quasi-hierarchy (joint venture) and quasi-market (recurrent contract) governance alliance modes. Chapter 6 concludes with a section justifying and analyzing the governance mode implemented in these two alliances against the factors involved in the total set of research hypotheses (Chapter 3), as well as against the subset of the statistically accepted hypotheses (Chapter 5).

### 6.1 Validation Methodology

As explained in the introductory chapter (Chapter 1), this research has applied a mixed method research methodology in order to move from theory to tentative hypotheses and then from grounded results (observation, facts) to abstract generalizations and theory. So far, the research has involved an attempt to build a conceptual model on the basis of established theory and previous research findings. The survey method was then used to transform the obtained theoretical model into predictions of the final outcome. Hereinafter, we describe the application of the case study method to validate the survey results and contribute to theory.

#### 6.1.1. Using Case Study as a Validation Method

Before proceeding to details on the applied validation methodology, it is important to specify the meaning of the concept of validation. The officially sanctioned DoD definition for validation is as follows (U.S. Department of Defense, 1996): "The process of determining the degree to which a model is an accurate representation of the real-world from the perspective of the intended use of the model". In this research setting, validation of the model refers to the application of qualitative data collection and analysis to confirm or disconfirm (triangulate) the survey's findings.



Case study has traditionally been applicable to exploratory studies, which aim at building rather than testing hypotheses (Johnston et al., 1999). This research approach is especially appropriate in new topic areas, where there is a need for novel, testable, and empirically valid theory (Eisenhardt, 1989). Nevertheless, case study can as well apply to confirm a posteriori theory-based hypotheses or findings of previous studies. Yin (1994) argues that the case study method can be used to research questions that are exploratory, confirmatory, or explanatory in nature. In this research, the case study method is used both for confirming and for explaining the application of the survey's findings under real world conditions. The ultimate purpose of this validation study is to generalize the survey results to the population of alliances within a particular context.

Case study research is a detailed investigation that attempts to provide an analysis of the context and processes involved in the phenomenon under study (Yin, 1994). Bonoma (1985) argues that case studies may be most suitable for conducting research in context dependent phenomena, because they rely on the use and triangulation of multiple sources of data. No attempt is made to isolate the phenomenon from its context, but instead, the phenomenon is of interest precisely because of its relation to its context. This is particularly important in our research, since the theoretical model applies to a specific context, including technology alliances formed in high velocity environments and can be subject to multiple contextual influences.

### **6.1.2. Application of the Case Study Method in this Research**

Similar to the survey method, the unit of analysis in our case study research involved the perspective of a firm, and more precisely the perspective of a firm's strategic manager, for a wireless alliance it has initiated. The population for the selection of the case studies involved all strategic alliances formed within the Greek wireless market. The selection of case studies was primarily guided by the application of the "extreme case analysis" technique (Caracelli and Greene, 1993). "Extreme cases" identified from theory as well as from analysis of the survey's results are pursued via additional collection and analysis of case study data, with the intent of testing and refining the initial explanations for the extreme cases (Tashakkori and Teddlie, 1998). In this research, we included two cases denoting the extreme values of the alliance governance variable. The first case concerned the SiEBEN – Telenavis alliance, a recurrent contract, indicating a very low degree of



interdependence between the two partners. The second case concerned the Nortel - Unisystems alliance resulting in the UNINORTEL joint venture, demonstrating high interdependence between the two partners.

Case study research requires data collected from multiple sources, so that the goal of data triangulation<sup>4</sup> is achieved. One way to collect data from multiple sources is to use more than one data collection methods (Johnston et al., 1999). In this research, we applied three data collection methods; a) documentary evidence, b) interviews, c) questionnaire. The first method involved collecting and scrutinizing electronic material collected via the company or third-party (e.g. press or portal) sites. Such material included press releases on the examined alliance, company profiles, company announcements, and other information regarding the company's collaboration activities. Following the collection of documentary evidence, we conducted interviews with key managers of the two investigated companies, SiEBEN and Nortel. Specifically, we interrogated SiEBEN's business development manager, and Nortel's enterprise accounts manager, for collecting information on the companies' strategic goals, general alliance policy, and details on the particular alliance. The final stage of data collection included asking the interviewee to fill in a questionnaire with appropriate information on the examined alliance. The questionnaire was the same with the one used to collect quantitative data during the survey.

The analysis of case research involves assessing whether the evidence within each case is internally valid, supportive of the pre-specified hypotheses across the multiple cases, and conclusive. Therefore, data analysis is concerned with the issues of internal validity and generalizability (Johnston et al., 1999). The issue of internal validity was assessed through an assessment of whether there was appropriate evidence to support triangulation. When the evidence from a case was conflicting or disconfirmed the research hypotheses, we tried to evaluate the evidence provided and even collect new evidence that could explain the hypothesis disproval. The issue of generalizability was addressed in two ways. First, interpretation and analysis was conducted to determine whether the two "extreme cases" confirm the initial research hypotheses. The use of two extreme cases allowed for

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<sup>4</sup> Triangulation refers to the convergence of evidence in one meaning (Bonoma, 1985; Yin, 1994).



replication of the validation logic in two totally different settings, investigation of theorized differences across the two extreme cases, and the possible suggestion of either reverse or rival hypotheses.

### **6.1.3. Limitations**

The limitations of the validation methodology applied are mainly related to the criticism made to the case study research.

Case research has typically been criticized as lacking objectivity and methodological rigor. To address such criticism, Johnston et al. (1999) have proposed a three-element research design for case studies aiming at testing, rather than building, theory. First, theory must guide research decisions. Second, the research design must be systematic and pre-planned. The rigor in research planning must exist at all stages of the research design: from defining the unit of analysis, to selecting the cases to investigate, to collecting and analyzing the evidence. Third, there must be evaluation criteria that can adequately refute criticisms of subjectivity. The limitations of the current research basically concern this last element. Particularly, the case data are liable to the subjectivity of the interrogated strategic manager.

Moreover, case research has been criticized for taking extensive time and effort. The required time and effort increases, if one considers the need for triangulation, which implies collecting similar data from many different sources. Nevertheless, the task of data collection was much facilitated due to gaining access to websites, e-mail and other electronic sources of information. Taking into consideration the time, as well as the effort, available for conducting our validation research, we finally managed to collect a large volume of digital information on the two extreme cases and conduct two interviews per manager and per case. Given more time and personnel, the research would benefit from conducting more case studies, thus enhancing both internal validity and generalizability of the validation outcomes.



## 6.2 Case A: Recurrent Contract between SiEBEN and Telenavis

### 6.2.1. Introduction

On 28<sup>th</sup> February 2005, SiEBEN and Telenavis signed a strategic alliance agreement aiming at exploiting the GPS technology. The primary objective of both companies was putting together the resources and know-how that each company possesses in each sector, in order to provide integrated mobile solutions.

SiEBEN is one of the most dynamic and fast growing Greek IT companies. Its primary business operation, as well as its strategic direction, involved the development of mobile applications on the Pocket PC platform. Currently, SiEBEN has developed a wide variety of mobile business operations and activities (sales, warehouse management, field service, manufacturing, etc).

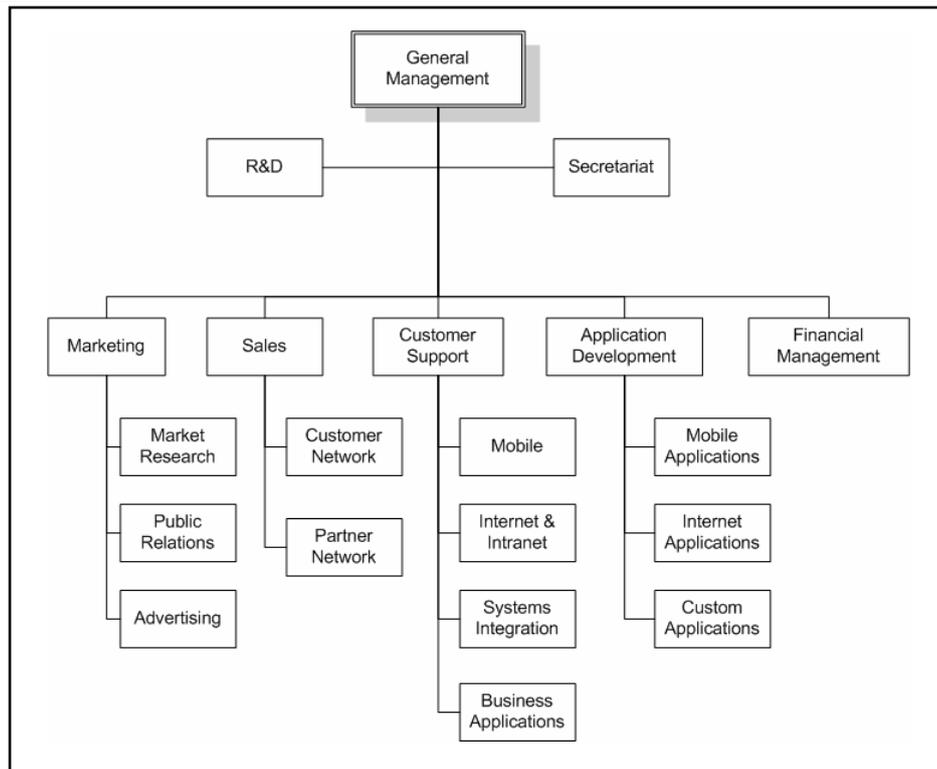
Telenavis leads the sector of Geographic Information Systems (GIS), providing products and services based on GPS, GSM and GPRS technologies. Telenavis provides Location Based Services (LBS) that cover a wide spectrum of business activities, ranging from the planning of a branch network to the operational requirements for optimized routing.

Telenavis has developed, and linked with the SiEBEN' PocketBiz platform, a new GPS module that is able to trace business users' (salesmen, technicians, sick callers, etc.) position per minute. The application administrator can locate - identify the exact position of - and track - monitor the route of - users at any time through the Webmap© Services module provided by Telenavis.

### 6.2.2. Organizational Status

SiEBEN Innovative Solutions ([www.sieben.gr](http://www.sieben.gr)) was founded in 2000 with the mission to provide innovative IT solutions exploiting the capabilities of state-of-the-art technologies. SiEBEN is a small-to-medium sized company (10-49 employees) and is organized as illustrated in [Figure 6-1](#).





**Figure 6-1. Sieben Organization Chart**

As shown in Sieben's organization chart, the company includes the following four operational divisions under the Customer Support Unit.

**Mobile Division.** They develop applications based on PDA and SmartPhone platforms. Sieben has developed the PocketBiz platform, on which a series of mobile applications are based. The PocketBiz solutions address the needs of users (employees in move) to complete their daily tasks, while they are away from their office by having an interactive communication with the corporate information systems. For the time being, Sieben has developed nine PocketBiz products (PocketBiz Sales, PocketBiz Sales Express, PocketBiz Warehouse, PocketBiz Field Service, PocketBiz SmartPhone, PocketBiz Medical, PocketBiz Production, PocketBiz Procurement, and PocketBiz Restaurant) addressing the needs of diverse industrial sectors and targeting companies of different sizes.

**Internet & Intranet Division.** Sieben provides a portfolio of internet-based services, ranging from corporate site development and hosting to the development of complex commercial applications, such as systems implementing B2B and B2C transactions (WebSell, TradeBiz), and Document Management systems (ShareBiz). Moreover, it organizes the business information and operations of a company with the development of its Intranet Portal.



**Systems Integration Division.** This division is responsible for information systems and network planning, procurement and installation of information and networking equipment, integrated enterprise solutions, system consolidation and platform migration, management of complex IT projects, as well as consulting services and feasibility studies.

**Business Applications Division.** Sieben provides services in the Customer Relationship Management domain by implementing CRM systems based on the Microsoft CRM tool.

The whole product portfolio of Sieben aims at developing and commercially providing integrated information systems, as packaged solutions, that help enterprises improve their relationship and collaboration with customers – consumers as well as with other companies.

In order to fulfill its mission, Sieben has entered a strategic alliance with Microsoft, using its products to develop its software applications. In 2004, Sieben was awarded with the “Microsoft Gold Certified Partner” title for the ISV Software Solutions and Information Worker Solutions domains. The PocketBiz platform, which is considered the core product series of Sieben, has been developed with a number of Microsoft tools (Exchange Server 2000/2003, Visual Studio .NET 2003, Microsoft PocketPC, Microsoft SmartPhone).

SiEBEN’s strategic orientation for the next three to five years is bi-directional; first expanding in new markets, mainly in countries of the Balkan area, and secondly reinforcing its current leading position and increasing its market share in the Greek mobile market, by enhancing the quality of its current products/services. Sieben’s management team has also attributed high importance to the strategic goals of differentiation from competitors by developing new or enhanced mobile solutions, as well as combining resources with complementors for providing integrated solutions in key sectors, such as restaurants, pharmacies, manufacturing, and retailing.

