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Promoting international cooperation as a strategy for economic development: A case analysis of Israeli and U.S. high-technology partnerships

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PROMOTING INTERNATIONAL COOPERATION AS A STRATEGY FOR ECONOMIC DEVELOPMENT: A CASE ANALYSIS OF ISRAELI AND U.S. HIGH–TECHNOLOGY PARTNERSHIPS

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For Linda

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ABSTRACT

PROMOTING INTERNATIONAL COOPERATION AS A STRATEGY FOR ECONOMIC DEVELOPMENT:
A CASE ANALYSIS OF ISRAELI AND U.S. HIGH-TECHNOLOGY PARTNERSHIPS

LIOR YAHALOMI

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This dissertation describes how economic development and entrepreneurship can be achieved through the mechanism of international joint ventures (IJVs). The role played by a specific type of IJV foundation-- created by the public sector in support of the private sector to foster economic development and growth-- is an important part of this research. Specifically, this research focuses on the Israel-U.S. Binational Industrial Research and Development Foundation (BIRD) in assessing the role of the foundation in promoting IJVs. Using data gathered from questionnaires and interviews of Israeli and U.S. companies, the research highlights factors influencing IJV design, management, and performance.

At the company level, several key conclusions emerge regarding the design and management of IJVs. First, the partners' commitment is critical for the project's success, even after controlling for the industry, ownership-form, age, size, and goals of the companies. Second, the industry in which the company is based has a statistically significant impact on project performance. Third, larger Israeli companies, with greater numbers of employees and revenues, perform better in IJVs than do smaller companies, even after controlling for the age and ownership-form of the firm. Fourth, Israeli firms should not rely on previous relationships with individuals in the prospective firm in choosing their U.S. partners. Finally, companies need to invest greater resources in partner selection, IJV design, and product commercialization in order to achieve greater success in the IJV.

At the broader macro level, this study documents the success of the BIRD Foundation in achieving its principal objectives of attracting new U.S. companies to Israel, encouraging U.S.

and Israeli firms to expand operations in the partner country, increasing high–value added exports, and enhancing the capabilities of the Israeli high–technology sector. It stresses the important role of BIRD–type foundation support as opposed to direct foreign aid in promoting the private sector, avoiding unnecessary governmental bureaucracies, creating mechanisms for organizational learning, and facilitating interpersonal relations that may help in overcoming political and cultural barriers between nations.

Based on the empirical results, this study makes several recommendations for improving the performance of BIRD–type foundations and IJVs. Chief among these are the need for a comprehensive set of guidelines for measuring foundation and project performance on an ongoing basis; the need to better assist companies in critical decisions regarding partner selection and in managing their partner relationship; the need for greater flexibility in determining the scale of foundation investment on a case by case basis; and the advantage of investing a disproportionately large share of funding in small businesses and start–ups, with no common ownership, and in industries in which the countries involved have a relative competitive advantage.

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CHAPTER I: INTRODUCTION

A. Introduction

Business and economic cooperation between nations is increasingly important in the the new emerging global economy. A key cooperative strategy for organizations, managers, and entrepreneurs is the strategy of international joint ventures (IJVs). Foundations created to support these initiatives can be of fundamental importance in promoting economic growth and development, in transferring knowledge between countries, and in providing risk sharing and long term stability to projects newly undertaken.

IJV foundations have a role to play as well in transferring resources from developed countries (DCs) to newly industrialized countries (NICs) and less developed countries (LDCs). Assistance through IJV foundations is complementary to direct foreign aid, while sidestepping many of the bureaucratic obstacles that inhibit the effectiveness of direct foreign aid in spurring new business. IJV foundations can promote entrepreneurship and small business development in countries with strong infrastructure, but not yet fully developed economies.

This dissertation focuses primarily on the Israeli-U.S. Binational Industrial Research and Development Foundation (BIRD). Using an extensive database of new information on IJVs from questionnaire responses of companies and interviews with key personnel, the dissertation assesses the key determinants of IJVs and the BIRD Foundation performance.

B. Purpose of the Study

This study is important for several reasons.

First, many researchers predict a continual increase in the use of IJVs in the emerging world economy (Janger, 1980; Killing, 1982; Drucker, 1973; Harrigan, 1984, 1986; IMAI, 1988). Consequently, research that will provide insight into ways of effectively creating and managing IJVs is needed now.

Second, the prospects for non-developed countries are bleak. The widening technological gap separating LDCs and NICs from DCs, and the burden of huge sums of foreign-held debt, place the economies of many of these countries at great risk. New sources of financial support are uncertain. In the current environment, there is great interest in finding new mechanisms of support for the development of NICs and LDCs, particularly those that emphasize the development of the private sector.

Third, while there is a considerable body of research on the performance of joint ventures (JVs), there is a scarcity of comparable research on IJVs. In addition, there is relatively little research on IJVs between DCs and NICs and LDCs, and what exists has tended to focus on specific aspects of IJVs. There exists no integrated conceptual model that reflects all factors of IJV organization, design, and management, and no prototype to be applied by decision makers or researchers at the national level. Largely exploratory in nature, this dissertation provides an analysis of all factors instrumental to the success of the BIRD Foundation and the IJVs it sponsored, and offers a comprehensive model of successful IJV foundations and IJVs.

Fourth, although an evaluation of IJVs exists in the literature on direct investment, multinational corporations (MNCs), public policy, economic development, and strategic management, this literature makes little effort to develop performance criteria to use in assess the primary and secondary effects of IJVs on the society as a whole. In light of this deficiency, a better understanding of the merits of IJVs may be beneficial.

C. Specific Objectives of the Study

This study has the following specific objectives:

1. To evaluate the BIRD Foundation and BIRD-IJVs with specific attention to the following:
    - key factors involved in the performance of the BIRD Foundation and IJVs
    - performance of the BIRD Foundation relative to its stated objectives
    - modifications to BIRD Foundation design and operation
    - role of the BIRD Foundation in promoting entrepreneurship and small business development.

2. To determine the key factors instrumental to the design and management of IJVs with attention to the following:

   - isolating the key problems in IJVs
   - offering a set of guidelines to be used by managers and entrepreneurs in improving IJV performance
   - recommendations for the selection of best suited partners for IJVs.

3. To understand the design and creation of a successful public IJV-foundation devoted to private IJVs with attention to the following:

   - elements necessary for successful design and management
   - development of a set of key factors necessary for IJV-foundations' success
   - development of a model for measuring the performance of public-private IJV-foundations
   - public-private IJV-foundations as a mechanism for economic development.

D. Study Questions

Two sets of key study questions have been explored in this research. One key set of questions concerns the performance of IJVs. The other set of questions concerns the role of IJV foundations as a mechanism of economic development.

Key study questions concerning the role of the foundation are:

1. How important is government involvement in the BIRD Foundation? Specifically, this research will explore the government role in:

   - guaranteeing funding of the endowment
   - designing and constructing the foundation's model
   - evaluating the technological feasibility of projects
   - controlling the major decision-making processes.

2. How does the BIRD Foundation find and help entrepreneurs in both countries?

   - Does the BIRD Foundation improve the structure of the Israeli economy by encouraging private enterprise?

3. How does the BIRD Foundation target small, medium, and large companies that cannot develop and/or commercialize their innovations without outside help?

4. To what extent is sustained funding a major reason for the success of the BIRD Foundation? In particular this study explores:

- the connection between funding and other support mechanisms such as marketing, management practices, networking, technological feasibility assessment, and business plan development
- the extent to which international joint ventures would seek or accept nonfinancial support from the BIRD Foundation in the absence of funding.

5. What types of performance measures are most suited to international joint venture foundations?

   - Are these measures applicable to other public-private international joint venture foundations?
   - What type of measures might be needed in other settings?

6. Is the performance of the BIRD Foundation different from that of the Israeli Office of the Chief Scientist?

7. To what extent does the BIRD Foundation correct market failures that occur because of unused resources such as technology and marketing know-how, and imperfect information?

Key questions concerning companies' performance measurements in this research include:

1. What are the key factors related to the performance of international joint ventures?

   - To what extent do these factors confirm or contrast with findings from other studies?
   - Is there a difference between the factors determining firm success in a developed country-- the United States—- and the factors determining success in a newly industrialized country-- Israel?

2. What factors influence companies' decision to embark on an international joint venture?

3. What are the key criteria in choosing a partner for the international joint venture?

4. What are the most typical problems and disagreements among partners in an international joint venture?

5. Does the industry influence the performance of a particular international joint venture?

- Are international joint ventures in certain high-technology industries more likely to succeed?
- What industry characteristics influence the performance of the international joint venture?

6. What is the role of common ownership among international joint venture partners?

7. Do foreign partners (the United States in this study) experience less conflict and greater satisfaction with the international joint venture than host partners (Israel)?

E. Scope of the Study

This study focuses on the BIRD Foundation and IJVs between Israeli and U.S. firms under the foundation sponsorship. The empirical results and recommendations of this dissertation are based on questionnaire responses from key personnel in Israeli and U.S. companies, and contain the following information: background on the company; goals, motives, and problems in the IJV; selection factors relating to the choice of partner; and assessment of the BIRD Foundation. The final database is comprised of 110 responses from companies. Although the results of this study are directly applicable only to the BIRD Foundation and the Israeli and U.S. IJVs, they are indirectly applicable to IJV foundations in other settings and IJVs between companies from other nations.

CHAPTER II: LITERATURE REVIEW

A. International Joint Ventures

Studies of international joint ventures (IJVs) can be found in the literature on direct investment, multinational corporations, public policy, economic development, and strategic management. These studies provide basic information about cooperative ventures. They define joint ventures (JVs), classify the types of JVs and the legal structures that underlie them, and identify the motives that lead countries and firms to participate in IJVs. In addition, some discussion of the particular advantages of IJVs for less developed countries can be found in the existing literature, as well as a general analysis of the drawbacks and problems of this type of enterprise.

What the literature does not provide, however, is any systematic method of measuring the performance of IJVs. Some studies consider the relationship between design and performance and seek to evaluate the degree of success achieved by different types of IJVs. Other studies distinguish the management strategies that contribute to the success of IJVs from those that may limit or undercut the performance of these ventures. The performance evaluation found in such studies, however, is largely qualitative or case-oriented.

This chapter reviews the literature on IJVs, highlighting specific findings by researchers. Subsequent chapters will build on the information contained in these sources and, at the same time, address some of the methodological and theoretical issues they tend to ignore.

In the last decade, there has been a proliferation of mergers, JVs, joint research and development (R&D) programs, production partnerships, research consortia, licensing, and other forms of cooperative strategies (CSs) among firms locally and internationally. International joint ventures are becoming increasingly important in international business and economic development. A growing number of governments in developed countries (DCs), newly industrialized countries (NICs), and less developed countries (LDCs) encourage and in many cases require multinational corporations (MNCs) to take local

partners as participants in their projects. Locally, within a given country, private partnerships and government participation are often the result of state intervention. Still, lowering the potential or actual equities of MNCs offers multiple benefits, such as reducing their overall risk and securing partners as allies. IJVs create a comfortable business atmosphere by increasing the role of natives in their own economy and by reducing concerns about foreign domination. In addition, through IJVs, DC firms think, plan, and implement for the long term rather than seek quick profits by taking advantage of LDCs' raw materials and cheap labor.

A JV is an enterprise created and owned by two or more firms, governments, or individuals. In addition to initial capital investment, JV partners often supply the venture with resources such as management, personnel, production facilities, and patents. A JV is distinguished from a standard corporate capital investment by its shared ownership, and from a merger by the relatively narrow focus of its purpose.

Harrigan (1986) defines JVs as separate entities with two or more active firms as partners. In this research, we will refer to JVs of this kind as "equity JVs." Operating equity JVs are partnerships in which the cooperating firms create a separate entity to carry out a productive economic activity and take an active role in its strategic decision-making and operating decisions. "Spider web equity JVs" link many firms to a single pivotal partner that is responsible for primary decision making. Depending on the needs of each partner and the sensitivity of information and resources to be exchanged, a firm could potentially forge a variety of patterns for cooperation in order to strengthen its competitive position.

In this research, the term JV is used broadly to describe any collaborative business created by two or more organizations. This definition includes equity JVs, project partnerships, and agreements affecting R&D, marketing, and production, but it excludes licensing, mergers, and acquisitions.

Legal Structure

From the legal point of view, IJVs can be formed and planned within four legal structures, namely:

- contractual - represents simplest legal structure;
- corporate - involves the formulation of a corporation whose shares are owned by the partners (referred to also as equity JVs);
- general partnership - involves the association of two or more firms;
- limited partnership - limits the liability of partners for losses in excess of capital investment.

Research does currently exist that defines JVs according to legal structure. This dissertation will not discuss in depth these aspects of JVs.

Motives for the Formation of International Joint Ventures

According to Contractor and Lorange (1988) there are two basic patterns of JV formation. Horizontal ventures are those in which the partners contribute similar inputs. Quasi-vertical ventures, by contrast, are those in which the contributions of partners are complementary. The ultimate goal of both these forms of JVs is typically a limited mission, for example, the production of a particular product or the marketing of a line of products in a specific geographic area. Gomez (1989) cites five principal factors motivating IJV formation among U.S. firms. They are:

- Governments of many countries with attractive domestic markets often try to restrict foreign ownership.
- Host country partners can ease and speed entry to new markets by providing management expertise and local contacts.
- European and Japanese businesses are creating intense competition for U.S. firms.
- Foreign firms have become increasingly attractive JV partners as their technological capabilities and market presence have grown.
- Operating on a global scale is becoming a distinct competitive advantage.

More generally, within the global community, the strategic advantages of IJVs to an international firm include:

- the ability to tap into new and potentially profitable markets
- the attraction and advantage of sharing economic risks inherent in new business ventures

- the ability to economize on transaction costs
- the benefits of pooling organizational know-how and expertise
- the ability to improve productive efficiency through the realization of economies of scale in production or specialization
- the access to local entrepreneurs with expert knowledge of their markets and cultures
- the satisfaction of nationalistic economic demands such as local government requirements for staffing and purchasing
- improved international relations through favorable and productive contacts with host governments
- reduction of the risks of expropriation by the host country.

Berg et al (1983) studied the correlation between industry return rates, potential market power, and JV formation. They investigated 300 JVs, dividing the ventures into "knowledge" and "non-knowledge" acquisitions. They concluded that industry return rates were negatively correlated to knowledge-acquisition JVs and positively correlated to non-knowledge acquisition JVs. Because the profits of market coordination are immediate whereas the payoff to R&D only takes place over the long term, knowledge-acquisition JVs do not enhance the market power of the firm.

Disadvantages and Problems of the International Joint Venture

While firms and governments have many reasons to encourage the formation of IJVs, the ventures also pose a host of problems. Contractor and Lorange (1988) argue that IJVs may cause strategic problems external to the venture itself. For example, the possibilities that the IJV will create a future competitor, while small, must be considered before entering into a cooperative venture or before transferring technology or expertise to another firm. Given this threat, companies should carefully analyze the potential partner firm. They should evaluate and monitor the relative competitive position of the potential partner to ensure that cooperation at present does not lead to competition in the future. In addition to this danger, Contractor and Lorange (1988) identify eight disadvantages or problems associated with the formation of an IJV. Their list includes:

- difficulties arising from differences in cultures
- slower decision making
- arguments over the rate and division of profits

- disputes over sourcing
- tensions in connection with the assignment of personnel
- disagreements over the form, function, or timing of future expansion
- the erosion of fundamental strategic rationales (external or environmental sources)
- disagreements on termination.

Reich (1986) has documented the problem of competition in specific examples of Japanese firms that started as junior partners of U.S. or European companies and became in short time their global competitors. Two famous examples from among those cited are the case of Western Electric, which licensed transistor technology to Sony, and RCA, which assisted Japanese companies in the process of manufacturing color-television receivers. The consequences of both these cases for U.S. firms and industry are, of course, well known.

Evaluating the likelihood that IJVs will transform partners into future competitors requires a detailed assessment of the characteristics of the industry in which the IJV occurs. To the extent that productive efficiency is enhanced through global production interaction, the risks of this type of threat are probably less severe. By contrast, to the extent that production techniques within the industry are country-specific, such a threat may be more dominant.

International Joint Venture Planning

Lorange and Roos (1987) studied the link between the design and performance of an IJV. Specifically, they researched the performance of IJVs in relation to design variables such as:

- thoroughness of analysis
- commitment to collaboration
- completeness of agreement
- intensity of communication.

They found a positive and statistically significant correlation between each of the design variables and the performance of IJVs.

Similarly, MacMillan and Charan (1987) argue that detailed and clear operating plans and explicit benchmarks for the corporate venture are fundamentally important to the IJV. Clear plans should provide the JV decision makers with rules for deciding when to redirect the project, accelerate it, or abort it. Failure results in part, they maintain, because partners prefer to take an overoptimistic view during the negotiation process, content with the "hope that things will work themselves out" (MacMillan and Charan, 1987).

Vertical Integration Joint Ventures

JVs, co-productions, R&D partnerships, and management or marketing service agreements are all forms of quasi-vertical integration, with each partner contributing one or more different elements in the chains of production and distribution. The essential feature of quasi-vertical integration in IJVs (Contractor and Lorange, 1988) is that the inputs of the partners are complementary, not similar (as in the case of horizontal IJVs).

Vertical integration JVs are of greatest importance to high-technology companies in their overall strategy, and specifically in their technology policy. A summary of the available JV literature indicates the following advantages of vertical integration:

- It avoids interfirm contracting, transactions, and negotiations costs (Williamson, 1975).
- It reduces the cost of achieving economies of scale by combining common administrative, production, transport, or information-processing activities in two or more stages of production or distribution (Contractor and Lorange, 1988).
- It improves deliveries and quality control by eliminating dependence on a third party (Riggs, 1983).
- It facilitates the internalization of technological and administrative abilities within a single firm.
- It promotes the quick implementation of technological changes.
- It allows companies to obtain a better understanding of strategy and operations within the industry as a whole, an understanding that may be used in the future for obtaining competitive advantage. (For example, many Japanese companies expanding into the U.S. market would first link up with established U.S. companies. This gave them a "beachhead" and a longer learning period before developing channels of their own.)
- It improves transactional efficiency while avoiding the major capital investment required for integration (Porter, 1986).

- It enhances the ability of companies to respond strategically to uncertainty in the environment (Harrigan 1983).

The literature stresses the following disadvantages of vertical integration:

- restricted flexibility, particularly as related to the ability to deal with a variety of suppliers and marketing outlets (Porter, 1980 and Riggs, 1983);
- increases in capital investment cost to a level higher then the firm can afford or risk, especially when operating in a turbulent business environment such as the semiconductor or oil extraction industry (Contractor and Lorange, 1988);
- the possibility that certain imbalances may be created in capacity and capability when some portions of the business are much more integrated than others;
- the possibility that the company will lose the specialization that gives it distinct competitive advantages (Riggs, 1983);
- increases in the fixed costs and thus the break-even point of production in the company, leading to greater vulnerability to cyclical fluctuation [for example, Boeing is co-developing its new "767" with Japan and Italy. Fixed costs of Boeing are lowered by contracting major parts of the airplane to its partners. At the same time, the company is sharing the development risk and gaining access to the Japanese and Italian markets (Contractor and Lorange, 1988)];
- dilution of the company's overall return on investment if the activities that the company integrates prove to be inherently less profitable than the core business (Riggs, 1983);
- the risk of causing management to overlook opportunities to manage suppliers, marketing outlets, and customers-- a risk that could increase the overall costs in case of an integration;
- reduced incentives for an individual operating unit to remain competitive if internal transfer prices do not reflect their external values (Porter, 1980);
- lost opportunities for gaining marketing or technical insights from outsiders (Porter, 1985).

From an industry perspective, vertical integration JVs established between competing firms may limit the access of outsiders to essential inputs. This restricts competition and creates inefficiencies in the marketplace. Competition may be harmed also if the parties bind themselves by ancillary restraints not necessarily essential to the legitimate purpose of the IJV, or share information that can lead to collusion in areas outside the scope of the project (OECD, 1986.)

The Management of International Joint Ventures

IJVs are increasingly being used as a strategy in mature economies like that of the United States. More IJVs will be launched in the wake of increasingly rapid rates of technological change, deregulation, and globalization, especially where boundaries between industries are less of an obstacle because of information processing and data transmission technologies. Managers in every U.S. industry will face the challenge of how to use cooperative strategies to their firms' competitive advantage (Harrigan, 1985).

A new form of competition is emerging with the following features: constellations of firms that routinely venture together, teams of companies that will replace structures where firms stand alone, and managers who increasingly emphasize effective cooperation. Firms in mature economies can use IJVs in forging global strategies. The successful implementation of IJVs within a global system presents firms and with major strategic and managerial challenges for the future. Managers should be trained to deal with difficulties that could arise in IJVs (Harrigan, 1986). Partners within the IJV should have compatible strategies and complementary strengths so as to avoid conflict (Contractor & Lorange, 1988; Harrigan, 1986; Killing, 1983). Management, when planning and implementing IJVs, should consider a host of trade-offs (for example, fully controlling a new foreign market entry as opposed to sharing the risk with a local firm or entrepreneur).

Cultural factors are a particularly important challenge for management in the process of forming and managing an IJV. When an IJV has been formed between countries with distinct cultures, there is a greater risk of failure because partners are less willing to compromise. This is most likely to occur when countries differ significantly in their socioeconomic conditions, educational backgrounds, or value systems--differences that can lead to different and often conflicting managerial goals and firm objectives (Harrigan, 1986).

Harrigan (1987) argues that directors should rotate in a pattern that provides continuity while guiding changing needs. Sponsors, on the other hand, should send their most effective employees to guide the venture activities and should make venture

management a reward for enterprising managers. At times, it may be necessary to hire outsiders for key positions to avoid loyalty conflicts and bridge communication problems.

Other problems that management should be prepared to confront in forming and managing IJVs are slower decision making, disputes over sourcing, disagreements on future changes (e.g., expansion, termination), erosion of fundamental strategic rationales, and the possibility of competitors emerging once the IJV experiences its initial success (Contractor & Lorange, 1988).

Flexibility in International Joint Ventures

Clearly, a potential source of advantage for the IJV is enhanced flexibility. Teubal (1989) claims that cooperation among firms is a way of ensuring a high degree of flexibility in the face of the combined effects of considerable financial and economic uncertainty, turbulence in the world economy, and technological change that is both rapid and interdisciplinary in nature. To achieve this advantage, the partner must be able to adjust to changing circumstances. Lorange (1985) argues that the IJV's ability to adjust to changing environmental and competitive conditions is crucial to the creation of value for the IJV over time. Niederkofler (1989) stresses the importance of the partners' ability to overcome operating misfit with structural and procedural changes, to renegotiate and reposition the partnership in order to reestablish strategic fit, and to exit at the appropriate time.

The IJV may find that its objectives are not being met and may therefore need to adjust its operation. Communication channels and trust between the management of the particular firms must be established in order to anticipate and overcome operational misfit. Niederkofler argues that operation misfit may be of two types: less serious misfit requiring minor adjustments to relationships and operation of the IJV, and major problems requiring restructuring of the original agreement and usually the consultation of top management in both parent firms. At some stage, as conflicts of interest between partners become more severe, the IJV may require a realignment and renegotiating of partners' interests. If a new basis for shared goals exists, both partners will benefit more from a

continuation of the IJV than from its dissolution. Typically, renegotiation will be followed by a repositioning of partner interests. In some cases, the problems may be so severe that renegotiation and repositioning may be impossible, and exit from the IJV is the appropriate alternative. It is important to recognize that exit may not necessarily indicate a failure of the IJV, but instead may be the best response when the IJV has completely fulfilled its objectives and little is to be gained from continued partnership.