Towards achieving its strategic goals, SiEBEN has cooperated with a large number of (about 20 in total) local and global companies for expanding to Cyprus, Bulgaria, Serbia, and FYROM. A recent example of such alliances is the cooperation with SuperNova Consulting, a leading ERP consultant in the Cypriot market. Instead of cooperating with a local player, Sieben decided to enter the Romanian mobile market using its own resources, thus creating a subsidiary named PocketBiz Romania. The cooperation between



Sieben and CG-Soft aimed at providing integrated solutions for the sector of restaurants, namely the PocketBiz Restaurant. CG-Soft provided the back-office (ERP) system, which was integrated with the front-office (PDA-based) system developed by SiEBEN. Finally, the SiEBEN - Telenavis alliance examined in this research served the need of enhancing the features of the PocketBiz platform with web mapping information, thus reinforcing its competitiveness over similar products.

All the aforementioned partnerships are governed by a contract-based agreement. An exception stands for the most recent partnership of Sieben with Mantis, a leader in the Greek and Cypriot markets of logistics. In that alliance, Sieben took over the Mantis mobile department (human and physical resources) to achieve the following objectives: a) reduce competition, b) increase its customer base, and c) acquire the knowledge and experience of Mantis. Thus, compared to the previous partnerships, in this case, Sieben looked not only at accessing but also at acquiring the competence of a competitor. To achieve this goal, Sieben opted for a quasi-hierarchy alliance, involving higher levels of communication and resource interdependence.

### **6.2.3. Perceptions for the Environment**

According to Sieben manager's perceptions, within the last year (2005), the mobile market has passed from the experimentation to the maturity phase. This is justified by the following market phenomena: a) increase in business customers' awareness of and interest in mobile technologies, b) increase in number of mobile solution providers, which means growth of the current competition, c) development of advanced mobile solutions, based on state-of-the-art programming, networking and positioning technologies, and d) decrease in mobile product and service prices.

Sieben believes that the market uncertainty of previous years has started decreasing, as enterprises become aware of the mobile technologies' capabilities, find interest in applying them to reengineer their daily business operations, and thus respond positively to the release of new mobile solutions. Nevertheless, there is still market uncertainty deriving from the end-users' difficulty in using handheld devices and mobile services. The lack of employee awareness of and familiarity with mobile technologies increases the risk posed to the management for applying innovative mobile solutions, which may not be fully exploited by its employees.



Finally, Sieben views the competition in the mobile market as increasing. The number of companies providing mobile products/services has grown, and thus Sieben's competitors, that are companies providing integrated mobile solutions, have also increased. The increasing level of competition has urged firms to develop integrated solutions through the creation of an expanded network of strategic partners, often operating both as complementors and resellers, or value added sellers. Partnerships that are based on combining partners' complementary products, rather than resources, give Sieben the ability to preempt competition in the launch of mobile packaged solutions (e.g. PocketBiz Restaurant, PocketBiz Medical).

#### **6.2.4. Partners' Relationship**

The SiEBEN - Telenavis strategic alliance has been an initiative of Sieben, under the concern of enhancing the features and competitiveness of the PocketBiz platform. Thus, the primary purpose of the alliance has been to develop new mobile services that would be included in the portfolio of PocketBiz features. Specifically, at the time when the alliance was formed, Sieben was looking at incorporating web mapping and positioning information into its platform. Thus, it contacted Telenavis, a leader in the market of Geographical Information Systems, and made the agreement of linking their GPS module to the PocketBiz platform. Both Sieben and Telenavis customized their programming code to enable the communication of the GPS module with the PocketBiz platform.

The two firms have medium degree of compatibility regarding their social norms, executive philosophies, organizational procedures, and technological capabilities. Also, the partners' resource complementarity is considered medium to high, since the resources contributed by both partners are quite significant, and valuable to each other, for serving the principal purpose for which the alliance was formed.

The two firms have never cooperated in the past. Therefore, we can assume that they do not know each other quite well, which is also expected, since both firms are rather young in the Greek market. Moreover, the two partners operate in diverse sectors, with Sieben in the mobile application development sector and Telenavis in the positioning technology/service sector. Therefore, there is no competition between them, and thus the need for applying hierarchical safeguards against partners' opportunistic behavior is rather limited.



### **6.2.5. Value Expectations from the Alliance**

The alliance with Telenavis is of low strategic importance for Sieben, and this is indicated from its low expectations for the six out of the seven groups of alliance benefits that this research has specified. Specifically, Sieben has no expectations for decreasing risk and gaining economies of scale through the alliance with Telenavis. Moreover, they have low to medium level expectations for gaining access to their partner's social network, co-opting their rivals, learning from their partner, and gaining complementary resources. Instead, their alliance is expected to raise integration-related benefits, such as reducing time to market for the GPS module of the PocketBiz platform and expanding delivery channels by selling the PocketBiz products to business customers of positioning systems.

### **6.2.6. Why Recurrent Contract?**

The following table presents the values of each of the eight antecedent factors, as well as their hypothesized impact on the preferred governance mode, formulated in research hypotheses. The values of the factors were attributed by the manager of SiEBEN during the interview and were collected via the questionnaire form that was used by the interviewer. Thus, it is important to stress out that these values express perceptions of the SiEBEN's manager for the corresponding factors. Nevertheless, since he holds the position of the Business Development manager, and thus is considered one of the principal decision-makers in SiEBEN, his perceptions have indeed an impact on the firm's preference towards either a quasi-market or a quasi-hierarchy governance mode.



**Table 6-1. Factor Values affecting Preferred Governance in SiEBEN-Telenavis Alliance**

	Factor	Value	Hypothesized Governance Mode
1.	Environment Uncertainty	Medium	-
2.	Competition Intensity	Medium to High	Quasi-Market
3.	Firm Size	Small	Non Quasi-Hierarchy
4.	Competitive Position	Medium	-
	<i>Resource Position</i>	Medium	
	<i>Market Position</i>	Medium	
	<i>Performance Position</i>	Medium	
5.	Strategic Orientation	High	Quasi-Hierarchy
6.	Partner Compatibility	Medium	-
	<i>Resource Complementarity</i>	High	
	<i>Social Compatibility</i>	Medium	
	<i>Operational Compatibility</i>	Medium	
7.	Competitive Relationship	Low	Non Quasi-Hierarchy
8.	Alliance History	Low	Non Quasi-Hierarchy
9.	Expected Alliance Value	-	-
	<i>Risk Reduction</i>	Very Low	
	<i>Economies of Scale</i>	Very Low	
	<i>Complementary Resources</i>	Medium	
	<i>Co-option</i>	Low	
	<i>Social Expansion</i>	Low	
	<i>Vertical Integration</i>	High	
	<i>Learning</i>	Low	

We can base our estimations for the preferred governance mode only on those antecedent factors that take the hypothesized extreme (either 'low' or 'high') values. Such factors are *firm size*, *competitive relationship* and *alliance history*. On the contrary, we do not take into account factors taking a 'medium' value (environment uncertainty, competition intensity, competitive position, strategic orientation towards diversification and integration, partner compatibility, expected alliance value), since we cannot isolate their impact on the preferred governance mode.

Based on the statistical analysis results (Chapter 5), from the aforementioned important factors, *alliance history* has proven highly significant ( $p < 0.01$ ), while *firm size* and *competitive relationship* have been less significant factors ( $p < 0.1$ ). No matter what the level of their significance is, in this alliance case study, the aforementioned factors take an extreme value that is the reverse to the value included in the formulated hypotheses. For instance, the H2a hypothesis assumes a quasi-hierarchy alliance when the *firm size* factor has a 'large' value. However, the hypothesis does not claim for the value of the alliance governance mode, when the *firm size* factor takes a 'small' value.



While the high statistical significance ( $p < 0.01$ ) of the *alliance history* factor allows us to presume the value of the governance mode in the reverse to the hypothesized value (through a two-tailed test), the low significance of the remaining two factors render such a deduction unreliable. After that, the only statistically significant factor that can drive the Sieben's preference for the governance mode is *alliance history*. Thus, based on this research's empirical evidence, but also according to the interview statements, the fact that Sieben did not have any previous direct or indirect tie with Telenavis favored the decision over forming a quasi-market alliance with Telenavis.

Moreover, taking into consideration the reverse impact of the *firm size* and *competitive relationship* factors, similarly to the alliance history factor, they also drive to less hierarchical and thus more market-like alliances. Thus, while the empirical research cannot support the significance of the reverse hypotheses (based on their t-values), the bi-directional effects of these factors seem to be applicable in this case.

Based on the Sieben manager's viewpoint, the alliance with Telenavis was primarily motivated by the need to combine complementary resources, as well as integrate their solutions to enhance the quality of the PocketBiz platform. Moreover, since the alliance did not intend to involve any co-development tasks, the value of joining complementary resources and skills was rated with a "medium" value. Instead, Sieben rated high the value that it expected to receive from integrating its product with the Telenavis' module, and thus improve the quality and delivery of its PocketBiz products. Thus, in this case study, these two categories of benefits (complementary resources and vertical integration) seem to affect the decision towards a quasi-market type of alliance. Such effects are in accordance with the hypothesis on the impact of the expected alliance value (Hypothesis 4).

Based on the Sieben manager's statements, the factors that indeed influence their decision over the governance mode of an alliance are:

- **Competition intensity.** As the competition in the mobile market intensifies, they are further stimulated to form new partnerships and even opt for hierarchical alliances. The Sieben manager cited the takeover of the Mantis mobile department, as a strategic move to tackle the increasing competition in the field of sales force automation.



- **Firm size.** The company's size is still small-to-medium and thus does not allow for making investments in new ventures. Instead, the company wishes to improve its competitive position and increase its size through strategic alliances, but at the same time keep their autonomy.
- **Alliance history.** The company is rather young in the Greek market, and even younger in the mobile market. To this end, it has a short alliance history with other Greek or foreign companies. This discourages Sieben from making heavy investments through complex alliances to partners with which it is not acquainted.
- **Partners' compatibility.** Only under the condition of high partner compatibility, especially in terms of strategic goals, Sieben would ever decide to proceed to a joint venture.

Hence, based on this case study, our empirical research has clearly identified the impact of the *alliance history* factor on the preferred alliance governance mode. While it has also claimed for the impact of *firm size* and *competitive relationship* on more hierarchical alliances, the reverse hypothesis, which seems to be valid in this case, cannot be fully supported, due to the low t-values of the correspondent factors.

## 6.3 Case B: Joint Venture between Nortel Networks and Unisystems

### 6.3.1. Introduction

On 13<sup>th</sup> July 2005, Unisystems and Nortel announced their collaboration agreement for the establishment of a new company called UNINORTEL, providing marketing and support services for the Nortel telecommunication and networking solutions in Greece and Cyprus. UNINORTEL is owned 70% by Unisystems and 30% by Nortel Networks. The case study concerns Nortel Networks' viewpoint for its partnership with Unisystems.

Nortel Networks is an international leader in the global telecommunications market, providing innovative technology solutions, including end-to-end broadband networks, Voice-over-IP solutions, multimedia services and applications, and wireless broadband networks. It operates in 150 countries worldwide.



Unisystems is one of the largest Greek Information Technology providers and holds the dominant position in the Greek market of Systems Integrators. It provides integrated IT solutions supporting and maintaining complex systems of different technologies. Unisystems specializes in developing and supporting mission-critical applications in both private and public organizations. A sample of integrated IT solutions that Unisystems provides includes ERP and CRM systems, e-Learning, Document and Workflow Management systems, billing systems, and mobile transactions systems. It also sells hardware, such as enterprise servers, VoIP telephony, optical networks infrastructure, and Interactive Voice Response (IVR) systems.

In the official announcement of the joint venture, Mr. Pierfrancesco Di Giuseppe, the president of Nortel South Europe said that “through its collaboration with Unisystems, a leading provider of high technology solutions in the Greek market, Nortel targets the market of telecommunication providers of both wired and wireless networks, and aims at increasing its market share in the area of enterprise solutions. The long-lasting and close relationships that Unisystems holds with great telecommunication providers in the Greek market will give Nortel the opportunity to reinforce and consolidate its current position in Greece.”

In order to support Nortel’s products in both sales and technical level, UNINORTEL intends to develop high technical skills. The new company will take on supporting Nortel’s current enterprise customers and delivery channels. The new legal entity will bring together the experience and knowledge of the Greek market that Unisystems possesses with the leading carrier and enterprise solutions provided by Nortel, thus looking at obtaining a leading position in the Greek telecommunications market.

The following figure illustrates UNINORTEL’s future organization chart. For the time being, UNINORTEL employs 10 people, but its business plan anticipates that the personnel will have reached 30 employees until the end of 2006.



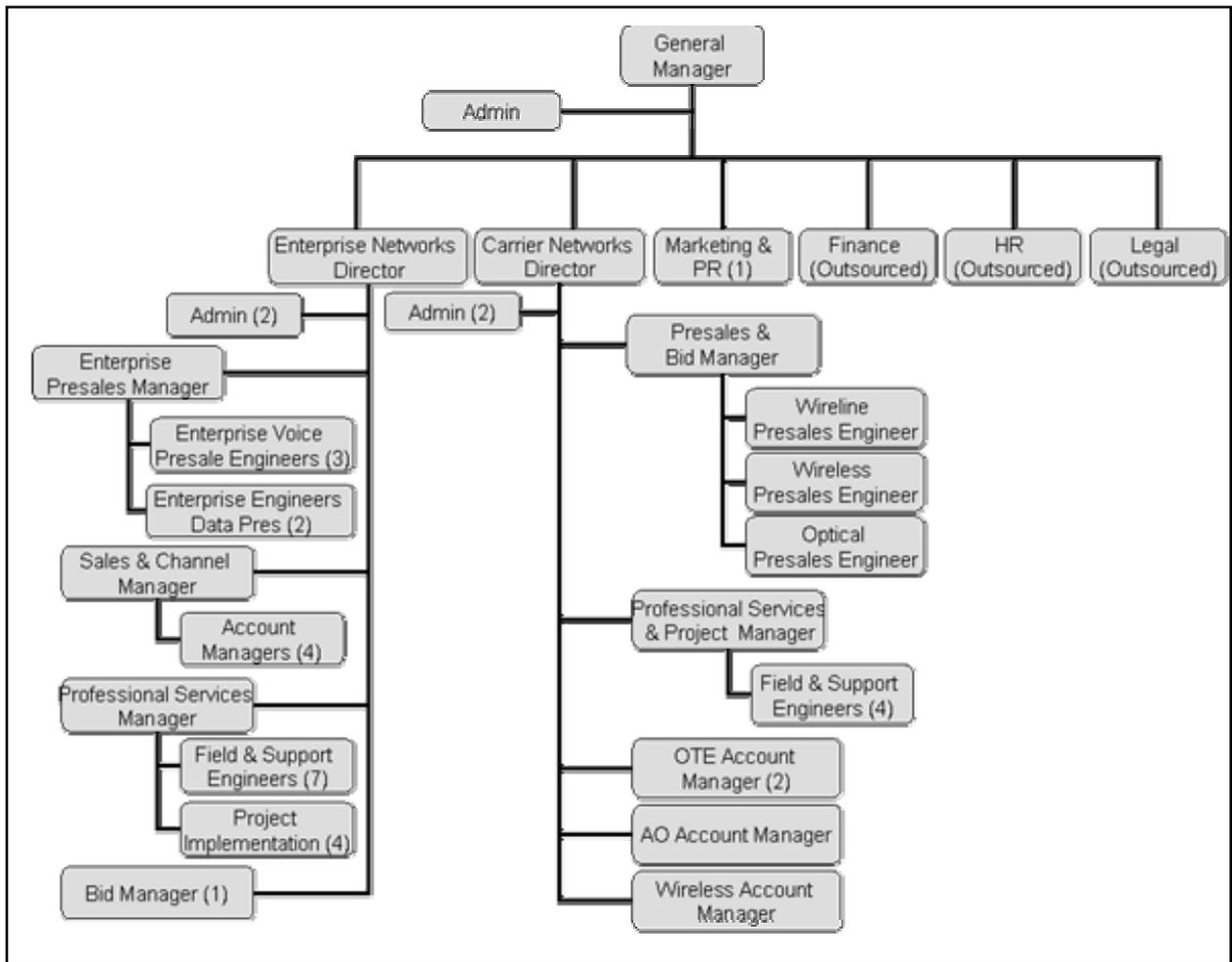


Figure 6-2. UNINORTEL's Organization Chart

### 6.3.2. Organizational Status

Nortel is a large-sized global firm of about 35,000 employees operating in the network equipment industry. Its market includes carriers and enterprises working as delivery channels of network solutions for enterprises.

Its branch in Greece, founded in 2000, is one of the smallest in global level, since it occupies about five people. The branch has no product development operations. Instead, its employees are working on sales, and thus are responsible for promoting, selling, and supporting the global firm's products/services in the Greek market. Its competitive advantage over other firms in the same industry is perceived to be the technological superiority of their products, as well as its global brand name.



Nortel Networks has been involved in a great number of alliances worldwide. The list of its global partners includes Accenture, CSC, Dell, EMC, IBM, Microsoft, RIM, SUN Microsystems, and Symantec. Nortel views strategic alliances with the above partners as “long-term global relationships that create unique value propositions in the marketplace by bringing together shared visions and increasing the marketing, research and development effectiveness of global partners to create new converged technologies”.

Apart from the aforementioned technology and research alliances, which target at the development of new or converged technologies, Nortel has also formed a number of partnerships that aim at promoting its technology solutions worldwide. In that case, Nortel treats strategic alliances as implementation means for serving its strategic vision of expanding and consolidating its position in existing and new markets. In fact, Nortel’s strategic orientation involves three primary objectives: a) entering large markets worldwide, such as China, b) entering smaller but emerging and profit-promising markets, such as Poland, and c) saving implementation and operations costs, derived from its expansion in new markets, by creating joint ventures, with the cooperation with great local players, instead of establishing its own branch. Until recently, Nortel’s strategy for entering new markets included creating a local fully-owned subsidiary. Within the last one and a half year approximately, this strategy has been transformed by preferring strategic alliances over subsidiaries in cases where either the new target market is small, saturated, or highly competitive, or Nortel wishes to expand both its sales and its development operations, and thus has to assure high levels of commitment and contribution from a local partner.

Nortel owns a broad alliance portfolio. The majority of its alliances are contract-based, while three of them have taken the form of joint ventures. Two of them, LG Electronics Nortel, established in Korea, and China Putian Nortel, established in China, are examples of alliances aiming at entering an emerging and large market, respectively, while the UNINORTEL joint venture has served the third objective of cost-cutting.



### 6.3.3. Perceptions for the Environment

Nortel views the Greek mobile and wireless business environment as low-risk, but highly sophisticated and complex from a technological perspective. While mobile networks (GSM, GPRS, UMTS) have been well-developed and commercially exploited, especially with the launch of advanced 3G services, the wireless technologies (Wi-Fi and Wi-Max) are still in an early phase of development, compared to the average global level. Therefore, for the time being, the competition among providers of wireless networking equipment is considered low. Moreover, the immaturity of the Greek wireless market raises Nortel's ambitions for future development and profit generation. Its strategic alliance with Unisystems is viewed as a vehicle towards attaining the goal of developing its capabilities on wireless technologies support and gaining an early competitive advantage in the Greek market.

Moreover, Nortel's strategic manager views the rate of products/services obsolescence in the Greek market as low, which means that the firm is not facing high market uncertainty from possible high-speed transformation of customer requirements. This is partly due to the immaturity of the wireless market. However, Nortel's Greek branch views the lack of adequate after sales support, due to its limited organizational resources, as a source of considerable market risk in the future. To this end, it wishes to decrease such risk by joining forces with a local player having the resources and know-how required to support Nortel's enterprise customers in the Greek and Cypriot markets.

In general terms, the Greek mobile market is considered of low competitiveness for the time being. The main areas in which Nortel face greater competition include advertising/promotional activities, and distribution channels that network equipment providers use to sell their products. Regarding after-sales support and product/service quality, competition is perceived to be medium. Nevertheless, Nortel is highly interested in improving the quality of its after-sales support, which includes one of its primary motivations for forming the alliance with Unisystems, in order to gain an early competitive advantage in the networking industry.



#### **6.3.4. Partners' Relationship**

Nortel Networks has chosen Unisystems to jointly establish the UNINORTEL venture, due to its long (since 1964) leading presence in the Greek market, which has resulted in long-lasting and loyal relationships with a great number of Greek business customers. Since the two partners are operating in separate industries, networking equipment and system integration, their relationship is considered as purely collaborative and not competitive at all.

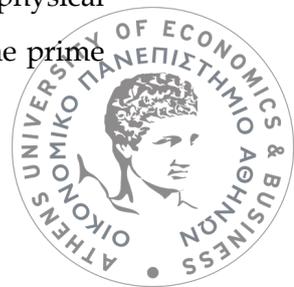
Nortel Networks and Unisystems have been partners since 2002, when they signed a contract-based agreement aiming at joining forces to compete dominant players in the Greek and Cypriot telecommunications industry. This alliance provided an opportunity for the two companies to assess their compatibility, in terms of strategic goals, social norms and resource complementarity, as well as develop trust for proceeding to a closer relationship involving the establishment of a joint venture. At the time when the joint venture was planned, Nortel viewed Unisystems as highly compatible in terms of strategic goals and social norms, as well as complementary in terms of resources. On the contrary, the firms are not quite compatible in terms of technical capabilities and organizational procedures, which may be due to the very different nature of their activities. Nevertheless, their cultural compatibility and resource complementarity was greatly enhanced due to their two-year contract-based partnership, and this mostly affected their decision to proceed to the joint venture creation.

In this alliance, Nortel has the negotiation power, since it provides the technological know-how and a global brand name, while Unisystems has the management and marketing power in the Greek market. Also, Unisystems is the one that contributes to the joint venture with financial, human, and physical resources, while Nortel contributes with its networking equipment, as well as the knowledge for producing and installing it.

#### **6.3.5. Value Expectations from the Alliance**

Through the alliance with Unisystems, Nortel mainly aimed at getting the following groups of benefits:

- *Complementarity of Resources.* Unisystems provides the financial, human, and physical resources required for the operation of the joint venture. Instead, Nortel is the prime



contributor of technological knowledge embedded in the promoted products/services. Nortel considers Unisystems to be a leader in the Greek market of system integrators, and thus expects to gain access to its valuable resources.

- *Co-option.* Although the competition in the Greek wireless market is not high enough to motivate co-option activities, Nortel wishes to gain early competitive advantage by improving its after-sales support services and thus reinforcing its position over rivals in the Greek networking industry.

More specifically, Nortel's decision to evolve its previous contract-based alliance to a joint venture was driven by the following value expectations:

- *Economies of Scale.* As explained earlier, Nortel applies the strategy of joint venture creation in new or saturated markets to save costs from own-funded expansion. Thus, the joint venture solution means saving internal development costs incurred in case of developing a subsidiary, and decreasing transactions costs incurred in contract-based collaborations.
- *Risk Reduction.* Due to its long presence in the Greek market, Unisystems has obtained good knowledge of the Greek firms, and most specifically of their requirements for enterprise telecommunications solutions. Thus, it can save Nortel from the risk of producing or promoting useless products/services. Moreover, by improving its support services via the UNINORTEL venture, Nortel expects to reduce the market risk of dissatisfying, and thus losing, its enterprise customers due to poor service quality.
- *Learning.* One of Nortel's primary motives for evolving its previous contract-based collaboration to a joint venture was to transfer know-how to Unisystems' human resources, which contribute to the UNINORTEL venture, so that they can provide support for Nortel's products. Such a goal could only be supported by an alliance governance mode involving high degree of partner commitment and interdependence.

Apart from the initial motivations, which can also be considered as expected benefits, the primary value that Nortel wishes to capture through this joint venture is to develop a staffed venture with strong brand name and large market share in the Greek networking market. It is part of their agreement that, given that the venture will successfully operate



in the Greek market for a predefined time span (e.g. 5 years), the venture will be finally sold to Nortel, thus operating as owned subsidiary. Until that time, Unisystems will have gained value from UNINORTEL's profits, as well as from its final sale to Nortel Networks.

### 6.3.6. Why Joint Venture?

The following table presents the values of each of the eight antecedent factors, as well as their hypothesized impact on the preferred governance mode, formulated in research hypotheses. The values of the factors were attributed by the manager of Nortel's branch in Greece during the interview and were collected via the questionnaire form that was used by the interviewer. Thus, it is important to stress out that these values express perceptions of the manager of Nortel's Greek branch for the corresponding factors. Nevertheless, since he is one of the primary decision-makers in his company, his perceptions have indeed an impact on the firm's preference towards either a quasi-market or a quasi-hierarchy governance mode.