Instability of International Joint Ventures

Kogut (1986) contends that three factors explain the instability of JVs: changes in the environment, changes in the strategy of one or more partners, and managerial conflicts. Most studies have concentrated on the managerial conflict factor. This study gives particular attention to the effect of changes in the environment and in the firms' strategy on the instability of IJVs. Kogut finds that the extent to which the firms' strategy changes has a critical effect on the survival and termination of IJVs. A study by Kogut and Singh (1986) shows a 46.3 percent instability rate for domestic and international JVs in the United States. Beamish's (1985) findings indicates that the rate of instability of JVs in LDCs is equal to that in Kogut's study--45 percent--but significantly lower than the instability of JVs in DCs, studied by Killing (1982, 1983). One of the variables tested in the BIRD Foundation case is the instability of IJVs; the results are discussed in later chapters.

Instability may also arise from conflicts between the parent firms and the joint venture. In this study I will not pursue this issue for two reasons:

- Most of the BIRD Foundation JVs are not a new form of equity organization, but a joint effort by two organizations to develop and commercialize a particular project. For this reason there have been very few conflicts of interest between parent firms and the JV.
- When focusing on the conflicts between JVs and parent firms, we are excluding conflicts of interest in other foreign entry strategies (e.g., conflict between a parent and subsidiary.)

Instability vs. Flexibility In International Joint Ventures

Although instability in JVs sometimes stems from the same sources that produce instability in wholly owned ventures, it may also result from elements unique to the JV

organizational form. Gomez is currently preparing a sample of 5,000 subsidiaries of 180 U.S. MNCs that he will use to compare the instability of jointly and wholly owned ventures.

Ownership changes occur for two reasons, the correction of mistakes and the adaptation to environmental changes. JVs are a flexible form of organization; they can adapt more easily than other forms of direct foreign investment to the environmental changes that occur rapidly in a global marketplace and in NICs and LDCs. Gomez (1989) suggests that instability in cases where changes in the environment are a result of the JV operations may be seen as a sign of success rather than failure.

Beamish (1985) explains why JVs are sometimes preferred over wholly owned subsidiaries. He argues that under particular arrangements, "the potential threats posed by opportunities and small numbers can be reduced to a point where JVs become a more efficient means of dealing with environmental uncertainty even in the face of bounded rationality."

B. International Joint Ventures and The Emerging Global Economy

The emerging global economy is increasingly international. For example, Drucker (1986) claims that companies wishing to compete successfully "will have to accept that it is the world economy that leads and that domestic economic policies will succeed only if they strengthen, or at least do not impair, the country's inter—national competitive position. This may be the most important--it surely is the most striking -- feature of the changed world economy." Clearly, IJVs and other cooperative strategies (CSs) have an increasingly important role to play in the emerging global economy-- a fact that has been recognized by several researchers.

There are several forces responsible for the new global economy. The first and most powerful force has been the impact of technology (IMAI, 1988; Toubal, 1988). The strategic postures of firms are contingent upon the nature and direction of technological change. The production of goods and services depends upon technological innovation and change. Technology, in sum, affects every aspect of our lives.3 In addition, soaring

research and development costs, shorter product life, and higher risk put pressure on companies, industries, and nations to internationalize in order to share costs, expand capacity, save time, acquire technological knowledge, and reduce risk.

A second major force in encouraging globalization of industries in DCs and NICs, where competition was previously constrained by geographical boundaries (Harrigan, 1986), is the reduction of institutional barriers to international mobility. Indeed, since the beginning of the 1970s, institutional barriers impeding cross-border business activity have gradually declined. On the global level, the new General Agreement on Tariffs and Trade (GATT) has been instrumental in reducing tariffs and quotas worldwide and establishing rules that help international trade to flourish. In addition, the International Monetary Fund (IMF) has removed barriers associated with currency convertibility. On the regional level, the emergence of "The New Europe" in 1992 will be the product of a global economic deregulatory movement, which even now is eliminating hundreds of rules governing finance and trade. Finally, the new, relatively comfortable political atmosphere that exists between the superpowers can only encourage further cooperation between countries. The easing of political tensions between East and West and the de-escalation of conflicts in several problematic regions in the world (for example Afghanistan, Iran-Iraq, Libya-Sudan, Namibia) create an atmosphere in which countries are able to transfer resources more easily and thereby utilize the mechanism of cooperation for further economic development.

In addition, international agreements between nations are spreading rapidly. At the industry and firm level, international cooperation is increasingly giving rise to JVs, cooperation agreements, joint research programs, exploration consortia, and other cooperative relationships.

The third and possibly most important force behind globalization is the development of communications (Harrigan, 1986) and the emergence of information technology. Partially the result of technology but an independent source of change, information-related industries play an increasingly central role in the new industrial development (IMAI, 1988). Perez (1985) claims that the faster growth of information-intensive services in

international trade will affect both the evolution of export markets for raw materials and other LDC goods and the composition of goods produced within countries.

Technology, the reduction of barriers to international mobility, and the development and expansion of communications systems are all factors in the growing importance of interorganizational linkages, and especially IJVs. Ulrich (1983) found four reasons supporting interorganizational linkages:

- resource scarcity
- information explosion
- increased complexity of businesses
- international competition.

CSs may hold important positive-sum-game implications not only for host economies but also for the global economy. It is conceivable that CSs in the long run do for accumulation and growth internationally what the advent of the limited liability joint stock corporation did a century ago in the context of industrial economies. Like the corporations, CSs provide a legal and institutional framework in which entrepreneurs, owners of physical assets, and financiers can join forces, separate equity ownership from effective control, and divide risks and responsibilities. In sum, cooperation among firms internationally meets the challenges of the current environmental changes and helps to overcome some dilemmas left unresolved by competitive strategy. Specifically, in technology-based industries, such as semiconductors and electronics, international cooperation offers a strategy to share resources more efficiently and to reduce risks.

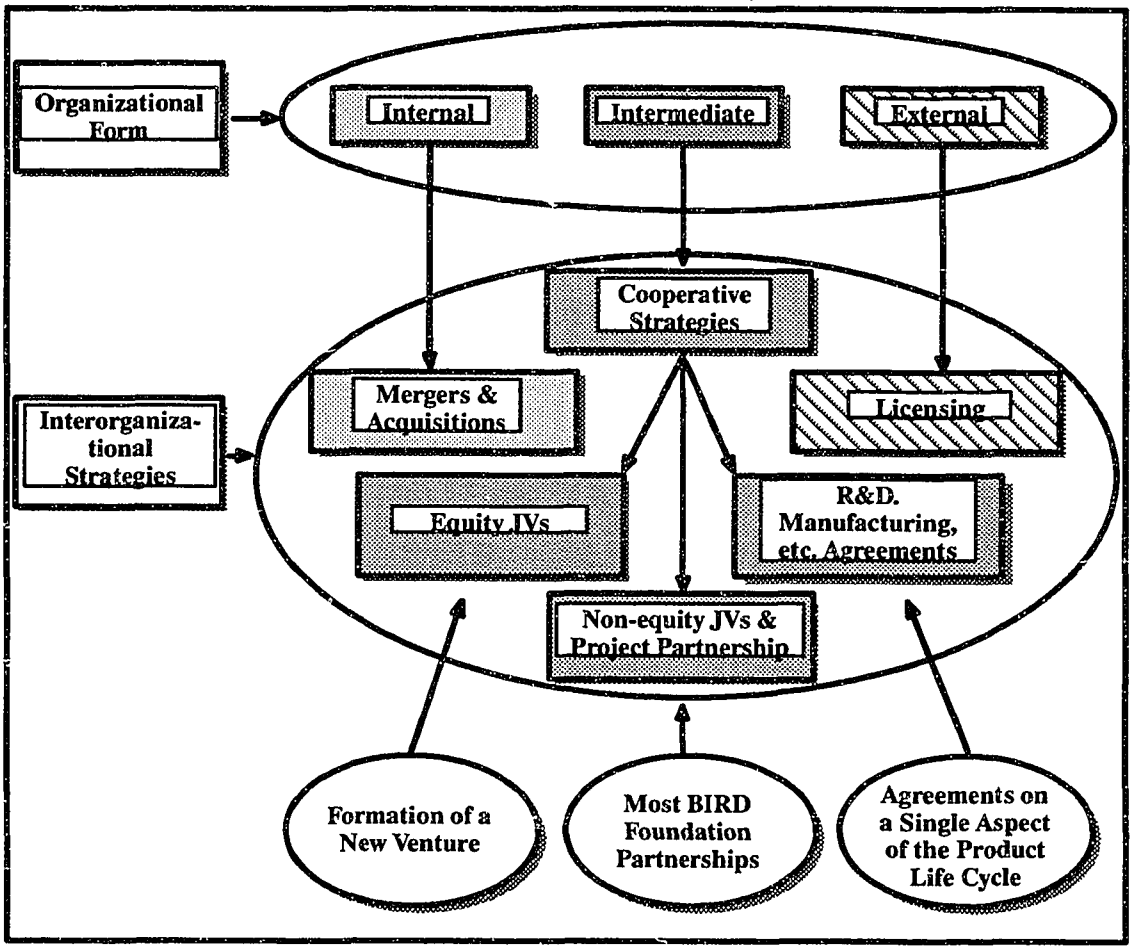
C. International Joint Ventures as a Strategy within Other Forms of Interorganizational Links

This section discusses the literature on cooperative strategies (CSs), the larger grouping to which IJVs belong.

Cooperative strategies (CSs) represent an alternative strategy to mergers and acquisitions and licensing (Exhibit 2.1). CSs are an intermediate form of interorganizational linkage and include equity JVs, nonequity JVs, project partnerships, R&D partnerships, manufacturing partnerships, and marketing partnerships. The merits

of CSs generally lie in their adaptability in resource allocation. By testing the water in a careful manner, the temporary alliance forged through CS may turn into a long term collaborative arrangement. The relatively limited degree of commitment in the partnership implied by the CS diversifies the risks of cooperation while retaining in the partnership an adequate control of technological development.

EXHIBIT 2.1
INTERORGANIZATIONAL LINKAGES



Abernathy et al. (1983) argue that the number, size, and scope of CSs have escalated dramatically during the past decade. Simultaneously, the form and purpose of CSs have changed. In the 1950s, mergers and buyouts were common in the United States and Europe. Later, JVs and minority equity participation tended to dominate. In the mid-to-late 1970s, cooperative arrangements were largely motivated by scale economies in

either production or distribution. In the 1980s, they are increasingly driven by the desire to acquire technologies and to access markets.

INDUSTRY CONCENTRATION

The literature indicates that there is a relationship between industry concentration and the incidence and form of CSs. Pfeffer and Novak (1976) find that CSs and mergers are most likely to be formed in industries with an intermediate level of concentration. Phillips (1978) claims that CSs are not sufficient for highly concentrated industries because information and coordination in these cases can occur through less expensive means. Pfeffer (1972) claims that CSs are not suited for industries with low concentration because in industries of this sort there are too many potential participants to coordinate, and because each participant affects the others' activities.

In summary, CSs may enhance the competitive position of both users and producers through the creation of new enterprises. By contrast, mergers and acquisitions cause the disappearance of an enterprise. CSs will be increasingly important in the development of new industries, the revitalization of mature industries, the rationalization of a firm's portfolio, and the enhancement of a firm's competitive advantage. Given the accelerating pace of industry evolution and the increasing interdependencies among players within previously independent industries, managers must evaluate all of their strategy options carefully, including CSs (Harrigan, 1986).

D. International Joint Ventures as a Strategy among Other Forms of Foreign Investment Strategies

Another issue addressed in the literature concerns the role of IJVs in particular, and CSs in general, among other forms of foreign investment strategies. Other existing forms of foreign investment strategies are fully owned subsidiaries, limited partnerships, production and R&D partnerships, and marketing agreements. In an increasingly international business environment, CSs have become a powerful strategy tool for foreign expansion, and the lower the firm's degree of foreign operation, the relatively greater importance attached to CS within its interorganizational network.

When MNCs establish operations in developing countries without using IJVs, developing countries, in many cases, gain very little. For example, U.S. MNCs invested heavily in Asian countries and developed export capacities in those countries. Although this certainly contributed to some extent to a creation of income in the host country, this was the sole benefit accruing to these countries (IMAI, 1988). Missing was the knowledge of technique and technology learned through partnership.