**Table 6-2. Factor Values affecting Preferred Governance in Unisystems–Nortel Alliance**

	Factor	Value	Hypothesized Governance Mode
1.	Environment Uncertainty	Low	Non Quasi-Market
2.	Competition Intensity	Medium to Low	Quasi-Market
3.	Firm Size	Large	Quasi-Hierarchy
4.	Competitive Position	Medium to High	Quasi-Hierarchy
	<i>Resource Position</i>	High	
	<i>Market Position</i>	Medium	
	<i>Performance Position</i>	High	
5.	Strategic Orientation	Medium	-
6.	Partner Compatibility	High	Quasi-Hierarchy
	<i>Resource Complementarity</i>	<i>Very High</i>	
	<i>Social Compatibility</i>	<i>High</i>	
	<i>Operational Compatibility</i>	<i>Medium</i>	
7.	Competitive Relationship	Low	Non Quasi-Hierarchy
8.	Alliance History	Rather Long	Quasi-Hierarchy
9.	Expected Alliance Value	-	-
	<i>Risk Reduction</i>	<i>High</i>	
	<i>Economies of Scale</i>	<i>Low</i>	
	<i>Complementary Resources</i>	<i>Medium</i>	
	<i>Co-option</i>	<i>High</i>	-
	<i>Social Expansion</i>	<i>Low</i>	
	<i>Vertical Integration</i>	<i>Low</i>	
	<i>Learning</i>	<i>High</i>	

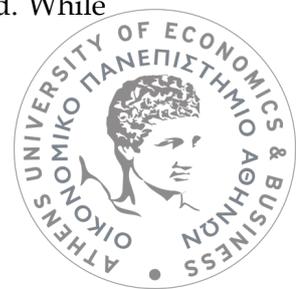


We can base our estimations for the preferred governance mode only on those antecedent factors that take the hypothesized extreme (either 'low' or 'high') values. Such factors are *firm size*, *partner compatibility*, and *alliance history*. On the contrary, we do not take into account factors taking either a 'medium' value (e.g. competition intensity, strategic orientation towards diversification and integration) or the reverse to the hypothesized value (e.g. environment uncertainty, competitive relationship) or an indeterminate value (e.g. expected alliance value), since we cannot claim for their impact on the preferred governance mode.

Based on the results of structural analysis on the hypothesized conceptual model (Chapter 5), from the aforementioned important factors, *alliance history* has proven highly significant, while *firm size* and *partner compatibility* are less significant factors. No matter what the level of their significance is, all the above factors drive to the decision over quasi-hierarchy alliances. This is in accordance with the preference and initiative of Nortel for the establishment of the UNINORTEL joint venture.

It is of worth mentioning that the *expected alliance value* factor seems to have an indeterminate effect on the preferred governance mode, as some benefits are rated as highly expected (i.e. risk reduction, learning, co-option), others are rated as low expected (i.e. social expansion, vertical integration, economies of scale), and others are rated with a medium value (i.e. complementary resources). Thus the great distribution of EAV items' values does not permit prediction of the preferred governance mode based on the EAV factor.

Nevertheless, we can derive some conclusions from the analysis of each of the seven categories of benefits, considered as first order factors causing the *expected alliance value* construct in the measurement model presented in Chapter 4. Based on the Nortel manager's viewpoint, the motivations of *complementary resources* and *co-option* affected highly the initial decision to collaborate with Unisystems (in 2002), while the motives of *risk reduction* and *learning* drove to the option of a joint venture over any other governance mode. Thus, in this case study, these two categories of benefits seem to affect the decision towards a quasi-hierarchy type of alliance. Since these two groups of benefits were rated with a 'high' value, one can hypothesize that the greater the expectations of managers for risk reduction and learning, the more quasi-hierarchy alliance types are preferred. While



this is in contrast with the more abstract hypothesis on the impact of the expected alliance value (Hypothesis 4), we can explain them under the theoretical lens of Transactions Cost Economics and Dynamic Capabilities-based View of the Firm.

The primary concern of Nortel when deciding its partnership with Unisystems, was protecting the technological know-how with which it contributes to the joint venture from its partner's possible opportunistic behavior. Based on Transaction Cost Economics, the need for protection from opportunism leads firms to more hierarchical alliances. Moreover, the motivation for risk reduction involved joining resources and know-how under a safe environment to enable improvement of after-sales service quality, and thus reducing the risk of future market failure. This motivation is highly associated with the learning objective of the alliance, since the resources with which Nortel contributes to the joint venture are knowledge-based and aim at enhancing the partners' technological and support capabilities. Based on Dynamic Capabilities View of the Firm, the need of partners to exchange great volume of know-how under a safe environment raises the need for employing hierarchical mechanisms to facilitate and secure the organizational learning process.

After that, the need for protection, in order to achieve the benefits of risk reduction and learning, led Nortel to the option of a quasi-hierarchy alliance. Thus, this case study has indicated the need for more hierarchical alliances, when the expected alliance value – for risk reduction and learning – is high. While from a first sight, this conclusion seems to contradict Hypothesis 4, a more careful analysis can reveal that it is in alignment with the theoretical propositions of this research in Chapter 3. Hypothesis 4 assumes a highly uncertain and competitive environment, which necessitates options assuring flexibility rather than protection, and thus requires looser alliance governance modes. In this case study, the manager's perceptions for the uncertainty and the competition intensity of the Greek mobile/wireless market is rather low, due to the early phase of its development, and thus the need for protection overcomes the need for flexibility.

Based on the Nortel sales manager's statements, the factors that indeed influenced their preference over the joint venture instead of a less hierarchical alliance mode were:



- a) Its **alliance history** with Unisystems since 2002, when they initiated their partnership with a contract-based agreement, which resulted in positive assessment of the two firms' compatibility and emergence of trust.
- b) Its intention to reinforce its competitive position in the Greek market, and gain an early competitive advantage in a **low-competitive but yet unexploited environment** with increasing development and profit margins.
- c) Its **strategic orientation** towards market expansion and consolidation in profit-promising markets under a low cost regime.
- d) The lack of any **competition** between the two partners in local level.
- e) The existence of high **partner compatibility** in terms of strategic goals, social norms, operational procedures and resources contribution.

Instead, the firm's large *size* and *strong competitive position* had an impact only on the decision to form an alliance with a local player, regardless of the governance choice.

Hence, our empirical research has managed to clearly identify the impact of three factors, *alliance history*, *firm size* and *partner compatibility*, on the preferred alliance governance mode. While it has also claimed for the impact of high *environment uncertainty* and high *competitive relationship* on market-like alliances, the reverse hypotheses, which seem to be valid in this case, are not statistically supported.

## 6.4 Discussion

The two case studies discussed in this chapter have been conducted with the purpose of testing the validity of the empirical results, and more specifically of the finally accepted hypotheses, under real conditions. To this end, this section discusses the set of hypotheses that were finally validated by the case study, hypotheses that should be formulated and tested in reverse order of the implied relationship, hypotheses that could not be validated at all, and finally new hypotheses, resulting from the existing ones, that could be tested in a future iteration of the empirical research.

The validation of the statistically accepted hypotheses primarily derived from the cases where the hypothesized governance mode in **Tables 6-1** and **6-2** coincided with the interrogated firm's preference for the alliance governance mode. As it is evident in **Table 6-1**, in the case of the SiEBEN - Telenavis alliance, most of the examined antecedent

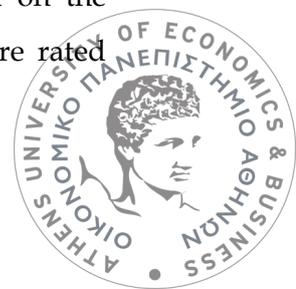


factors are attributed a reverse to the hypothesized value, and thus none of the finally accepted hypotheses could be validated. On the contrary, based on Table 6-2, where most factors take the hypothesized value, the following statistically significant factors were validated; *firm size*, *alliance history*, and *partner compatibility* (hypotheses H2a, H3a and H3c).

The value of the validation test resides not only on testing the validity of the statistically significant factors, but also on proposing new hypotheses that seem to be valid in both or just one of the examined alliances. Particularly, based on evidence provided in Table 6-1, when the *firm size* and *alliance history* factors take the reverse to the hypothesized value, then they may also drive to the reverse to the hypothesized governance mode. For instance, when firm size is small, then the preferred governance mode may be hypothesized to be quasi-market. Furthermore, some hypotheses that are currently considered as either non-significant or rejected could be transformed and tested in a reverse order. Specifically, the *environment uncertainty* (Table 6-2) and the *competitive relationship* (Table 6-1) factors take a reverse to the hypothesized value, which may lead to the actually preferred governance mode. Hence, the following set of new hypotheses could be formulated and empirically tested in the future.

- H1: *The smaller the firm size, the more quasi-market governance modes will be preferred for the alliance.*
- H2: *The shorter and the less quasi-hierarchy the prior ties of partners, the more quasi-market governance modes will be preferred for the alliance.*
- H3: *The lower the environment uncertainty, the more quasi-hierarchy governance modes will be preferred for the alliance.*
- H4: *The less intense the partner competitive relationship, the more quasi-market governance modes will be preferred for the alliance.*

Both case studies elicited a rather indeterminate total value for the Expected Alliance Value (EAV) factor. This is due to the great number of EAV dimensions, which may take absolutely different values. This is mainly evident in Table 6-2. Based on these validation outcomes, we propose the formulation of individual hypotheses for the seven (7) sub-factors of the EAV second order factor. The two case studies can aid in the formulation of hypotheses for the individual impact of some dimensions. Particularly, based on the SiEBEN - Telenavis case, the *complementarity* and *vertical integration* benefits are rated



highly and positively associated with a quasi-market governance mode. Instead, based on the UNINORTEL case, the *risk reduction* and *learning* benefits are rated highly and positively associated with a quasi-hierarchy governance mode. While the first two benefits seem to be correlated with the governance mode in the hypothesized by H4 relationship, the two latter benefits are linked with a reverse-mode relationship. This difference can be justified by the value that is attributed to the perceived degree of *environment uncertainty*. While in the first case study this factor takes a 'medium to high' value, in the second case study, *environment uncertainty* is rated 'low'. Hence, while hypothesis H4 cannot be directly validated, we have some evidence of validity for the implied relationship in terms of individual benefits.

Since EAV takes an indeterminate value, the sets of H5, H6, and H7 hypotheses could not be validated. However, based on statements of Nortel's interviewee, the positive value of the partner compatibility had indeed a positive impact on the firm's expectations for risk reduction and learning benefits through the alliance, the two highly rated dimensions of the EAV construct, which means that H7a can be validated. Nevertheless, this conclusion is rather weak.

Finally, some factors were not validated at all, because they take a 'medium' value in both case studies. These factors are *competition intensity*, *competitive position*, and *strategic orientation*. While the empirical research rendered *competitive position* and *competition intensity* as non-significant factors, the *strategic orientation* factor was confirmed as statistically significant at 0.01. Thus, the requirement for validation of this antecedent factor is even more intense. This is a challenge for further investigation and validation efforts. To address that, we propose that either a better measurement model should be specified for the aforementioned factors, or more case studies should be included in the validation stage, so that at least one case study where each factor takes an either 'high' or 'low' value is examined.

## 6.5 Summary

Chapter 6 describes the organization and the results of the validation stage of this research. The chapter opened with a presentation and justification on the use of the case study method to validate the survey's findings (Chapter 5) and test and revise the



theoretical framework (Chapter 3) following an inductive logic. After presenting key principles of applying case study under a confirmatory approach, section 6.1 discussed the methods applied for collecting and analyzing case data for the validation purpose of this research. The section concluded with a discussion of this validation's limitations, which were mainly associated with the subjectivity of the data collected as well as the number of case studies examined due to time and effort restrictions. The two next sections presented and analyzed data regarding two alliance cases of the wireless Greek market; a recurrent contract (quasi-market alliance) and a joint venture (quasi-hierarchy alliance). The next section concerned the replication and cross-validation of the initial hypotheses, as well as the induction of new theoretical relationships not examined in this research. More analysis of the validation outcomes, as well as emerging research questions for future investigations, is presented in the last chapter of this thesis.



# CHAPTER 7

## CONTRIBUTION AND THE WAY AHEAD

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This chapter concludes the discussion of our research investigations. We begin by summarizing the arguments and findings of the work discussed in the previous chapters. We then proceed to discuss the achievements and contribution of this research as far as its underlying research disciplines and subject areas are concerned. Next, we discuss the boundaries and limitations of our research regarding both the methodology followed and the object investigated. We conclude the chapter by identifying and discussing a number of avenues that our current research has shown for future research in the same or closely related areas.

### 7.1 Summary of Research

This research was primarily concerned with identifying factors affecting strategic decision making on an alliance's governance mode. The increasing number of strategic alliances and mostly those involving an exchange of technology components or knowledge, since the early 1980s, has motivated a growing body of research on strategic alliances. The principal research concerns with respect to the governance of strategic alliances revolved around the issues of market versus hierarchical mechanisms employed to govern alliances, or otherwise stated, the choice between equity and non-equity alliances. The debate on the most appropriate governance mode, as a critical strategic decision to be made at the firm level, provided the motivation and the starting point of this research.

The majority of current studies in this field have grounded their arguments on the Transaction Cost Economics theory, which adopts a cost perspective for grounding its arguments on the appropriate alliance governance. According to them, equity forms of alliances are preferred in cases where there is need for protection rather than efficiency in partners' transactions, and such protection can only be provided via complex structures based on hierarchical organization mechanisms. In this thesis, we argued for the need to incorporate additional factors sourced from several theoretical perspectives on strategic alliances for building a theoretically integrated governance model. These are Transaction



Cost Economics (TCE), Resource-based View (RBV) of the Firm, Dynamic Capabilities View (DCV) and Knowledge-based View (KBV) of the Firm, Social Exchange Theory (SET), Game Theory (GMT), and Real Options Theory (ROT). Some of them have been considered as conflicting to TCE, since they provide contradicting rationales on the way firms, and more specifically their strategic managers, raise preference for the alliance governance mode. Nevertheless, this research aimed at providing evidence for the complementary, rather than contradicting, relationship of these perspectives and hence demonstrated the need for investigating governance issues of strategic alliances under a multi-perspective framework.

To enable such a **theoretical integration**, we grouped a spectrum of factors, sourced from each of the aforementioned perspectives, into three (3) antecedent levels, commonly identified by research on strategic decision-making integration frameworks. These are environmental, organizational, and alliance-specific factors. The theoretical integration also concerned the examination of both the cost and the value aspects of alliance formation and governance. Transaction Cost Economics (TCE) has been accused for a cost minimization emphasis that neglects the interdependence between exchange partners in the pursuit of joint value (Zajac and Olsen, 1993). To overcome this shortcoming, our research involved an examination of theoretical perspectives that emphasize more on the value rather than the cost aspects of alliance formation. The two theoretical perspectives that primarily focus on the value capture potential of strategic alliances are Game Theory and Real Options Theory.

To assist towards the fulfillment of the integration goal, a **context-specific approach** to alliance governance decision-making was adopted. This approach concerned governance decisions made by companies and alliances that operate in emerging technology-based industries, also concerned as high velocity environments, since they are featured by rapid and discontinuous change in demand, competition, technology and/or regulation (Bourgeois and Eisenhardt, 1988). Strategic decision making is problematic in such environments (Bourgeois and Eisenhardt, 1988). On the one hand, firm strategies must assure flexibility, ability to change, and speed of response. On the other hand, their strategies must target innovation, and thus involve some risk, but under an as safe as possible environment. Thus, strategic decisions should provide a balance between flexibility and protection from the uncertainty that any innovation incurs.



The primary output of this research was a **conceptual mediation model** theorizing the direct and indirect impact of a set of antecedent factors concerning the organization, the environment, and the alliance itself on the preferred governance mode for a strategic technology alliance. The primary motivation of building a conceptual model was identifying and interpreting the mechanism under which the three antecedents affect the governance decision. The underlying proposition of this research was that the three primary antecedent factors affect the governance decision not only directly, but also indirectly through the mediating role of the *Expected Alliance Value (EAV)*.

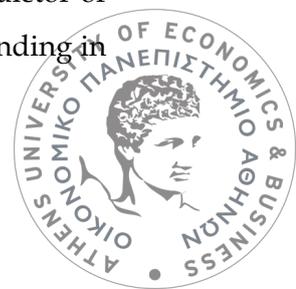
A core argument of this research was that strategic managers make their decision based on the type and degree of the expected alliance value. These two value parameters were also defined under the influence of the same antecedent (environmental, organizational, alliance-specific) parameters determining the firm's alliance governance preference.

To enable empirical testing of its theoretical propositions, this research focused on an instance of high velocity environments, namely the wireless business environment. For data collection and analysis, we employed a **mixed method research methodology**, involving a sequence of quantitative and qualitative techniques. At the first stage, a survey was conducted to explore the alliance governance decision-making mechanism by establishing a theoretical order of relationship/causality among the hypothesized predictors and mediating factors of the conceptual model. A great volume of quantitative data was collected and analyzed with the aid of a Structural Equation Modeling (SEM) technique, namely Partial Least Squares (PLS). At a later stage, an "extreme cases analysis" approach, involving qualitative data on two particular alliances, one in the form of a recurrent contract and one joint venture, was applied in order to confirm the quantitative results.

## 7.2 Achievements and Contribution

### 7.2.1. Major Findings

The most significant finding of our empirical investigations was that the Expected Alliance Value does not have a statistically significant mediation role in the proposed governance model. Instead, it has been proven to be a statistically significant predictor of our ultimate dependent variable, the firm's governance preference. Putting this finding in



a theoretical context, we could argue that a firm's expectations for value capture constitute a significant determinant of their preference for the alliance governance mode. However, the Expected Alliance Value does not operate as mediator, and thus does not intervene between the antecedents of the governance (input) and the governance preference (output).

The statistical analysis of empirical data provided support for the significant influence of the six out of nine hypothesized predictors of alliance governance preference; 1) alliance history, 2) strategic orientation, 3) partner compatibility, 4) competitive relationship, 5) firm size, and 6) expected alliance value. Three of them were finally validated through the case study part of our research; alliance history, partner compatibility and firm size. The remaining parameters were not confirmed from the case study method, because their values in the two examined case studies were either reverse to the hypothesized ones or non-definite.

Grouping the exogenous factors of the conceptual model under the three prime antecedent levels (organizational, environmental, alliance specific) enabled us to make estimations about the impact of each antecedent on the firm's governance preference through an inductive logic. Hence, based on statistical analysis results on the isolated impact of each factor, we found that the firm's governance preference is mainly determined by a number of organizational and alliance-specific influences. On the contrary, the impact of environment-specific factors proved almost negligible. This may be due to the primary assumption made, which also guided the research design, according to which all firms and alliances operate in a highly competitive and volatile environment. Hence, it was expected that no significant fluctuations would exist on the values of these two parameters in the empirical sample. Conversely, alliance-specific parameters had a significant influence on the preferred governance mode. This explains why the same firm might have different preferences for the governance mode of alliances to which it has participated, based on features of its partner and their unique bilateral relationship.

Although the initially proposed mediation relationship was not empirically supported, the value of the mediation model was identified in alternative ways. First, through the empirical analysis of the mediation model, we identified three significant predictors of the

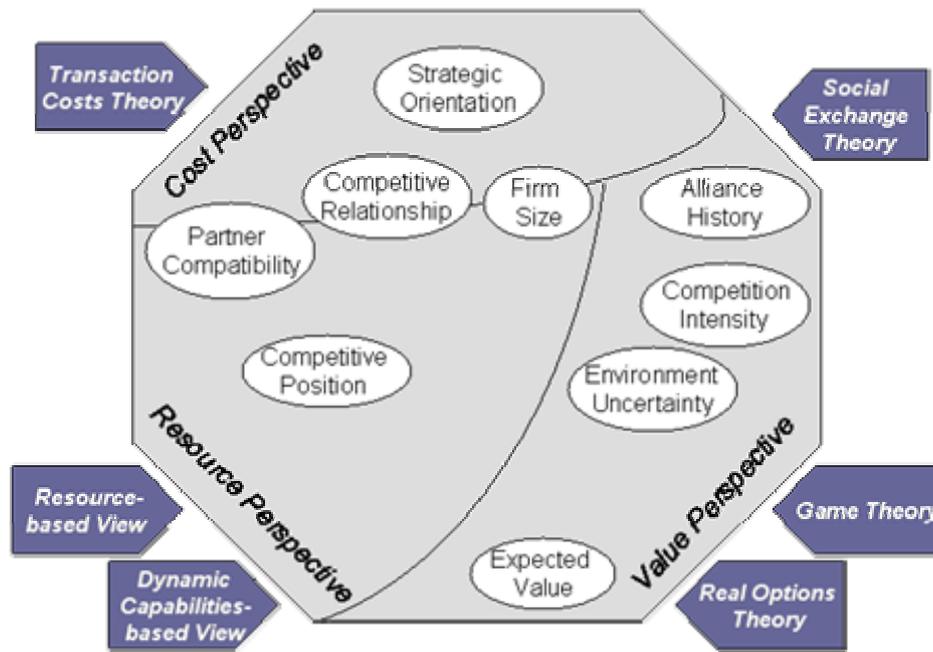


Expected Alliance Value (EAV); 1) competition intensity, 2) partner compatibility, and 3) partner competitive relationship. The first two factors have a positive impact on the value of the EAV, while the third is negatively associated with it. Moreover, the mediation model prevailed over competitive models (direct, semi-mediation) regarding the number of identified predictors. Firm size and partner compatibility were only identified in the mediation model. This is considered a substantial shortcoming of the remaining models, given that the impact of these two parameters was confirmed from the validation part of this research.

### **7.2.2. Contribution to Theory**

This primary contribution of our research is to the field of strategic alliances. Through our theoretical and empirical investigations, we provided evidence that the alliance governance decision is affected by multiple factors, the impact of which cannot be explained by adopting a single perspective. Transaction Cost Economics, the most commonly applied theory for explaining the governance issues of strategic alliances, has yielded a number of factors (i.e. asset specificity, alliance scope, behavioral uncertainty), which address the cost aspects of strategic alliances and affect the balance between partners' protection and alliance efficiency. Nevertheless, factors that relate to value aspects have been rather neglected by TCE. Such aspects are addressed by the Resource and Knowledge-based Views of the firm, as well as perspectives emphasizing on partners' interactions (Social Exchange Theory, Game Theory) and valuation perspectives (Real Options Theory). This research constituted an attempt towards building a multi-perspective governance model, which would express not only the cost, but also the resource and the value aspects of the alliance governance issue. The following figure illustrates the hypothesized predictors classified under each aspect, related with the theories used to explain their impact on the governance mode of strategic alliances.





**Figure 7-1. A multi-perspective governance model**

The development of a multi-perspective model was finally achieved through the detection and demonstration of a complementary relationship amongst the various perspectives being traditionally applied in the strategic management literature to investigate the governance issue. The complementary relationship of the various perspectives raised through research hypotheses supported by more than one perspectives under a different, albeit balancing, rationale, which propose the same preference for the alliance governance mode, and research hypotheses concerning decision-making factors not addressed by traditional perspectives but supported by emerging theoretical perspectives, such as the expected alliance value parameter sourced from the Real Options Theory.

Through our empirical research, we indicated that TCE is efficient but not sufficient for explaining strategic alliances in dynamic environments, featured by a high degree of uncertainty. While there has been some critique of transaction costs reliance on opportunism (Ghoshal and Moran, 1996), our empirical study provided support for several hypotheses that are based on the concept of opportunism. Following the Mayer and Bercovitz's future research recommendations (2003), we examined the significance of opportunism in such environments by testing whether prior relationships provide a level of trust that reduces the need for more protective governance provisions (suggesting that



opportunism is of great concern) or whether prior relationships provide learning opportunities that allow transacting organizations to improve their bilateral coordination through more refined contractual provisions. Our study was illustrative of the second case, thus indicating the insufficiency of opportunism in guiding governance decisions in uncertain environments.

One of the most important parameters taken into consideration when developing the conceptual governance model for technology-based industries was uncertainty. While TCE examines uncertainty deriving from partners' heterogeneity and potential opportunistic behavior, ROT studies the effects of uncertainty sourced from changes in customer requirements, competition, and regulation in a dynamic environment. The diversity of what uncertainty means has urged the formulation of different propositions regarding the preferred governance mode. While partners' behavioral uncertainty drives firms to more complex (quasi-hierarchy) coalitions, ensuring protection for their members, environment uncertainty requires firms to pursue flexibility through looser (quasi-market) partnerships. That is why results that are consistent with transaction cost expectations about the relationship between uncertainty and governance contradict real options expectations about the relationship between uncertainty and governance. We noticed and stressed this conceptual difference from a very early stage of our investigations and thus handled uncertainty in two ways. On the one hand, the partners' behavioral uncertainty triggered a number of hypotheses (such as those postulating on the impact of firm size and partners' competitive relationship) that advised over the more safe quasi-hierarchy governance structure. On the other hand, the environment's uncertainty was introduced as both a direct predictor of the preferred governance mode and as a condition under which the expected value may lead firms towards the more flexible quasi-market governance structures. Thus, this research has demonstrated the necessity for incorporating both aspects of uncertainty, since they may drive to diverse suggestions regarding the governance mode of alliances. Our empirical research has proved that under conditions of high perceived environment uncertainty, strategic managers do pursue value for their firm through quasi-market alliances, whereas under the risk of their partners' behavioral uncertainty (i.e. due to competitive relationship), large-sized firms do tend to prefer hierarchical alliance modes.