The study of IJVs is of particular interest because of the existence of various alternative foreign entry strategies. Although the bulk of empirical work in the area has focused on strategic motivation (Kogut, 1986), some research does exist exploring entry strategies and their role in minimizing transactions costs.

Stopford and Wells (1972) conducted a statistical analysis of the foreign entry strategies for 155 U.S. MNCs. Testing the wholly owned subsidiary and the JV entry strategies, they found that the use of JVs declined as the importance of technology, marketing, and product standardization increased. In cases where entry entailed product diversification, however, JVs were found to be a more useful entry strategy, predominantly because they provided a structure for acquiring local expertise.

In the case of technology IJVs between Israeli and U.S. firms, the major objectives of Israeli firms are entering the U.S. market and learning through the U.S. partner about the U.S. marketplace structure and customer needs. Specifically, this will help Israeli firms to develop and commercialize, with greater success, existing technological innovations for the U.S. large market. (This becomes a stronger factor when viewing the new Free Trade Agreement between Israel and the United States. The agreement enables Israeli firms to export free taxed goods to the United States without a local IJV partner.)

Hladik (1984) tested R&D and export-oriented IJVs in developed countries. In R&D IJVs, she concluded that the size of the market, the technological competence of the partner, and the technological resources of the host country were positively correlated with IJV formation. By contrast, she found that scale economies in R&D and the U.S. firm's technological intensity were negatively related to IJV formation. In export-led IJVs, the

IJV was more likely to be allowed to export if the product was outside of, or peripheral to, the parent's product lines.

Marketing and distribution-type agreements create several strategic advantages, including rapid access to an existing marketing establishment, links with key buyers, knowledge of the local market and culture, and benefits from association with a recognizable brand name. In sum, they provide better market access (Contractor and Lorange, 1988).

Even when the subsidiaries are 100 percent foreign owned they may be viewed as an IJV with the host government because of the risk-sharing and gains-sharing features of such operations described above. This point is easily demonstrated in the case of concession agreements established for natural resource development in LDCs. Although most extraction operations in LDCs before the Second World War were 100 percent owned in project equity by the foreign firm, the ad hoc concession arrangements between the host government and the foreign investors covered a wide range of issues defining the rights and responsibilities of both parties. The effects of such operations were the same as those of IJVs.

Ad hoc contract arrangements of this sort are still popular in natural resources sectors. Although less visible, and certainly less dynamic, ad hoc arrangements in the manufacturing sector of LDCs seem to be no less pervasive (Hasan, 1980). It is this ad hoc feature that makes our problem interesting to analyze. If operations function under a uniform set of rules and regulations, then the government-firm IJV problem becomes an institutional question (Kwok, 1981).

Cooperative Strategy: A New Foreign Investment Strategy

New form of investments have come to occupy a central place in the international strategy of firms around the world. Cooperation as a foreign investment strategy entails assets for an investment project or enterprise in the host country, but the foreign company does not hold majority ownership of the investment project or enterprise as such. Among new foreign strategies are JVs in which foreign equity does not exceed 50 percent, licensing

agreements, management contracts, franchising turnkey and "product in-hand" contracts, production sharing and risk-service contracts, and international subcontracting. Projects are ones that are at least 50 percent locally owned, with some assets supplied by one or more foreign companies. Oman (1988) argues that LDCs are promoting CSs over more traditional foreign strategies (TFSs-- mainly direct investments) so as to enhance local control over industry and to circumvent the re-extracting powers of multinational firms, powers seen as being embodied in TFS. In the first half of the 1970s interest rates were lower and many developing countries pursued strategies of debt-financed growth, with greater reliance on CSs for access to nonfinancial assets when necessary.

Cooperative Strategies and Traditional Foreign Strategies

The changing international division of risks and responsibilities reflects a tendency for some MNCs to modify their views on the advantages and disadvantages of CSs over TFSs. Companies find that they can earn from certain tangible or intangible assets that they can supply without necessarily having to own or finance projects. By supplying assets via CSs, they can also benefit from increased leverage, and CSs often mean reduced exposure to the commercial and political risks accompanying TFS. Newcomers use CSs to compete with established MNCs: offensively, to penetrate or increase market shares; and defensively, when their managerial and financial resources are stretched thin. By sharing technology, control, and profits with local partners, they can benefit from their partners' knowledge of local markets, local financial resources, and willingness to share risks. Finally, some MNCs use CSs as part of a strategy of disinvestment, as technology diffuses and products mature and become increasingly price competitive.

In general, the importance that MNCs attach to CSs relative to TFSs is likely to be determined less by developing government decisions than by the dynamics of interfirm competition and by the interaction of these dynamics and host-government policies. Those dynamics reflect patterns of technological innovation and of supply and demand that are global in scale, but they tend to be industry-specific.

MNCs tend to concentrate their efforts in industry segments where barriers to entry, and hence value-added and profitability ratios, are highest, while at the same time the MNCs can maintain or increase flexibility. Within these areas, the MNCs will focus on strategic activities such as technological innovation, marketing, and key aspects of management. These activities could increasingly become their primary bases of control and profits in a world economy characterized by the growing internationalization of production and interfirm competitiveness, coupled with rapid technological change and considerable instability in world product and financial markets (Oman, 1988). In other words, MNCs may become intermediaries for both the input (technology and management) and output (world market) sides of industry in developing countries while shifting a greater share of the investment risk associated with the investment process onto international or, more likely, third party country partners.

The future of CSs will depend largely on the dynamics of interfirm rivalry, especially on whether more newcomers and followers will want to expand through CSs. Most international investment is still in the OECD region where the emphasis is on mergers and acquisitions. In many countries, especially Latin America, modern elites have consolidated their power through import-substitution industrialization.

Many competitors (including some that engage in CSs only because of developing countries' regulations) have come through experience to appreciate the potential advantages of CSs over TFSs in terms of risk shedding and increased leverage. Others, particularly relative latecomers and market-share followers, have found CSs to be an effective means of penetrating new markets and/or increasing market shares in competition with established MNCs. In sum, IJVs are often a superior route of overseas investment when compared to the acquisition or creation of a wholly owned subsidiary for the following reasons:

- strong investment incentives that encourage local participation, offering a lower cost of capital for the new IJV
- the potential to secure technological know-how with a relatively small financial commitment
- lack of knowledge of the local regulatory climate

- strong legalities and policies restricting other forms of foreign investments.

E. Technology and Cooperative Strategies

Technology is changing the nature and basis of competition among firms operating in similar industries, but as Porter (1985) points out, there is not yet a comprehensive view of how technology can be a foundation for creating defensible competitive advantages for firms. Researchers in industrial economics have taken a narrow view of technological competition (Wu, 1989), focusing on the relation between technology input and output, firm size, diversification, industry seller concentration, profitability, and technology as part of the firm's overall competitive strategy. Porter (1985), emphasizing the inner working of firms, focuses on the ultimate impact of technology on cost reduction and differentiation. However, the ways in which technology change can alter firms' strategy in competition or cooperation with competitors are left unexplored.

The technology of NICs represents a unique challenge to world economic developmental efforts. The technological gap between NICs and DCs is narrowing, and the bargaining power of transferees (NICs) is increasing. Because of these developments, transfers of technology are more equal, more reciprocal, faster, and more adaptive. The current literature does not deal adequately with the dynamics of technological competition and the shifting of competitive advantage. The focus of technology transfer has been on the host-country's economic development level. At the firm level, there is very little literature dealing with the important issue of the transferees' ability to absorb and adapt the technology to its best local use.

Technological development has a profound impact on the formation and evolution of an industry. Focusing only on the role of a particular firm is no longer sufficient, because the boundaries of firms become blurred because of interfirm linkages. The transfer of technology from DCs to NICs and LDCs is perhaps the major mechanism of economic development.

This study will focus on a different direction of technology transfer, namely from the NIC (i.e., Israel) to the DC (i.e., the United States). The mechanism for the development

of the NIC, in this case, is the transfer of marketing know-how, management expertise, and commercialization activities from the DC. In addition, development relies on the ability to link technological innovation and development to the relevant marketplace and the needs of customers. United States MNCs' subsidiaries have set up foreign laboratories for the following reasons (Fusfeld, 1958):

- to have a window on foreign science
- to gain access to special skills not easily available in the home country
- to develop new sources to explore technical concepts
- to establish, in the international environment, corporate operations concerned with science and technology.

An interesting study by Berg et al. (1983) examined JVs and R&D expenditures of the firm. Their major finding is that where joint venturing increases, expenditures on R&D activities decrease. The conclusion of this research is that JVs act in the aggregate as a substitute for internal R&D in technology-based firms. Another conclusion is that management strategically decides to acquire part of its technology externally for speeding the R&D activities, buying technological innovations not available from their company, and sharing the risk of developing new technologies.

According to Oman (1988), CSs are more frequent in investment projects using relatively stable or mature technology than in those using high or rapidly changing technology. There are three reasons for that tendency:

- Host countries are more likely to accept foreign ownership and control in return for the high technology.
- Host countries recognize that companies forced to share ownership and control with local partners are less likely to transmit continuing technology improvements that constitute key corporate competitive assets to affiliates they do not fully control.
- International CSs tend to concentrate, like traditional foreign direct investments, in host countries, principal growth industries, or high value-added segments within industries.

F. International Joint Ventures between Small and Large Technology Firms

Faster entry into a market may be possible if the testing and certification done by one partner is accepted by the authorities in the other partner's territories, or if one partner

cedes the legal rights to a partially developed process to another firm which then refines it and shares its rewards in a JV. This is a typical JV pattern among smaller and larger firms (Doz, 1988). IJVs between small and large technology firms constitute a unique partnering experience, which has been explored recently in the literature.

Radtke et al. (1987) explore the rationale for CSs between small and large technology firms. They find that while the small firm has the ability to recognize and respond quickly to opportunities in specialized market niches, large firms possess many of the key resources needed to exploit a new business opportunity fully. The large firms' key resources include:

- name recognition
- established marketing channels
- distribution and field service operations
- greater capital resources
- effective and experienced management of production, administration, and distribution.

Niederkofler (1989) found three factors to be key in small firms seeking linkages with large firms, namely:

- distribution channels
- credibility with banks, customers, and suppliers
- capital to finance a high growth rate.

This study suggests three additional advantages for the small- and medium-sized firm that engages in a cooperative partnership with a large firm:

- help in overcoming entry barriers, including trade barriers
- the ability to compete more effectively in an existing market
- the achievement of scale economies enabling the smaller firms to compete more effectively with larger, more established firms.

The Niederkofler study confirmed the basic model of Stevenson (1983) and Jarillo (1986) in suggesting that smaller firms are not deterred from the pursuit of an opportunity by a lack of resources, but instead cooperate with larger firms to gain control of external resources. Doz (1988) studied some critical issues in technology partnerships between larger and smaller firms. He argues that the partners' purposes need not be identical, only sufficiently compatible, to allow agreement on a minimum set of operational goals. He

found that cultural distance, uncertainties, misunderstandings, and hidden agendas make such partnerships difficult. For large firms, internal support for the partnership is subject to organizational politics; therefore, they may find it hard to maintain consistency in their relationships with smaller firms.

Williamson (1975) argues that small firms may find internal resources to be inadequate in meeting growing financial needs. This study identifies the nonfinancial resource problems of small firms as important, since resource deficiencies of this sort cannot be alleviated with money. Hull et al. (1988) argue similarly that money is not enough. Small firms need access to markets, manufacturing know-how, and managerial expertise, all of which can best be provided by a cooperative strategy with a large firm. Without such intangible resources and informal exchange, small firms can neither survive nor grow.

This is applicable to small firms in LDCs as well as DCs. In the United States, most of the export goods are delivered by large corporations. Today, more small- and medium-sized companies are realizing the potential of the international marketplace. For U.S. small businesses, export JVs offer a means by which they can obtain some of the advantages of large firms (e.g, scale economies, risk minimization, elimination of redundant costs, and market development). The export trading act of 1982 was created to stimulate new entrepreneurial initiatives in export trade by encouraging, in particular, U.S. small- and medium-sized firms to be more creative in designing and implementing export ventures.