Another contribution of this research has been the introduction of an additional building block, called Expected Alliance Value (EAV), which denotes the value that a firm expects to capture from its participation in an alliance. The key elements of this value reflect the most important strategic motives of a company for entering the alliance. No previous research has introduced this parameter as a predictor of the alliance governance mode. This research has proved that the Expected Alliance Value has a significant influencing power. Moreover, the empirical research has contributed to identifying predictors of this newly introduced construct. As explained in the previous sections, the empirical research proved that competition intensity, partner compatibility, and partners' competitive relationship exert great influence on manager expectations for the overall value that the alliance will raise for their firm.

While most of the examined background perspectives - mainly Transaction Cost Economics, Resource-based View, and Knowledge-based View - have been extensively applied and tested in several empirical studies (Osborn and Baughn, 1990; Colombo, 1998; Pangarkar and Klein, 2000; Chen and Chen, 2003), the experimental investigations on factors sourced from the Real Options Theory are rather limited (Leiblein and Miller, 2003). Instead, there are an increasing number of studies arguing over the application of the Real Options Theory to the study of organizational governance (Barney and Lee, 1998; Leiblein, 2003; Sanchez, 2003). Our research contributes to this research stream, and more broadly to strategic alliance literature, by testing hypotheses, and thus providing empirical evidence, on the impact of several ROT-related factors, such as environment uncertainty, competition intensity and expected value, on the choice of alliance governance. The analysis of our empirical data has identified the significant influencing power of one of these factors, namely the Expected Alliance Value. On the contrary, the impact of the other two ROT-related factors, environment uncertainty and competition intensity, was proven non-significant, possibly due to the confirmation of the assumption made that all alliances of our sample were set in an environment perceived as highly competitive and uncertain.

While previous studies have organized factors influencing the alliance under the theoretical perspective they are associated with (Colombo, 1998; Leiblein and Miller, 2003; Chen and Chen, 2003), our research followed a rather novel approach for grouping the factors sourced from the various theoretical perspectives. Based on an integrative



Strategic Decision Process Framework (Rajagopalan et al., 1993), and basically on their definition of three antecedent factors affecting strategic processes, we built a strategic decision model describing how the strategic choice of alliance governance mode (a strategy content issue) is made under a specific decision context (a strategy process issue). The decision context was specified through a number of organizational, environmental and decision-specific influences. The application of a Strategic Decision Process Framework provided a scientifically legitimate way to integrate a set of antecedent factors, sourced from different theoretical perspectives, and thus enable their comparable examination and analysis under the same conceptual governance model.

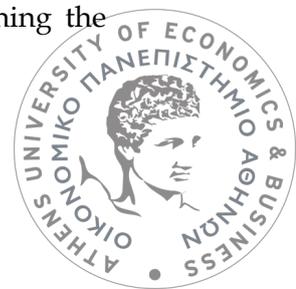
Last, the findings of this research have also contributed to emerging literature on strategic decision making in high velocity environments. Strategic technology alliances have received limited attention in literature focusing on high velocity environments. Our research has contributed to this field by supporting that strategic technology partnering in high velocity environments needs to be configured under considerations of both flexibility (value) and efficiency (costs).

Summarizing, this research work has contributed to multiple theoretical fields; a) to the field of strategic alliances, by building an integrative theoretical model including the influences on firm preference for alliance governance mode sourced by different theoretical perspectives, b) to strategic management, by defining an interrelationship between a strategy content issue and a strategy process issue, and c) to the emerging literature on high velocity environments, by analyzing strategic alliance decisions made in these settings.

### 7.2.3. Practical Implications

The theoretical constructs and the empirical outcomes of this research have several practical implications. Potential users of the model include **alliance researchers/ analysts** and **strategic managers/ executives** having an active role in their firms' decision process regarding strategic alliances.

Strategic managers have a ready-to-use framework, the parameters of which they should assess before making their decision on a prospective alliance's governance mode. Thus, they can apply the model to build their own decision-aiding tool for determining the



preferred governance mode of an alliance. This implies that strategic managers put weights on each factor, as well as to each of the three antecedent levels (organizational, environmental, alliance-specific), and use them to form the firm preference on the governance mode of an intended alliance. Weights to factors and levels may be decided either in individual or firm level. In the first case, weights are attributed by each manager separately and thus the final preference reached by each manager. Nevertheless, this will raise a significant opportunity for the firm to decrypt the decision-making process followed by the executive staff on strategic alliance issues. In the second case, weights are decided in common by the executive board to comply with the firm's policy on strategic alliances and its long-term strategic goals.

The continuous change in technology-based industries forces managers to be highly considerate of hidden value and risks incurring from the formation of strategic alliances. Thus, the construct of Expected Alliance Value provides a framework under which strategic managers can define and estimate the value pursued and ultimately achieved from each alliance. Value estimation can help them in the management of the examined alliance, but principally in its evaluation, against the strategic or tactical objectives set by the firm at the outset of the alliance. To do so, they could use the list of expected benefits listed in this research, also commonly met in the literature as strategic objectives, to specify which of them were achieved by the alliance. The degree of similarity and alignment between the initial objectives and the achieved outcomes can constitute a measure to assess the success of an alliance. For instance, in the case of Nortel and Unisystems's joint venture (Chapter 6), Nortel's decision to form the UNINORTEL joint venture was triggered by the strategic goal of reducing the market risk of promoting its wireless networking solutions in the Greek market. In a later life-cycle stage, the Nortel management may decide to assess the success of the alliance by measuring the degree to which this objective has been achieved.

### 7.3 Research Limitations

To make the current research a viable undertaking, we have set several restrictions on both the content and the design of our research. Following, we present the principal limitations regarding the methodology followed and the research object and context adopted.



### 7.3.1. On Research Methodology

We have chosen to adopt the case study approach to validate the empirical research results. Although Yin (1994) argues that the case study approach can be used to research questions that are exploratory, confirmatory, or explanatory in nature, the application of the case study method has mainly been descriptive and exploratory (Stake, 1995). The major concern about case studies is that they provide an allegedly weak basis for scientific generalizations. “How can you generalize from a single case?” is a frequently asked question (Yin, 1994). To this end, confirmatory methodologies advocating for the use of multiple case study research designs have been developed (Johnston et al., 1999). Our validation approach involved two case studies, representing the two extreme values of our dependent variable. While this approach is in accordance with Caracelli and Greene’s (1993) “extreme case analysis” strategy, we believe that, given more time and resources, more cases studies could be conducted to improve generalizability of findings, and enable the emergence of new insight from the validation phase of our research. Moreover, the aforementioned criticism concerns mainly studies where the case study method constitutes the primary empirical testing method. Instead, our research has been based on the application of the survey method for collecting quantitative data and the structural equation modeling technique for extracting valid results. Thus, case study is used as rather auxiliary or complementary to the survey method for demonstrating the applicability and generalizability of our empirical findings.

In the empirical part of our research, the dependent variable was handled as an observable (single-item) variable capturing the governance mode that constitutes the respondents’ preference for the alliance under consideration. In the existing literature, the great majority of studies have handled the governance variable as binary (Osborn and Baughn, 1990; Hagedoorn and Narula, 1996; Colombo, 1998; Pangarkar and Klein, 2000; Chen and Chen, 2003; Oxley and Sampson, 2004), and very few as categorical (e.g. Gulati and Singh, 1998). In our research, the survey respondents were asked to choose among the following governance options the one that best described the level of interdependence wished; 1) recurrent contracts (very low interdependence), 2) relational contracts (low interdependence), 3) minority investment (medium interdependence), and 4) joint venture (high interdependence). This scale concerns an ordinal rather than a numeric variable, since the intervals between the four scale-points cannot be considered equal. However,



the use of PLS analysis required all data to be in interval scale. Therefore, we had to transform the governance mode variable from ordinal to interval data. To do so, we have assumed that the ordinal governance variable is based on an underlying variable with an unknown interval metric. The use of ordinal variables, such as the 5-point Likert scale, with interval techniques (e.g. multiple regression, canonical correlation, structural equation modeling) is the norm in contemporary social science. Moreover, according to prior theoretical and empirical analysis (Boyle, 1970), regression and path coefficients are generally quite stable, and thus there are no empirical dangers when equal scales are assumed and ordinal variables are transformed to interval.

### **7.3.2. On Research Content and Design**

The research aimed at building a model that specifies the factors and reveals the mechanism through which firms, and more specifically their strategic managers, form their preference for the governance mode of an alliance in which they intend to participate. Towards this aim, the research adopted the manager perspective on viewing strategic alliances, and thus examined a set of factors corresponding not to objective measures, but to managers' conceptual frameworks, involving perceptions for the market and the firm, as well as expectations from their relationship with another partner. Moreover, the research has been restricted to capturing data on the perspective of a single partner on the alliance. Since any alliance involves at least two parties, it would be interesting to investigate how the individual preferences of firms entering a negotiation regarding a strategic technology alliance affect the course of the negotiation itself, and thus the finally implemented governance structure. However, this was set out of the current research scope.

Based on the primary assumption made that strategic decision-making differs between stable and dynamic environments (Chapter 1), the research scope was defined to involve alliances in high velocity, also referred as dynamic, environments. Moreover, the empirical research focused on the Greek wireless and mobile market for a number of reasons explained in Chapter 4. Provided that this is an emerging market, which means that providers of wireless products/services exhibit intense business activity, the number of consolidated strategic alliances was not large enough at the time when the survey took place. Therefore, the pool of alliances from which we could draw data was rather limited.



Whereas large firms operating in this market had a larger portfolio of alliances, due to the market's high competitiveness and uncertainty, they were somewhat reluctant to provide data related to their long-term strategy. As result, the empirical research was restricted to 57 alliances, which is considered marginally sufficient for analyzing data. This limitation also affected the choice of the PLS rather than any other SEM technique.

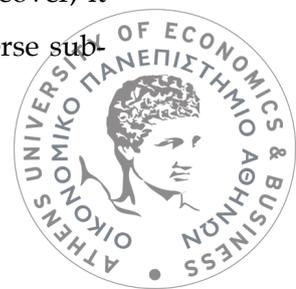
Finally, in the present form of the model, all factors were equally weighted as far as their impact on the decision over the preferred governance of inter-firm collaboration is concerned. However, it is natural to expect that some factors have a greater impact than others. Moreover, the model, in its current form, does not take into account direct or indirect relations among the various antecedent levels and their factors (e.g. correlation among firm size and alliance history) that may affect the governance preference raised. The following section discusses such issues and provides motivation for future research that could address them.

## 7.4 The Way Ahead

In this section, we intend to illustrate some avenues for further research in several fields of the strategic alliance literature. The most significant ones are; alliance governance, alliance management and evolution, and alliance valuation.

### 7.4.1. High Technology Environments

One of the limitations discussed in Section 7.3.2 concerned the choice of the wireless sector as the single dynamic environment in which the conceptual model was empirically tested. The research has opened up an opportunity for testing the same conceptual model in other dynamic environments (e.g. biotechnology, microchips, software, and so on). The most prominent direction for extending our empirical investigations involves the broader Information and Communication Technologies (ICT) sector, to which the wireless sector also belongs. It would be of outmost research interest to make a cross-comparison of the empirical outcomes derived from the application of the model in sub-sectors of the ICT market, such as software, hardware, telecommunications, and Internet services. Such a research stream would improve the research outcomes in many ways. First, it would increase the sample size, and thus guide to more reliable and valid results. Moreover, it would enable cross-comparison of statistical data collected from surveys in diverse sub-



sectors, thus encouraging research on building a sound governance model applicable to any high velocity setting.

#### **7.4.2. Alliance Governance Research**

The validation stage of our research has provided insight on a number of new hypotheses that could guide future empirical work. Some of them involve a reverse to the hypothesized value of the concerned independent variable, and test its influence on the preferred governance mode. This is the case for the 'firm size', 'alliance history', 'environment uncertainty', and 'competitive relationship' factors. Thus, future research could provide hypotheses regarding the impact of the 'small firm size', 'short alliance history', 'low environment uncertainty' and 'moderate competitive relationship' on strategic managers' governance preference, as proposed in Chapter 6.

The model intends to support, rather than substitute, the decision process by ensuring that strategists take into account all parameters (endogenous and exogenous alike) when contemplating whether to enter an alliance and what the appropriate governance mode would be. Thus, in its present form, the model has mainly descriptive and explanatory power. Its ability to predict the preferred governance mode is limited to the assumption made that the three antecedent levels and the factors included in each of them are equally weighted in terms of power of influence. However, it is rational to assume that not all factors will affect the governance decision to the same degree. A natural extension of our research would be towards investigating the relative weight of each statistically significant factor and expanding the model to increase its predictive power. This would require updating the empirically tested model to include only the six identified predictors of the governance variable, collecting data on a validation sample, and finally conducting a regression analysis on those data with the aim to extract the weight of each hypothesized predictor.

Another area for future research concerns extending the use and value of the model in order to extract a number of factors that affect the actually implemented, rather the individually preferred by each partner, alliance governance mode. A rather simplistic way to do so is applying the model more than once, and so many times as the number of partners is, so that the preference of each partner is captured. However, since the result may include set of contradicting governance preferences, further research is required



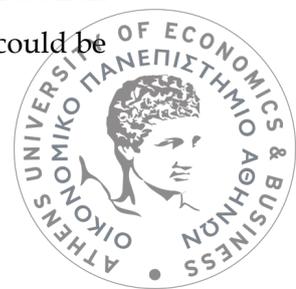
towards factors that finally lead the governance choice in such cases. These may or not relate with the antecedent factors of our model, such as partner size and negotiation power, contribution of resources, geographical position, and so on.

### **7.4.3. Alliance Dynamics (Evolution) Research**

Our research has explored how differences in perceptions for certain organizational, environmental and alliance-specific factors relate to the preferred structure of a future alliance. To do so, it assumed that changes in one or more initial conditions or alliance formation processes affect the structuring of the alliance. Future research may consider exploring the conditions under which the preference for a governance mode may change over the alliance duration. However, such research requires a longitudinal analysis exploring intermediate feedback loops on values for the factors that describe initial conditions and their possible influences on the initial governance preference. For instance, as trust between partners increases over time, the initial concerns for opportunistic behavior may deteriorate, and thus partners may opt for a more closed partnership (quasi-hierarchy). This example takes into consideration a possible change on a single factor, and thus its impact could be easily specified. As an alliance proceeds, it is expected that more than one factors corresponding to initial conditions may change. Considering that a factor may change more than once over the alliance duration, and that the influences of the transformed factors may be contradicting, we realize that there is open space for both theoretical and empirical research on the interaction between static (governance) and dynamic (evolution) dimensions of alliances.

### **7.4.4. Alliance Valuation Research**

As explained in Section 7.2.2, one of our primary contributions has been the proposition and empirical validation of the impact of the EAV factor on the preferred governance mode. This contribution has been restricted by a theoretical assumption, discussed in Chapters 2 and 3, according to which the Expected Alliance Value includes a number of expected benefits, which can be theoretically met as strategic contributions of alliances (Contractor and Lorange, 2002). Thus, the structure provided on organizing these benefits has been adopted from literature on strategic contributions and motives of alliances. A challenging future research stream would involve initiating an exploratory research aiming at developing a measurement scale for the Expected Alliance Value. This could be



either a generic scale applicable to any business environment, or a customized scale concerning dimensions of the alliance value in dynamic environments. As soon as the dimensions of the value are defined, one could assign weights to these dimensions. Towards this direction, we urge conducting empirical research using a mixed methodology, which would include qualitative techniques (e.g. interviews with managers) for capturing insight from strategic managers on possible items of the construct, as well as quantitative techniques (e.g. factor analysis) for defining the construct structure and weights for its dimensions. This research would further encourage a replication of our empirical study to re-test our proposed mediation model using a more reliable and customized mediator.

## 7.5 An Ultimate Reflection

In the global information and telecommunications industry, the pace at which new technologies and products are developed and introduced is remarkably high, and product lifecycles accordingly short. As a result, several challenges for the managers of strategic technology alliances emerge. First, they have to be alert on regularly updating their business plans to include efficient business processes of technology/service innovation. Second, they should watch out to reap the benefits of firm specialization to enable short product development. Thus, strategic decisions should balance between exploration, pursued via innovation, and exploitation, pursued via combining capabilities and assets with other companies.

An emerging body of business research examines the impact of strategic managers on driving an alliance to success (Stiles, 1994; Spekman et al., 1996; 1998). The alliance manager is the person charged with carrying the alliance forward at each stage in its lifecycle. Alliance managers may play many different roles (strategic sponsor, facilitator, mediator) depending on the current life-cycle stage of the alliance. In the early stages, the alliance manager is a strategic sponsor, a combination of visionary and emissary. He is responsible for transferring the vision of the firm to a number of decisions that have to be made regarding the alliance formation and operation, such as partner selection, alliance duration, and alliance governance mode.



Recognizing that strategic managers play a critical role in alliances, and that their role becomes more difficult under the pressure of competition and uncertainty prevailing in high-tech environments, our study demonstrated that they decide on the appropriate governance mode of their prospective alliances under the following concerns:

- Taking advantage of trust developed through prior cycles of the same or other alliances with the same partner(s).
- Reaping the benefits of partner compatibility for exchanging skills and resources, and thus producing new products and knowledge.
- Exploiting their large size to invest in new ventures with smaller companies possessing resources or skills of competitive advantage.
- Growing via pursuing product/service diversification and integration.
- Capturing value by fulfilling the strategic objectives that the firm has set at the formation stage of alliances.

The formation and management of strategic technology partnering is to a great degree affected by capabilities and tools that strategic managers possess. Our research aimed at developing a tool able of analyzing strategic managers' cognitive processes in deciding on the governance mode of their alliance. Future research efforts should be oriented towards producing those analytical and decision-aiding tools that will help strategic managers to make efficient management decisions throughout the alliance lifecycle.



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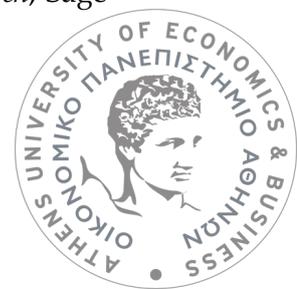
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## APPENDIX A:

### FULL SET OF RESEARCH PROPOSITIONS AND HYPOTHESES

ID	Research Propositions and Hypotheses
Proposition 1:	Environmental factors affect the firm preference for an alliance governance mode.
H1a.	<i>The greater the environment uncertainty, the more quasi-market governance modes will be preferred for the alliance.</i>
H1b.	<i>The higher the competition intensity, the more quasi-market governance modes will be preferred for the alliance.</i>
Proposition 2:	Organizational factors affect the firm preference for an alliance governance mode.
H2a.	<i>The larger the firm size, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
H2b.	<i>The stronger the firm competitive position, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
H2c.	<i>The higher importance is attributed to the growth strategies of diversification and integration, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
Proposition 3:	Alliance-specific factors affect the firm preference for an alliance governance mode.
H3a.	<i>The greater the partner compatibility (resource complementarity, cultural and operational compatibility), the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
H3b.	<i>The more intense the partner competitive relationship, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
H3c.	<i>The longer and the more quasi-hierarchy the prior ties of partners, the more quasi-hierarchy governance modes will be preferred for the alliance.</i>
Proposition 4:	Managers' expectations for the alliance value affect the firm preference for an alliance governance mode.
H4.	<i>Under conditions of uncertainty, the higher the alliance value, the more quasi-market governance modes will be preferred for the alliance.</i>
Proposition 5:	The relationship between environmental factors and preferred alliance governance mode is mediated by the expected alliance value.
H5a.	<i>Perceived environment uncertainty is positively associated with managers' expectations for the alliance value.</i>
H5b.	<i>Perceived competition intensity is positively associated with managers' expectations for the</i>



*alliance value.*

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Proposition 6: The relationship between organizational factors and preferred alliance governance mode is mediated by the expected alliance value.

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H6a. *Firm size is negatively associated with managers' expectations for the alliance value.*

H6b. *Firm competitive position is negatively associated with managers' expectations for the alliance value.*

H6c. *Firm strategic orientation towards diversification and integration is positively associated with managers' expectations for the alliance value.*

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Proposition 7: The relationship between alliance-specific factors and preferred alliance governance mode is mediated by the expected alliance value.

H7a. *Partner compatibility (resource complementarity, operational and social compatibility) is positively associated with managers' expectations for the alliance value.*

H7b. *Partner competitive relationship is negatively associated with managers' expectations for the alliance value.*

H7c. *Alliance history is positively associated with managers' expectations for the alliance value.*

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## APPENDIX B:

### SURVEY QUESTIONNAIRE

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#### Expected Benefits from the formation of Strategic Technology Alliances in the Mobile Business Market

##### SELF-ADMINISTERED QUESTIONNAIRE

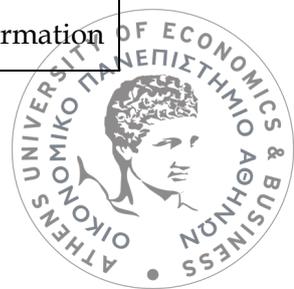
##### Survey Purpose

This questionnaire has been developed as part of a PhD research, which takes place in the Department of Management Science and Technology (DMST) of the Athens University of Economics and Business (AUEB), and investigates the diverse types of alliances under which firms join forces and compete in the **emerging market of mobile and wireless technologies**.

This research identifies three primary types of strategic technology alliances:

- a) Joint Venture. Involves partners that agree to combine their resources and capabilities to create a separate company under their joint ownership (e.g. set up of the FreeMove venture in March 2004 under the joint ownership of Orange, Telefonica Moviles, T-Mobile and Telecom Italia Mobile).
- b) Minority Investment. Involves the purchase of equity shares of one organization by another and the acquisition of a position on the board of directors (e.g. minority investment of Siemens Mobile Acceleration (SMAC) in Playo in February 2004).
- c) Long-term Contract-based Agreement. Involves partners that commit under a long-term contract to exchange resources and capabilities for a common strategic purpose (e.g. strategic agreement between France Telecom and SAGEM in March 2004 for the development of mobile location-based services).

You are kindly requested to contribute to this research by providing us with useful information and insight on: a) a specific alliance between your company and another one (**dyadic relationship**) within the mobile/ wireless business market, b) basic information



on your company's business identity, position and strategic orientation, c) characteristics of the external environment in which your company activates. The alliance discussed in this questionnaire can be either operating, terminated or even under advanced negotiations.

The Athens University of Economics and Business (AUEB), which is the prime sponsor of this research, declares that the collected data will be used only for aggregate analyses and will not publish any information about the company and the manager that participated in this survey.

After completing the questionnaire, please send it to:

**Adamantia Pateli** {[pateli@aub.gr](mailto:pateli@aub.gr)}

Department of Management Science & Technology  
Athens University of Economics & Business  
Euelpidwn 47A & Leukados 33, T.K. 113 62  
Tel: +30 210 8203663, Fax: +30 210 8203664



**SECTION A: STRATEGIC ALLIANCE IDENTITY**

In this section, you are requested to provide information regarding a **specific alliance that your company has formed in the past or intends to form in the near future**. Having this alliance in mind, please provide responses regarding: a) primary features of the alliance (e.g. purpose, scope), b) characteristics of your partner, and c) your expectations (as individual) from this alliance's formation.

**A1. COMPANY NAME:**

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**A2. PARTNER NAME:**

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**A3. YEAR OF ALLIANCE FORMATION:**

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**A4. YEAR OF ALLIANCE TERMINATION (if has been specified):**

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**A5. Please choose from the list your partner's relative geographic position:**

Same Country	<input type="checkbox"/>	
Other Country in the Same Continent (please specify country):	<input type="checkbox"/>	<input type="text"/>
Other Continent (please specify continent):	<input type="checkbox"/>	<input type="text"/>

**A6. Please choose from the list the primary purpose for which this alliance has been formed:**

Develop new products/ services	<input type="checkbox"/>
Develop and promote standards	<input type="checkbox"/>
Globalize/ Expand into new markets	<input type="checkbox"/>
Join forces to compete dominant players	<input type="checkbox"/>
Obtain new competence	<input type="checkbox"/>
Other (please specify):	
<input type="text"/>	



**A7. Please choose from the list the type of alliance that you have preferred on behalf of your company:**

<u>Recurrent Contract-based Agreements</u> (e.g. between an application and a content provider for the development and launch of a new mobile service)	<input type="checkbox"/>
<u>Relational Contract-based Agreements</u> (e.g. between an application and a content provider for the maintenance and continual update of a mobile portal)	<input type="checkbox"/>
<u>Minority Investments</u> (e.g. equity share of a mobile application provider by an operator)	<input type="checkbox"/>
<u>Joint Ventures</u> (e.g. set up of a new company providing wireless services under the joint ownership of an operator and an Internet service provider)	<input type="checkbox"/>
Other (please specify): <input type="text"/>	

**A8. Has your company been engaged with your partner in alliances other than the present one?**

Yes  No  Don't Know

*If yes, please answer the following questions. Otherwise, continue to A9 Question.*

a) How many other alliances?  No. of Alliances

b) For how many years do you know each other?  Years

c) What type of alliance(s) did you have (choose all that apply)?