The "dominance hypothesis" argues in a short-sighted manner for the overall superiority of large over small firms. The reality is that the economy consists of a mixture of large- and small-scale firms, and the survival and proliferation of small firms is proof that they are necessary to the market. Small firms have many advantages over large firms. One of the main characteristics of smaller firms is their high degree of innovation. A study by the National Science Foundation (1979), for example, found that small firms spend their R&D dollars four times more effectively than do large firms.

Large firms may seek CSs with smaller firms in order to utilize the unique capabilities of the small firms, such as the small firm's dominance in certain rapidly advancing technologies. Niederkofler suggests the following reasons for large firms to engage in CSs with smaller firms:

- the "window on technology" provided by some small firms
- exposure to new markets
- diversification and growth
- enhancement of entrepreneurial spirit
- management development and training
- subsequent acquisition of companies.

Niederkofler (1989) groups these motivating factors into two groups: strategic motivations and pure financial motivations. Strategic motivations relate to the long term survival of the firm and its growth. Financial motivations are those concerned strictly with the return on investment. Furthermore, he divides the larger firms' rationale for cooperation into two areas: coping with and taking advantage of technological change, and enhancing corporate entrepreneurship. The large firms he studied formed strategic alliances to complement their internal capabilities and to broaden their existing product lines. Others used joint venturing to diversify into a new business area or to prepare for a fundamental technological transformation of existing business.

Niederkofler (1989) does not find support for the importance of entrepreneurial management training and organizational change in CSs forged between large and small firms. One possible explanation for this result is that enhancing corporate entrepreneurship is a strategic concern of higher level decision makers than those interviewed in his study. Finally, he reports that in all six cases studied, the larger partners pursued a strategic rationale rather then purely financial motivations. The larger firm either intended to protect or enhance its existing competitive position by complementing its own product line, or to establish a competitive position in a new market by diversifying or preparing for fundamental technological change. In national economies, especially those of LDCs and NICs, the local government policies and procedures are an important

factor in firms' competitive and cooperative strategies. The importance of CSs in the realization of national objectives can not be underestimated.

G. International Joint Venture Foundations and International Joint Ventures in Government Policies

IJVs, and the foundations that are created to support and promote them, must be viewed in a larger context of governmental policy. The use of IJVs and other CSs is influenced heavily by the attitude governments take towards partnering in general.

Investigations into the efficacy of IJVs and other forms of CSs are especially timely now that some governments have been taking a friendlier attitude toward the use of cooperative ventures. In his dissertation research, Wu (1989) finds that CSs are a congruent part of a country's industrial policy. He argues further that major European and Japanese MNCs are aggressive pursuers of CSs. Finally, the role of cooperative formation in the planning and implementation of national economic objectives should be emphasized.

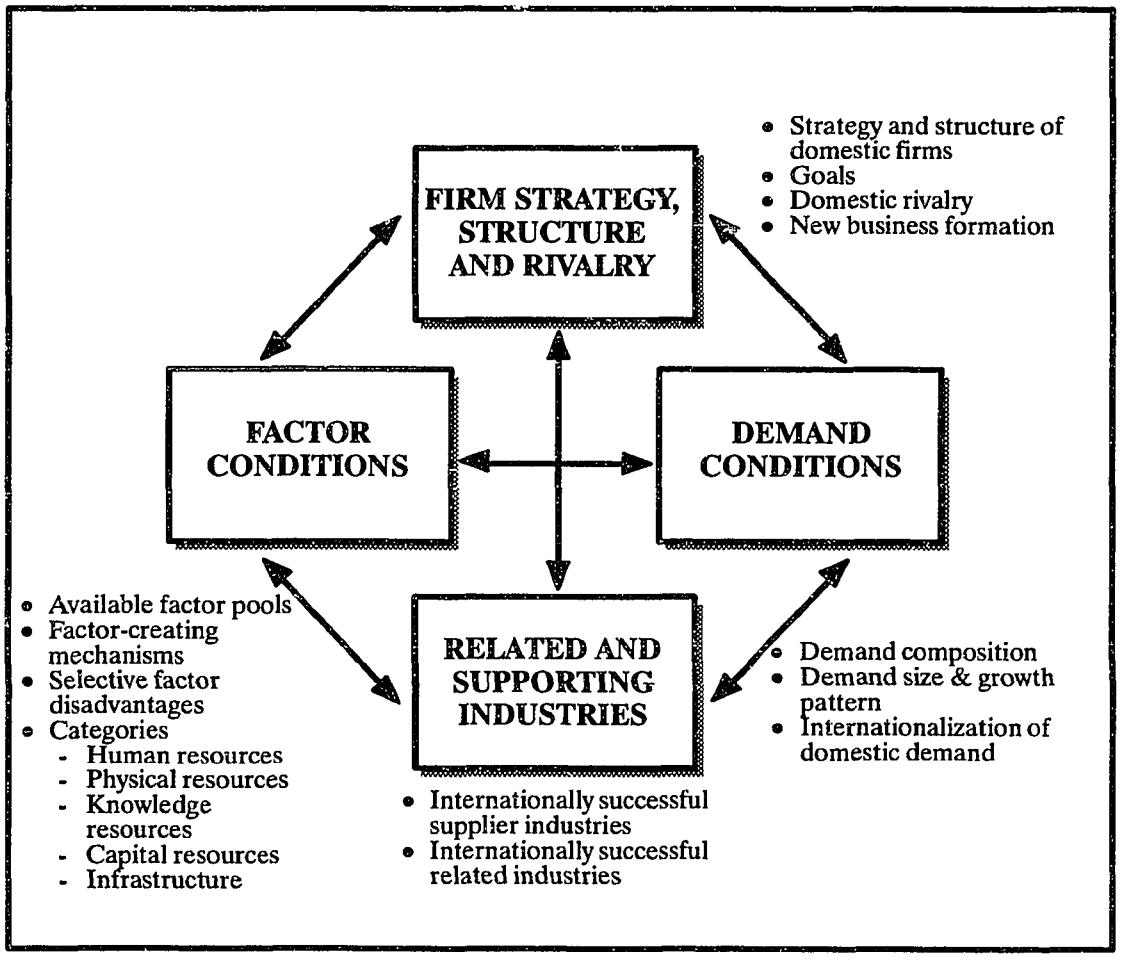
Globalism could be seen as superseding the role of the nation in international competition. This view of competition is a static one since it is based on eliminating inefficiencies in the economy and taking advantage of scale economies as the key for success. According to Porter (1990), this is the way in which European companies and governments are approaching the unification in 1992. He claims that an approach based on static economies would prove beneficial, but he argues that companies and governments would do better to approach international competition more dynamically by focusing on rapid technological progress. In addition, in Porter's model, the nation as an economic entity maintains a central role in global success.

Nations differ markedly in the industries, and segments thereof, in which their firms have competitive advantage in the world market. These competitive advantages become greater in an open-border, non-tariff world economy. In the knowledge- and skill-intensive industries that form the backbone of advanced economies, Porter finds that competitive advantage springs not from static efficiencies but from constant improvement and innovation and from the ability to upgrade competitive advantages to more sophisticated

types. Four characteristics of a nation singly and jointly shape the capacity of its firms to achieve and sustain advantage:

- the presence of advanced and specialized human resources, technical infrastructure, and other factors of production needed in the industry
- the presence of sophisticated and demanding home customers, whose needs anticipate those abroad
- the existence of home-based suppliers and related industries that are internationally competitive
- the presence of capable, committed, fiercely competing local rivals.

EXHIBIT 2.2
DETERMINANTS OF NATIONAL COMPETITIVE ADVANTAGE
THE DIAMOND MODEL



One of the key lessons from Porter's model is particularly applicable to the Israeli government and the BIRD Foundation. Porter stresses that no nation can compete

internationally in all industries. Specifically, in the case of the Israeli economy, which is relatively small and in the process of maturing, the government should encourage and promote the development of particular sectors. Given that the BIRD Foundation targets high-technology firms, the foundation might achieve a higher success rate overall if they were to concentrate efforts in select industry sectors that have the potential to be internationally competitive.

Competitive advantage, in the Porter (1990) model, arises in part from local rival competition that may be in opposition to JVs and CSs. Specifically, global success arises from a process that is often highly localized in the national and, at times, regional levels. National differences in culture, values, and institutions are not threatened by global competition but vital to success in it. Competitive advantage arises when several local rivals pressure each other to advance. This benefits the entire national industry by stimulating specialized industries. In addition, it accelerates successful global competition. Finally, the national environment becomes a self-reinforcing system that promotes rapid progress. Porter finds that widespread collaboration within a national industry is a sign of decline. For example, in his study of national economies of ten DCs, the most competitive industries were those in which capable national rivals were pressuring each other to advance. (Porter maintains, for example, that the success of Japan's economy is due in part to fiercely competing local rivals rather than to cartels and collaboration. In its global leading industries, Japan has nine car-makers, fifteen TV-set manufacturers and ten fax producers.) The most successful industries have strong local competition that creates a challenging environment fostering constant innovation and improvements.

In sum, Porter's recommendations for governmental policies are:

- Competition policy: Governments need to design their antitrust policies to promote competition among firms within an industry. Mergers and alliance among leading rivals should be prohibited. Privatization should be carried out in a way to prevent national monopolies.
- Trade policy: Quotas on foreign products should be eliminated, as should various types of subsidies to inefficient local companies and industries.
- Cooperative activity: R&D collaboration should be restricted among rival companies; most R&D activities should be conducted internally. This strategy

will enforce active independent effort. In addition, government policies should not encourage joint production and joint marketing activities among competitors.

- Standards: Stringent standards for product safety, quality, and environmental impact promote international competitiveness by pushing firms to improve and innovate.

Whereas Porter stresses that CSs can be an obstruction to competitive strategy, other researchers highlight the complementary role of CSs. Telesio (1979) argues that the basic motivation of licensing has to do with the innovative environment and the R&D policy of the firm. He points out that in industries where the rate of technological advance is rapid and continuous innovation exists, cross-licensing between competitors prevents a block to the technological development of an industry.

Twiss (1980) states that DCs' firms should use CSs as a complement to their competitive strategy and internal R&D policy. The firm's technological strength, product line diversification, and international experience determine how it can exploit its technological leadership in CSs with other firms. For NICs' and LDCs' firms, technological strength, understanding of the DC marketplace, and local comparative advantage are defining channels for importing appropriate technologies.

JVs form the most convenient mechanism to overcome government-mandated investment and trade barriers (Contractor and Lorange, 1988). These more or less protectionist policies are not exclusive to LDCs or planned economies. For example, Japan is known for its exclusionary policies, and these policies are a major factor in the decisions of hundreds of U.S. firms to use the JV mechanism as the most practical way to sell products in the Japanese market.

Development of Cooperative Strategy at the Industry Level

The literature on foreign direct investment by MNCs and on the mechanism of technology transfer provides evidence of the shifting emphasis of investment patterns over time. The emergence of the world economy is profoundly influencing both the competitive structure of world industry and the competitive structures of its major participants. Differences in government economic policies and antecedent customer demands are

creating new grounds and incentives for cooperative strategies among national industries. Wu (1989) argues that government policies seem to carry more weight in the formation of IJVs in some industries. In his study of strategic alliances in the telecommunications and computer industries of six western countries (Canada, France, West Germany, Japan, England, and the United States), he found that government policy helped to create more alliances in the telecommunications industry than in the computer industry.

Each industrial sector demonstrates its own alliance pattern. The reasons lie in the market size, growth, and structure of each industry. In the aerospace industry, for example, cooperative strategies among firms are relatively numerous because of high costs, the uncertainties involved in making new investments, and the great variety of components and subsystems required to develop and commercialize final products. In the petrochemical industry, Stobaugh (1984) found different patterns of transfer both at the domestic and international levels. He also observed that licensing was used more intensively than either JV or full equity ownership in international expansion.

Government Policy in Science and Technology

In the context of accelerated internationalization and rising R&D costs, policy issues regarding JVs must be set against the background of the new challenges to national science and technology policy making. Co-operative R&D projects, set up with a view to pooling otherwise dispersed R&D resources and creating linkages that may accelerate the process of technological accumulation, are quite definitely instruments of contemporary science and technology policy. They should serve to introduce and diffuse new technology (Teubal, 1989). In the view of national and industrial policy makers, collaborative R&D projects provide five important advantages:

- Direct resources are granted to alternative R&D activities, and purely duplicative activities are eliminated (Peck, 1986; Technology JVs).
- Economies of scale are realized in R&D through greater human capital and more numerous research facilities and equipment (Peck).
- Research diversification makes it possible to explore several alternative approaches to a given objective, thus reducing the risk of failure (Peck).
- The commercialization phase is entered with a better assessment of the technological feasibility of, and technological alternatives to, a given product.

- Time loss is avoided.

Governments are often involved directly or indirectly in collaborative negotiations for one or several reasons (Teubal, 1989):

- The government plays a role in supporting R&D in a specific industry.
- The government plays a role as buyer of products through public procurement contracts.
- The government controls the export of products and/or particular technologies for national security reasons.

This involvement can also have industrial and technological policy dimensions stemming from the high-technology and strategic features of the industries concerned. These industries not only carry out R&D, but also play a decisive role of a technology-pull and technology-diffusion character. They involve the development and manufacture of products with systemic traits, products that create interfirm linkages beyond the circle of firms that belong to the industry. Consequently these industries have a strategic role from the standpoint of contemporary technological and industrial development, independent of the strategic (for example, defense-related) role that they may also play. Teubal (1989) claims that, for governments, interfirm technical agreements are both a part of the contemporary scene and a particular type of technology policy instrument. In the case of precompetitive cooperative R&D efforts, agreements are an instrument of government policy for the creation of new technology or the consolidation of the domestic R&D base.

Governments should be aware that interfirm agreements will have numerous impacts on the structure and organization of domestic technological capacities and on the patterns of technological specialization and complementarity among countries. The result of internationalization in industrial technology is the current complicated patchwork of intra- and inter-firm corporate networks directed to the sourcing and exploitation of technology. These networks of interfirm relationships straddle national frontiers, incorporating domestic technological capacities in ways that are at present mainly the outcome of corporate strategies. Finally, governments are faced with the need to assess the extent to which these agreements and networks contribute to the objectives of national technological

policy, notably the building of interactions and synergies required, at a national or regional level, for the development of new technologies.

Government Firm Bargaining Power

Host government policies affect the ability of international firms to cooperate successfully. Although official government policies of LDCs and NICs are more restrictive than similar policies in DCs, government intervention in LDCs and NICs is more flexible and embodies many more incentives for foreign investments. These policies vary, of course, between countries and with respect to the industry and foreign firm involved. (For example, Vishay Intertechnology, Inc., a Philadelphia-based international electronic company, has been a given variety of incentives, both financial-and non-financial, to expand its Israeli subsidiary. These extra incentives do not appear in any Israeli government industrial policies, and are not available for most other internationally based companies as well as some Israeli firms).

A firm's international cooperative strategy, as part of its overall competitive strategy, relies on the relative bargaining power of the host government and the firm. This study identifies several factors influencing the firm's bargaining power:

- the anticipated amount of exports
- the expected amount of local purchase and the necessity in the local market
- the absolute number and proportion of foreign/local nationals employed
- the firm's nationality and the overall relationship between the countries
- the firm's industry-competitive position
- the firm's size
- the firm's performance
- the firm's R&D expenditures
- the operational and managerial complexity of the proposed investment entity.

Small Country Issues

Small firms from small countries will be affected negatively if their objectives in establishing IJVs are to compete with large firms in countries possessing large technological bases and power in the world marketplace. Small country firms should make use of IJVs in securing access to a wider market and in acquiring the technology necessary

for the commercialization of their technological innovation. In exchange, they will share with the larger firms their expertise in a specific technology or product. The success attained by a small country firm is likely to depend on:

- its bargaining power relative to its experience and the degree of dominance it exercises in its market
- the appropriateness of its technology innovation to the marketplace
- the degree to which its technology is characterized by a dominant design or is in a state of technological flux
- its ability, when developing a successful innovation, to acquire complementary and necessary assets for a successful commercialization.

As familiarity with IJVs and their potential competitive advantages spreads worldwide, the IJV may come to be used as a vehicle by many small- and medium-sized firms to internationalize their operations. Such firms have tended to be excluded from traditional foreign direct investment because of their limited financial and managerial resources bases relative to those of the MNCs. Small firms should be able to exploit via new foreign investment mechanisms certain types of assets they commonly possess (e.g., a unique product technology or organizational and technical know-how better adapted to small-scale production). The collective importance of smaller firms in industrialized countries is so great that the stimulus to such firms that would result from their "multinationalization" via new foreign investment could have a major positive impact on the economies of their home countries.

NICs should adopt industrial policies to pool resources and to create valuable and unique products that can compete in the world marketplace. Those policies should give firms in small NICs the support to transform local industries to global status (Porter, 1980).

CHAPTER III: FRAMEWORK FOR ANALYSIS

A. Theories Supporting the Concept of International Joint Ventures

This chapter will place the topic of IJV foundations, international product partnership, and entrepreneurial development in a suitable theoretical context in order to guide the research in this study. More specifically, it will apply to IJVs important concepts drawn from the following branches of theory:

- the transaction cost paradigm of organizational design
- the strategy paradigm of organizational design
- the technological aspect of competitive strategy
- entrepreneurial development.

Studies of IJVs can easily be found in the direct investment, economic development, and multinational corporations literature, but most of the existing research focuses upon the politics, developmental effects, and rationale for entering the joint venture. Except for a few cases (e.g., Adler, 1976; Hasan, 1980), the methodology and approach used in the literature are qualitative, empirical, and/or case oriented. Existing studies supply us with prolific data and useful recommendations. However, serious theoretical studies of JVs are few in number. Without some theoretic structure for the problems considered, the unique merits of JVs are difficult to sort out and analyze (Kwok, 1981).

The transaction cost and strategic theories provide us with standards for planning, managing, and evaluating CS programs. The value of such programs can be established or measured through the criteria of profit maximization (the strategic paradigm) or cost efficiency (the transaction cost paradigm). The strategic paradigm provides an additional measure of performance for CSs--the achievement of competitive advantage. These criteria can be applied to the planning, management, and evaluation of BIRD IJVs and the BIRD Foundation--a task the study will undertake in Chapters V and VI.

The transaction cost (TC) approach to CSs is derived from the theory of TC as developed by Williamson (1975, 1985). It analyzes joint ventures as an efficient and cost-minimizing solution to the hazards of economic transaction.

The strategic behavior perspective stems from theories concerning the firm's strategy, and how strategy influences the firm's competitive position. It places JVs in the context of competitive rivalry and collusive agreements to enhance market power.

Macro-organizational theory is another form of theory dealing with JVs. Hannan & Freeman (1977) and Pfeffer & Salancik (1978) analyze environmental conditions conducive to interorganizational cooperations. This literature is based primarily on public sector relationships, rather than on CSs at the firm level, and so is only partially applicable to JVs in the private sector. In this study, the author decided not to explore further the relevance of macro-organizational theory to the design and implementation of JVs.

One possible reason for the shortage of serious theoretical attention to JVs is the complexity of their organizational form. Williamson (1975) argues that JVs contain elements of both external markets and internalization of activities, and hence do not fall neatly into either a "market" or a "hierarchy" category.

Intermediate forms of organizational interfirm transactions are best suited in the environment contexts market with rapid change, high risk and great uncertainties (see Exhibit 2.1). These international organizational linkages are driven by the firms' international strategic direction and are constrained by the dynamic forces of the market, technology, and the emerging global economy. The economic paradigm is the main source of the literature on JVs. The most vigorous work (within the economic paradigm) is that based on transaction cost theory.

Transaction Cost Theory and Cooperative Strategies

Coase (1937) initiated the application of the TC paradigm to the design and structure of organizational relationships. Williamson (1975) elaborated the theory, prompting its wide acceptance in marketing, organizational design, labor contracting and corporate strategy. The basic aim of TC theory is to distinguish the conditions under which administrative allocations of resources, as opposed to market allocations, are most efficient for the firm. Williamson (1985) defines TC economics as a comparative institutional approach to the study of economic organization in which the transaction is

made the basic unit of analysis. TC theory argues that market mechanisms will be abandoned in favor of internalization of activities at the point at which the costs of executing market transactions exceed the administrative costs of internalization.

Williamson proposed three critical dimensions that characterize the TC paradigm:

- uncertainty
- frequency with which transactions recur
- degree to which durable transaction-specific investments are incurred.

He claims that the choice of governance structure to manage each transaction efficiently should then depend on the firm's capability and the degree of market perfection. Three factors influence the governance decision:

- the efficiency of the final product
- intermediate product market or know-how market
- organizational skills.

Specialization in technological development and communication is affected by the marginal change in these three factors. Organizational skills could reduce both external and internal TCs. Firms with superior organizational skills are better able to utilize foreign technology. Their tendency will be to internalize technological development. When intermediate product markets are inefficient, firms tend to internalize development and communication activities. When final product markets are efficient, firms tend to use specialized machinery in production to economize on the process technology available. The final product market influences the length of production runs, on effect that has further implications for the firm's strategy in acquiring technology. In the later stage of the product life cycle, final product markets have the tendency to be more efficient.

Williamson (1975, 1985) proposed that the TC paradigm explains CS involvement in boundary activities. Firms seek to minimize the sum of production and transaction costs; this objective will guide the firms' transaction choices. Production costs may differ among firms because of the scale of operations, learning process, or proprietary assets. In addition, they may also differ because of economies of scope. TCs refer to the expenses incurred for writing and enforcing contracts, negotiating terms and contingent claims, deviating from optimal kinds of investment in order to increase dependence on a party or

to stabilize or relax, and administering a transaction. (According to TC theories, a firm could decide to internalize a part of the product life cycle--the B-site test, for example--even if it would be cheaper to conduct the test outside. Such a decision would reflect the firms' judgment that the expected TCs of relying on an outside supplier exceed the B-site saving.)

Williamson (1975) finds that transactions may be costly to perform depending on various behavioral and external factors. He isolates the following transaction difficulties:

- bounded rationality-- cognition and perception
- opportunism-- self-interest combined with guile
- small numbers bargaining-- such as oligopoly conditions
- and information impactedness or asymmetrical distribution of information.

In addition, he claims that transactional difficulties and TC increase when transactions are characterized by asset specificity, uncertainty, and infrequency. Indeed, Williamson (1985) claims that it is asset specificity that is the "locomotive" to which TC economics owes much of its predictive content.

Building on Williamson (1975, 1985), Reve (1989) proposes a new theory of the firm as a nexus of contracts, with transaction the basic unit of analysis for the contracting framework. Williamson (1979) claims that the key premise of TC theory is that the properties of the transaction ultimately determine the governance structure of the firm. Reve posits further the conditions of asset specificity and uncertainty that will lead to certain governance structures. He maintains that when asset specificity and uncertainty are low and transactions are relatively frequent, transactions will be governed by markets. High asset specifity and high degrees of uncertainty produce transaction difficulties that will prompt the firm to internalize transactions. Finally, medium levels of asset specificity tend to direct the firm into CSs, which are found to be a more efficient governance structure.

Reve (1989) adopts the agency theory definition of the firm in claiming that a firm is a function of contracts. Furthermore, combining the concept of incentive structure from the agency theory with the notion of skills from the strategic literature yields a definition of

contracts as a function of incentives and skills. When skills are critical in realizing the various economic opportunities of a firm, incentives ensure that the necessary skills are attracted to a firm and kept in place.

Cooperative strategies provide governance structures when asset specificity is intermediary and organization and resource flexibility remain higher than if the transaction were internalized. It is suggested that over the long term, for a firm to attain strategic goals, core skills need to be supplemented by complementary skills that are mainly acquired from other organizations. In order to establish an efficient mechanism for controlling core and complementary assets, a firm needs to govern its core assets internally, and to enter into CSs with those firms controlling the required complementary assets the firm ultimately seeks.