Long-term Contract-based Agreement

Minority Investment

Joint Venture

Other (please specify):



**A9. Please choose from the list the core mobile/wireless sector(s) to which your partner belongs based on its resource contributions in this alliance (choose all that apply):**

Mobile Network Operators	<input type="checkbox"/>	Mobile/ Wireless Internet Service Providers	<input type="checkbox"/>
Virtual Network Operator	<input type="checkbox"/>	Mobile/Wireless Application Service Providers	<input type="checkbox"/>
Mobile Device Manufacturers	<input type="checkbox"/>	Positioning Technology Providers	<input type="checkbox"/>
Mobile Device Retailers	<input type="checkbox"/>	Content Providers	<input type="checkbox"/>
Network Equipment Vendors	<input type="checkbox"/>	Mobile Portals	<input type="checkbox"/>
Other (please specify):	<input type="text"/>		

**A10. Please indicate which of the following types of resources has been brought to this alliance by both your company (second column) and your partner (third column). In both cases, choose all resources that apply.**

	<i>Your Company</i>	<i>Your partner</i>
<b><i>Property-based Resources</i></b>		
Financial Resources (e.g. capital, investments)	<input type="checkbox"/>	<input type="checkbox"/>
Human Resources (e.g. employees' experience, interfirm contracts)	<input type="checkbox"/>	<input type="checkbox"/>
Physical Resources (e.g. buildings, equipment, raw materials)	<input type="checkbox"/>	<input type="checkbox"/>
Technological Resources (e.g. equipment, networks, devices)	<input type="checkbox"/>	<input type="checkbox"/>
Other Organizational Resources (e.g. patents, copyrights, trademarks)	<input type="checkbox"/>	<input type="checkbox"/>
<b><i>Knowledge-based Resources</i></b>		
Tacit Know-How (e.g. organizational processes, managers' insight)	<input type="checkbox"/>	<input type="checkbox"/>
Market Knowledge (e.g. market info, customers' installed base)	<input type="checkbox"/>	<input type="checkbox"/>
Technological Knowledge (e.g. capabilities in technology development)	<input type="checkbox"/>	<input type="checkbox"/>
Management Systems (e.g. controlling and coordination systems)	<input type="checkbox"/>	<input type="checkbox"/>
Other Resource contributed by <b>your company</b> :	<input type="text"/>	
Other Resource contributed by <b>your partner</b> :	<input type="text"/>	



**A11. Please choose the category that better describes the relative competitive position of your partner in its mobile/wireless sector (specified in A9):**

<u>Lone-star</u> (no competitor):	<input type="checkbox"/>
<u>Leader</u> – has established and sustains strong position in its sector	<input type="checkbox"/>
<u>Follower</u> – major player but not leader in its sector	<input type="checkbox"/>
<u>Newcomer</u> and <u>Latecomer</u> – relatively new entrants in the sector	<input type="checkbox"/>

**A12. Please indicate how much you agree or disagree with the following statements regarding your company's organizational, cultural and resource association with your partner:**

	Strongly Disagree	1	2	3	4	5	Strongly Agree
a. Our partner's organizational values and social norms resemble with ours.	1	2	3	4	5		
b. Our executives' philosophies/ approaches to business dealings are consistent with those of our partner's executives.	1	2	3	4	5		
c. Our partner's strategic goals and objectives do not hinder ours.	1	2	3	4	5		
d. Technical capabilities/solutions of our partner and our company are compatible with each other.	1	2	3	4	5		
e. The organizational procedures of our partner and our company are compatible.	1	2	3	4	5		
f. Employees of our partner have similar professional or technological skills with our employees.	1	2	3	4	5		
g. Both companies need each other's resources to accomplish their strategic goals.	1	2	3	4	5		
h. The resources contributed by both firms are significant for serving the principal purpose for which this alliance is formed (specified in A6).	1	2	3	4	5		
i. Resources brought into the alliance by each firm were very valuable for the other.	1	2	3	4	5		



**A13. This question lists a number of benefits that may be expected by a company from its participation in a strategic technology alliance. Please, choose a number to indicate the level of your expectations for each of these benefits (no matter if they were finally materialised or not) at the time of this alliance's formation:**

	Extremely Low		Modest		Extremely High
1. Economize on the sum of production and transaction costs	1	2	3	4	5
2. Share market risk (e.g. from the production of new or differentiated products/services)	1	2	3	4	5
3. Share technological risk (e.g. from the delivery of technological sophisticated products/ services)	1	2	3	4	5
4. Increase flexibility to rapid market and technological changes	1	2	3	4	5
5. Exploit complementary resources	1	2	3	4	5
6. Gain access to the partner's resources	1	2	3	4	5
7. Internalize partners' capabilities (e.g. technological, production, marketing)	1	2	3	4	5
8. Deploy new skills and knowledge	1	2	3	4	5
9. Enable provision of products/ services in lower prices	1	2	3	4	5
10. Improve quality of products/ services	1	2	3	4	5
11. Improve quality of after sales support	1	2	3	4	5
12. Expand service delivery in new channels	1	2	3	4	5
13. Benefit from partner's strong brand name	1	2	3	4	5
14. Differentiate existing product/services (new features in existing products/services)	1	2	3	4	5
15. Extend products/services range (new products/services)	1	2	3	4	5
16. Reduce time-to-market	1	2	3	4	5
17. Increase knowledge about the partner and its social network (e.g. suppliers, complementors) for future alliances	1	2	3	4	5
18. Differentiate from competition (e.g. by developing new technological standards, creating patents)	1	2	3	4	5
19. Increase Return On Asset (ROA)	1	2	3	4	5
20. Increase market share	1	2	3	4	5



**SECTION B: INTERNAL ENVIRONMENT OF YOUR COMPANY**

**B1. Please indicate your company's size in number of employees:**

0 – 9 empl.	<input type="checkbox"/>	10 – 49 empl.	<input type="checkbox"/>
50 – 249 empl.	<input type="checkbox"/>	250+ empl.	<input type="checkbox"/>

**B2. Please choose from the following list the core mobile/wireless sector(s) to which your company belongs based on its resource contributions in this specific alliance (choose all that apply):**

Mobile Network Operators	<input type="checkbox"/>	Mobile/ Wireless Internet Service Providers	<input type="checkbox"/>
Virtual Network Operator	<input type="checkbox"/>	Mobile/Wireless Application Service Providers	<input type="checkbox"/>
Mobile Device Manufacturers	<input type="checkbox"/>	Positioning Technology Providers	<input type="checkbox"/>
Mobile Device Retailers	<input type="checkbox"/>	Content Providers	<input type="checkbox"/>
Network Equipment Vendors	<input type="checkbox"/>	Mobile Portals	<input type="checkbox"/>
Other (please specify):	<input type="text"/>		

**B3. Please rate your company's strengths relative to competition in its mobile/wireless sector (specified in B2):**

	Much Below the Average		Near the Average			Much Above the Average	
<b><i>Property-based Resources</i></b>							
Financial Resources (e.g. capital, investments)	1	2	3	4	5	6	7
Human Resources (e.g. employees' experience, interfirm contracts)	1	2	3	4	5	6	7
Physical Resources (e.g. geographic location, equipment, access to raw materials)	1	2	3	4	5	6	7
Technological Resources (e.g. equipment, networks, devices, standards)	1	2	3	4	5	6	7
Organizational Resources (e.g. patents, copyrights, trademarks, registered designs)	1	2	3	4	5	6	7
<b><i>Knowledge-based Resources</i></b>							
Tacit Know-How (e.g. efficient organizational processes, managers' insight)	1	2	3	4	5	6	7
Market Knowledge (e.g. market info,	1	2	3	4	5	6	7



customers' installed base)							
Technological Knowledge (e.g. capabilities in technology usage/ development)	1	2	3	4	5	6	7
Management Systems (e.g. controlling and coordination systems, strategic planning)	1	2	3	4	5	6	7

**B4. For each of the following, please rate your company's competitive position in its mobile/wireless sector (specified in B2).**

	Much Below the Average		Near the Average			Much Above the Average	
a. Low production costs	1	2	3	4	5	6	7
b. Time-to-market	1	2	3	4	5	6	7
c. Product/ service quality	1	2	3	4	5	6	7
d. Low prices	1	2	3	4	5	6	7
e. Quality of after-sales support	1	2	3	4	5	6	7
f. Product/service delivery	1	2	3	4	5	6	7
g. Brand name	1	2	3	4	5	6	7
h. Promotion/ advertising	1	2	3	4	5	6	7
i. Differentiated products/services	1	2	3	4	5	6	7
j. Technological superiority of products/ services	1	2	3	4	5	6	7
k. Market share	1	2	3	4	5	6	7
l. Return on Assets	1	2	3	4	5	6	7

**B5. Please indicate the degree in which your company has been involved in the following types of collaboration with third parties (e.g. suppliers, customers, partners, government) in the last 3 to 5 years:**

	Extremely Low to Null		Medium		Extremely High	
a. Customer- supplier relationships (e.g. paying an application provider to develop your company's WAP site)	1	2	3	4	5	
b. Licensing Agreements (e.g. purchase of a software package and support for a given time of years)	1	2	3	4	5	
c. Joint R&D contracts (e.g. European R&D projects)	1	2	3	4	5	
d. Contract-based Agreements (e.g. collaboration of an application and a content provider for the development, operation and support of a mobile service)	1	2	3	4	5	



	Extremely Low to Null	2	3	4	Extremely High
e. Direct Investments (e.g. equity share for an operator in the capital of a mobile application provider)	1	2	3	4	5
f. Joint Ventures (e.g. set up of a new company providing wireless connections under the joint ownership of an operator and an Internet service provider)	1	2	3	4	5

**B6. Please indicate the degree of importance that your company's corporate strategy, as it is formulated for the next 3 to 5 years, provides to each of the following strategic goals:**

	Extremely Low to Null	2	3	4	Extremely High
Increase market share in the existing markets and for the existing products/ services	1	2	3	4	5
Introduce the existing products/ services into new markets	1	2	3	4	5
Increase sales through development of new products/ services	1	2	3	4	5
Differentiate from your competitors on the existing products/ services	1	2	3	4	5
Differentiate from your competitors on new products/ services	1	2	3	4	5
Vertical Integration (with suppliers, customers)	1	2	3	4	5
Horizontal Integration (with complementors, competitors)	1	2	3	4	5



**SECTION C: EXTERNAL ENVIRONMENT OF YOUR COMPANY**

**C1. Please indicate how much you agree or disagree with the following general statements regarding the mobile/wireless sector (specified in B2) in which your company activates:**

	Strongly Disagree	Neutral	Strongly Agree
a. Very risky, one false step can mean my company's undoing.	1	2 3	4 5
b. Rich in investment and marketing opportunities.	1	2 3	4 5
c. An environment that the company can control and manipulate to its own advantage.	1	2 3	4 5
d. Technologically, a very sophisticated and complex environment.	1	2 3	4 5

**C2. Please indicate how much you agree or disagree with the following statements regarding the competition in your mobile/wireless sector (specified in B2):**

	Strongly Disagree	Neutral	Strongly Agree
a. The competitive intensity regarding product/service price in our sector is extremely high.	1	2 3	4 5
b. The competitive intensity regarding product/service characteristics (e.g. quality, package, etc.) in our sector is extremely high.	1	2 3	4 5
c. The competitive intensity regarding advertising/promotional activities in our sector is extremely high.	1	2 3	4 5
d. The competitive intensity regarding access to distribution channels in our sector is extremely high.	1	2 3	4 5
e. The competitive intensity regarding after-sales support to customers in our sector is extremely high.	1	2 3	4 5
f. Actions of competitors are almost unpredictable.	1	2 3	4 5

**C3. With respect to the rate of market and technology changes in your mobile/wireless sector (specified in B2), please indicate how much you agree or disagree with the following statements:**

	Strongly Disagree	Neutral	Strongly Agree
a. The rate in which products and services are getting obsolete in our market is very high.	1	2 3	4 5
b. Our company must change its marketing practices frequently.	1	2 3	4 5
c. Demand and consumer tastes are almost unpredictable.	1	2 3	4 5
d. The technology used for production and delivery of our products/services change often and in a major way.	1	2 3	4 5
e. There is intense R&D activity in our sector.	1	2 3	4 5



**SECTION D: RESPONDENT PROFILE**

1. FULL NAME:

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2. JOB SPECIALTY:

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3. COMPANY POSITION:

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4. TEL:

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5. FAX:

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6. E-MAIL:

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Please provide (if available) the following info on a contact person in the partner company:

7. FULL NAME:

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8. POSITION:

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9. E-MAIL:

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END OF THE QUESTIONNAIRE

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*Thank you for the valuable time that you devoted to this research!*