Strategic core skills can be maintained and protected by creating various organizational incentives at the firm. These core skills are the economic rational for the firm's existence and are critical for the firm if it is to compete effectively within an industry. TC theory identifies four major core skills, namely:

- site specificity or locational factors under conditions of resource immobility
- physical asset specificity, that creates a type of technological advantage for the firm
- human asset specificity including unique know-how, experience, organizational routines, and culture
- dedicated assets that are specialized investments.

From a managerial perspective, three practices are key to the success of the core strategy, namely:

- creating the core strategy
- sustaining the core strategy by building the necessary incentive structures
- transforming and adopting the core strategy constantly to environmental changes.

Whereas only core skills of high asset specificity should be governed internally, complementary skills of medium asset specificity can more efficiently be obtained through CSs and are more efficiently governed in a bilateral setting. Finally, low specificity assets

are more efficiently contracted in the market, and no specialized governance structure need be maintained to support this type of asset.

Whereas Williamson (1985) views economizing on TCs as the main purpose of vertical integration, and the condition of specificity as the dominant factor behind the decision to integrate, Reve (1989) identifies superior alternatives to integration under some conditions of asset specificity. Specifically, he characterizes CSs as an alternative to vertical integration. He claims that only in cases where asset specificity is very high should full vertical integration be undertaken. Reve argues that economies of upstream and downstream integration can, in most cases, be more efficiently obtained through vertical CSs than through vertical integration. Whereas vertical integration involves ownership, CSs are contracts over complementary skills and are governed bilaterally.

In addition to focusing on the acquisition of skills as the principal motive for creating core strategies and CSs, Reve (1989) highlights the role of properly formed incentives for developing and maintaining core strategies. The main difference between internal and external contracts is the range of incentives available for the governance of exchange. Whereas internal contracts rely on hierarchical controls and assign decisions to authority, external contracts rely on relational controls with negotiation and consensus complementing authority in the decision-making process. In organizations, incentives are built with both hierarchical and relational elements or, alternatively, with a mutual penetration of the organizational and market principles. The advantage of simple hierarchies is, in the view of Williamson (1985), that they economize on transaction costs.

In firms in developed countries, the dominant trend is toward increased reliance on market-based incentives within organizations (e.g., profit centers, transfer pricing, results-based remuneration, and other types of decentralized measures), and increased interest in the firm's culture and governance through shared values and trust. Whereas interorganizational governance tends to be soft and based on negotiations, organizational governance tends to be hard and authority based.

Kogut (1986) studies the role of TCs in a specific type of CS, namely the JV. He argues that because a JV straddles the border between the firm and the market, the TC implication is that the production cost (inclusive of investment) of internal development or acquisition is significantly higher than external sourcing for at least one of the partners and that a spot market or supply agreement is fraught with opportunistic hazards. A TC theory of JVs must explain their distinctive institutional properties and identify the transactional situations to which JVs are best suited.

Kogut (1986) argues that two properties of CSs are particularly distinctive: joint ownership and control rights, and the mutual contribution of resources. For IJV foundations, the latter is of more importance. To understand the value of these properties, first consider a JV designed to supply one of the parties and then a JV serving as a horizontal extension of one or more links of each parent's value-added chain. (In cases where the JV represents a vertical investment for one party and a horizontal investment for the other, the venture becomes a supply agreement. In this case, the venture is the outcome of the production advantage of the supplier coupled with the TC hazards facing one or both of the parties. In a supply contract, these hazards are likely to stem from uncertainty whether the downstream party is providing information on market conditions, whether both parties are sharing new techniques, or whether the supplier is performing efficiently.)

Particularly problematic is the possibility that a basic asymmetry between the two parties could lead to exploitation. A JV resolves such issues by creating a superior monitoring mechanism and alignment of incentives to reveal information, share techniques, and guarantee performance. In a CS agreement, both parties share costs in all stages of the venture and share profits; thus, both parties will be affected by the JV performance. In cases where the JV represents a horizontal investment designed to supply both parties or to sell to external markets, the venture is the outcome of a complementarity in assets coupled with transaction hazards. BIRD JVs, for the most part, are a more complex type of JV. In the BIRD case, the motivation is to take advantage of full economies of scale or business-learning benefits (mainly the Israeli companies), to

transfer technologies developed outside to new product lines (mainly the U.S. companies), and/or to share costs and risks.

In summary, when applied to JVs, TC theory helps to resolve the high levels of uncertainty over the behavior of the contracting parties when the assets of one or both parties are specialized to the transaction. In addition, the theory shows that hazards of joint cooperation are outweighed by the higher production costs of full ownership.

Finally, the TC approach concentrates on the comparative efficiency of various forms of transactions but reflects the dynamic pattern of TC variation over time. In addition, studies that examine the dynamic pattern of technological transfers in CSs do not explain sufficiently the shifting costs and benefits of different transfer modes. Davis and North (1971) identify four factors that prompt the innovation of new institutional arrangements:

- capturing the potential increase in income arising from externalities
- overcoming risks
- minimizing TCs
- capitalizing on production economy of scale.

Although the TC paradigm explains institutional arrangements, the other three streams of literature--the strategy theory of organizational design, the technology aspect of competitive strategy, and the role of entrepreneurship--are of importance in explaining systematically CS in the domain of technological competition and market maturity. Most of the empirical studies conducted using the TCs paradigm examine vertical integration strategy in various individual settings. The relevance of such studies to the large number of JVs characterized by horizontal integration in therefore limited. These studies suggests that economizing on TCs is the only objective of the firm. To explain more fully the diverse strategic directions that firms take, TC theory must accommodate systematically the dynamic elements that guide firms' decisions. In this way, TC theory could better illuminate the concepts of corporate competitive strategy.

Strategic Theory and Cooperative Strategies

CS is a form of organization in which two or more players share resources in achieving their strategies. Conceptually, a firm chooses this mode of organization over alternative

modes to achieve a specific strategy. A strategic theory of CSs sheds light on the motives of firms in adopting a cooperative form of organization.

The major difference between TC and strategy theories is that strategic motivations are driven by a profit-maximization approach, while TC theory is driven by a cost-minimizing approach. Nevertheless, the strategic theory of JV is complementary to, rather than a substitute for, the TC theory of JV (Kogut, 1988). For example, given a strategy for JV formation, TC theory is of use in analyzing problems in bilateral bargaining. The decision to establish a JV, in strategic theory, arises from the firms' belief that it represents a more profitable alternative to other forms of organization.

Vernon (1983) argues that the JV is a form of defensive investment by which firms hedge against strategic uncertainty, especially in an industry of moderate concentration where collusion is difficult, despite the benefits of coordination. Strategic behavior could encourage the formation of JVs to deter entry or to erode the position of the competitors. Vickers argues further that for small innovations, a JV is an effective mechanism to guarantee the entry-deterring investment. In cases of large innovations, firms tend to pursue their own development and commercialization efforts. Berg et al. (1983) argue that R&D JVs are motivated by efficiency considerations. They find that firms with extensive use of JVs tend to lower their R&D expenditures.

In some cases, even if a supply agreement would mean lower production costs and TCs, a firm may choose the expensive JV route in order to maintain the option, albeit at a cost, of exploiting ventures capabilities in the future. In this situation, what drives the choice of JV is the possibility of exploiting future opportunities across markets and across contractual and organizational modes of transaction (Kogut 1988).

Strategy simply refers to the means adopted to achieve higher ends. The strategic management literature fundamentally deals with firms' competitiveness, long term growth, and survival. Porter (1985) identifies competitive advantage as the goal of strategic management efforts. The objective of strategic management is to enhance competitive positions in existing businesses and to establish competitive positions in new businesses.

Harrigan (1988) argues that JVs are now being used voluntarily as a strategy option in order to build competitive strengths. Contractor and Lorange (1988) claim that cooperation and competition provide alternative or paths to success. They argue that in planning corporate strategy, management should attach the same importance to the mechanisms of cooperation that it customarily assigns to the mechanisms of competition. Thus a JV is encouraged under three conditions:

- when the production of goods entails complex organizational interactions between the complementary assets of two firms;
- when one or both firms desire to acquire the other's know-how;
- or when one firm wishes to maintain an organizational capability while benefiting from another firm's current knowledge or cost advantage.)

In sum, cooperative management has become an alternative to competitive management in light of rapid changes in the environment of firms. When partners enter into a cooperative agreement, they expect an improvement in their competitive position. (See next section for a fuller discussion of the concepts of cooperation and competition.)

In-depth studies of JVs, at either the firm or industry level, are specifically oriented towards testing whether JVs increase efficiency or enhance market power. Whereas a finding that JVs strengthened market power in all firms in the industry suggests strategic motivations for JVs, findings of efficiency are consistent with, but do not necessarily confirm, a TC hypothesis since strategic rivalry may reduce costs without any firm attaining a long-run competitive advantage. As Kogut (1986) argues, this is why it has been easier to test strategic motivation explanations for JVs than to test the TC hypothesis.

Stuckey's (1983) study analyzes the rationale for JVs along both strategic and TC lines. He studies sixty-four JVs among the six major firms in the aluminum and bauxite industry. He finds that new industry entrants use higher numbers of JVs. Many of these JVs result in greater efficiency because firms are able to achieve optimal scale economies in production stages where partnership in expansion is most vital . Stuckey's major conclusion is that in the upstream stages of the product life cycle, strategic behavior is more prevalent, whereas in the downstream stages of aluminum production, TC better explains the behavior of the firm.

There is an obvious complement between the transactions costs and strategy theories. The link is to be found in the economic theory that teaches cost-minimization as a duel of profit-maximization, and proves the latter to be the more powerful condition for behavior. Whereas profit maximization implies cost minimization on the part of firms, the reverse implication is not necessarily true. The transactions cost paradigm posits that firms seek to minimize the cost of production and transactions in pursuing the IJV route. The strategy paradigm suggests that the motive of firms is profit maximization. In addition, it directs firms to be more competitive.

B. International Joint Venture Foundations and International Joint Ventures, and Supported Business Dynamics

The transaction cost and strategic paradigms outlined the motivational theory behind IJV creation. The actual planning and implementation of the IJV is a dynamic process. This section will discuss some instrumental and developmental dynamics of IJV formation and operations.

Instrumental Dynamics: Resource Match and Boundary Spanning

Hennart (1988) develops a static theory of equity JVs using the insights of TC theories. Equity JVs occur when a company acquires partial ownership of another firm or when two or more sponsors have given assets to an independent legal entity and are paid for some or all of their contribution from profits earned by the entity. Equity JVs may be either "scale" or "link" JVs. Scale JVs arise when parent firms attempt to internalize a failing market, but indivisibility caused by scale or scope economies make full ownership of relevant assets inefficient. Link JVs result from the simultaneous failing of the markets for the services of two or more assets. Whenever these assets are firm specific, public goods costs and significant management costs would be entailed in acquiring the firm that holds them. Hennart argues that all JVs can be explained as means to bypass inefficient markets for intermediate inputs. If assets can be shared at low marginal cost (public goods), replication is more expensive than acquisition. When the assets each party needs are related to those held by its partner, a JV will be chosen over a takeover.

The term "boundary spanning" applies to formal and informal structures used to control and manage the interface between JV partners. Employees interacting with partner companies to transmit information back and forth are called boundary spanners. Boundary spanners are key for the successful linkage of organizations. They transmit the appropriate information to the partner firm and filter information they receive from their partners. The role of the boundary spanner is to bridge cultural gaps, overcome structural differences, and successfully transfer know-how from both firms to the JV and back.

Bridging Cultural Gaps

The central consideration in managing the interface between two firms is the extent of integration between them, ranging from a complete "distance-cooperation" (such as in a sales agreement) to full cooperation (such as an equity joint-venture). Doz (1988: 331) argues that close cooperation without careful preparation can be quite destructive, mainly because of cultural differences. Companies are likely to lack a clear understanding of their partners. Two organizations may have no common language, no way to comprehend each other's operating mode, and no understanding of the manager's sales and positions in the partner organization. For example, when an IJV has been formed between countries with distinct cultures, there is a greater risk of failure because partners may be less willing to compromise. This is most likely to occur when countries differ significantly in their socio-economic conditions, educational backgrounds, or value systems-- differences that can lead to divergent managerial goals and firm objectives.

Overcoming Structural Differences

Companies that have achieved international success often employ different strategies and pursue a variety of goals, unconstrained by a single set of national norms and policies. These differences in an international context are much stronger, because nations influence the specific way in which their firms are structured and managed. Boundary spanners are those managers with entrepreneurial skills and attitudes that not only overcome these structural differences but also capitalize on them to create competitive advantage.

Successfully Transferring Knowledge

The transfer of invisible assets (relative to material resources) is dependent heavily on boundary spanners' communication skills and know-how. Doz (1988) found that smooth transfers seem to hinge on the development of good personal relationships among a handful of individuals at the boundary between two organizations. Cultural, structural, and know-how transfers among partners should be conducted in a professional manner in order to limit their negative effect on the success of the JV. Boundary spanning can improve the linkage of partners when effective tactics closely tied to CS objectives are used and when the role of each partner is clearly specified. Clearly specifying the interface between the partner firms is a key factor, and companies should spend time and resources in detailed planning. For example, in the case of the BIRD Foundation program where the relative advantages of Israel and the U.S. are distinct --R&D in Israel as against marketing in the United States--most JVs operate with a clear and specified function. Both partners contribute in the area of their expertise. In cases in which the relative advantage of the two partners is not as clear, it may be more difficult to specify the interface between the partner firms. Selecting the right boundary spanners is clearly critical for the success of the CS.

Developmental Dynamics: Long-Term Organizational Learning Mechanisms

Kogut (1988) advances the theory that JVs are an instrument of organizational learning. He views JVs as a means by which firms learn and seek to retain their capabilities. Organizational learning enables firms to initiate organizational changes successfully, to respond more flexibly to environmental changes, and finally to become more risk tolerant. Lyles (1988) argues that organizational learning or development in JVs occurs on two levels. At the lower level the firm learns how to build successful management systems on the basis of past experiences. At a higher level, firms develop by making fundamental changes in their internal systems of norms and values. In the case of an IJV between a DC and an LDC firm, the potential for the LDC firm to enhance its organizational abilities is particularly great. The LDC firm has a unique opportunity to improve its marketing skills, financial control, and overall management expertise. As a

result of this international experience, the LDC firm is more equipped to compete in the global economy. In addition, the development of the LDC firm contributes to the specific industry and to the LDC economy.

C. Cooperation vs. Competition at Micro-and Macro-levels

There is an important role for both cooperation and competition in the strategic paradigm. Strategic theory validates those types of venture that increase the participating firms' competitive advantage. Many observers believe that IJVs, usually seen as cooperative undertakings, can in fact place the participating firms in a better competitive position. Competition and cooperation coexist in the strategic decisions of a firm in the emerging global economy.

CSs and international networks have attracted widespread attention--favorable and critical--from both academics and practitioners. While some experts argue that cooperation enhances the competitive position of firms, others argue that cooperation may actually erode competitive advantage. Strong industrial policy advocates such as Reich and Mankin (1986) claim that IJVs endanger the future of U.S. industries. Porter (1990) argues that international cooperation has become a managerial "fad and cure-all"; while cooperation can achieve selective benefits, it always exacts significant costs. These costs ultimately make most CSs short term transitional mechanisms rather than long term stable relationships.

Specialists in international organizational strategies, however, argue that cooperative strategy is a necessity in an era of global competitiveness. (Perlmutter and Heenan, 1986). They see a cooperative approach to technology as an important part of a firm's competitive strategy. Increasing R&D expenditures, shorter product life-cycles, and shared technological problems make it advantageous to establish links with firms in other countries. If used correctly, cooperation may avoid duplication of R&D efforts and facilitate coordination of market delivery.

To be sure, competition should dictate the terms on which agreements are concluded, and it will persist once the cooperative arrangement is finalized. But as Doz (1986)

argues, a cooperative agreement in itself can often be an instrument of competition. One way for a firm to assert its predominance over another firm is to acquire its technology, possibly on unequal terms. Cooperation agreements may pave the way for a takeover later. Most studies argue that, to date, technological cooperation has on balance enhanced competition in most of the industries where it has occurred, either by increasing the number of effective competitors or by delaying the failure of weaker firms through mergers.

Coopting or Blocking Competition

Potential or existing competition can be co-opted by forming a JV with the competitor or by entering into a network of cross-licensing agreements (Telesio, 1979). The majority of these are defensive strategic moves. Vickers (1985) claims that many firms enter into R&D partnerships in order to file patents to stake out the ground against competitors. Although JVs are scrutinized by governments for their potential anticompetitive and welfare-limiting effects, they are examined less stringently today than a decade ago.

Stein and Das (1988) argue that the maintenance of competitive advantage in emerging industries requires strategic partnerships between companies--even between competitors. Some reasons are that the shortness of product life cycles, the site of markets, and the cost of R&D are beyond the capabilities of even large corporations. The authors stress both the need for cooperative relationships and the need for the federal government to create a competitive environment for individuals and for organizations. Once again, cooperation and competition are viewed as compatible, rather than mutually exclusive, processes.

Bloch (1988) observes that new technologies break down institutional and geographic barriers. The need to increase knowledge at an accelerating pace requires cooperation between universities and industry. He proposes the formation of an integrated infrastructure of R&D, science, and engineering. Technological development alone will not make NICs like Israel competitive globally. Technology innovations must be commercialized through cooperation between the agents of production and marketing, and between government, local industry, universities, and the private sector.

Although U.S. companies consider competition and cooperation major forces that affect their welfare, they are less clear on the strategic relationship between these forces. A dominant world producer at the end of World War II, the United States attributed its success to superior skills rather than to its position in the world economy. The diminished U.S. economic position today implies that strategies that were successful in the past may no longer be effective.

At least one study, however, disputes the argument that alliances are formed either as a preemptive action against competitors or as an oligopolistic reaction to major competitors' cooperative strategy. Wu (1989) suggests that cooperative efforts such as research consortia, JVs, and development cooperations will increasingly be generated by new competitive strategies.

Harrigan (1988) presents an interesting framework for using JVs within varying competitive environments. She tests the impact of particular industry traits upon competitor options in pursuing JVs. Some key environmental traits to consider when formulating cooperative strategies are:

- demand uncertainty
- customer traits
- infrastructure development
- production technology
- volatility of competitive behavior
- nature and extent of linkages between the venture and its owners.

Harrington finds that the form, focus, autonomy, and duration of firms' cooperative strategies will differ from industry to industry because of their traits.

Kogut (1988) studied the relationship between competition and the creation and instability of JVs. He found that JVs originate as a response to the competitive rivalry within an industry or between partners. In addition, the break-up of a JV is often caused by the transfer of organizational skills from one firm to its competitor and partner. A major conclusion of his case study is that "termination is not always the outcome of the competitive pulls on cooperation but often a reflection of the successful competition of the transfer of organizational knowledge."

The current willingness of managers to contemplate cooperative strategies that they had ignored in the past represents a watershed in their way of thinking about competitive strategy. It has also raised a warning flag for firms whose managers have not yet considered the implications of this strategy option (Harrigan, 1986).

As boundaries blur between industries, nations, and continents, managers increasingly need to understand how changes like these will affect their need for cooperation. Because making ventures work is largely a matter of managing the chemistry among partners, their ventures, and the industry in which thus will compete, managers must discover how they can best enhance the benefits of these relationships within their JVs (Harrigan 1986). Given that interfirm cooperation has suddenly become prevalent in certain competitive environments, managers need a way to consider what effect this structural change will have on their industries, on their firms, and on the new ways in which their firms must compete. For example, it is doubtful that commercial or military aircraft will be developed or produced in the future without the assistance of partners. Cooperation is becoming mandatory in the automotive industry in the United States. Risky ventures-- for example, satellite communications, coal gasification, or undertakings involving costly and untried technologies such as genetic engineering-- are the irreversible forums where many types of JVs will occur. In light of this, managers need a new way of thinking about cooperative ventures as a strategy option.

Timing is an important part of effective joint-strategy formulation in situations where environments change rapidly. Firms that move first to establish JVs often can gain access to better partners, which in turn can give them a competitive advantage that late entrants could not capture easily. Managers need to understand how the evolution of an industry's structural conditions can make ventures seem at certain times more and less attractive. They must be able to recognize the penalties for entering cooperative ventures in home markets too late (as in the automobile industry, where the best partners may already have been taken), and they should recognize the penalties for holding on to a particular form of venture too long. In addition, they should consider whether moving early to set up JVs will

offer their firms opportunities to create synergies. And finally they should consider when they can best leverage the relationship between joint venture and owner to strengthen their firms' competitive advantages.

In summary, managers need to understand how JVs can help them supplement internal resources and capabilities to build strength and bargaining power by responding faster to competitive challenges. They must also be able to assess whether cooperative ventures can create synergies--through vertical relationships or by resources--and what limitations will be placed on those synergies by the venture's needs for operating autonomy.

D. Performance - The Impact of IJVs on Firms, Industries, and Nations

The unique nature and objectives of IJVs, especially those ventures supported by an IJV foundation like BIRD, make it important to measure the performance of IJVs on three levels--the firm, industry, and nation. This section, devoted to performance measurement, draws on theories introduced at the beginning of the chapter. In addition, it also discusses some evaluation criteria not explicitly incorporated in these theories.

Performance: Firm Level

In evaluating the advantages of JVs, Pekar (1986) claims that JVs allow cooperating firms to pool their strengths to expedite productivity, penetrate markets, gain access to new technologies, and share or reduce risks. In his study he finds three factors to be important in eliciting this type of JV success:

- clear objectives (necessary for management risk-taking, flexibility, and sharing of resources);
- clear definition of each partner's obligation and areas of activity;
- clear lines of authority.

Blumenthal (1989) finds that JVs achieve higher performance standards and are better suited to meeting longer term objectives like skill acquisitions. He claims that when short term "bottom line" results are sought, a JV might not be the best solution. Although bottom line goals are the most highly valued, they are the least likely to be achieved through the JV form. In a dynamic environment, flexibility should be valued and performance should not be measured only against the partners' original objectives.

Finally, an important way to assess the performance of an IJV is to ask the partners if they would enter into another joint venture.

A significant control on the performance of the JV is through reporting obligations. Management should be careful, however, not to overburden the venture with excessive reporting obligations. The reports must be consistent with each partner's performance measures, review procedures, reward system, and other needs. The evaluation of JV success must consider the venture's original purpose, the trade-off between problems and benefits, the profit from pooling resources, and cost savings.

A study of twelve core ventures between the U.S., the U.K., and Canadian MNCs and LDC firms was conducted by Beamish (1987). Eighteen questionnaires were administered to parent-company executives and general managers involved in the core ventures. Beamish finds that MNC executives in high-performing ventures looked to their local partners for greater contributions than did MNC executives in low-performing ventures. The former group of executives characteristically relied on local partners for specific contributions in two general areas: local knowledge and local management. Low-performing MNC executives did not seek such specific contributions from their local partners. Rather they entered into partnerships to satisfy existing or expected government requirements for local ownership or to avoid political intervention. In a previous study, Beamish (1985) showed that foreign dominant control is not common in LDCs and that shared control produces better performance.

Harrigan (1986) measures performance with three main variables: venture survival, duration, and sponsor-indicated assessments of success. This study assumes that the criteria of survival and duration are not meaningful. However, if a JV is terminated because it has fulfilled its purpose (such as technological transfer), these criteria could be used as a performance measurement. The problem with sponsor assessments, on the other hand, is that they are likely to be overoptimistic because no manager likes to present himself as a loser. Harrigan's later study (1988) indicates that ventures last longer between partners of similar cultures, asset size, and experience with cooperative arrangements. In addition, the results suggest that ventures last longer when the activities are related to both

partners' activities. A question arises whether the long-lasting JVs performed better in an absolute sense and relative to the JVs' initial objectives.

Ghazi et al. (1989) assessed the performance of JVs through the testing of several behavioral hypotheses found in the literature. Responses to a questionnaire were obtained from 186 JV managers in the chemical and petrochemical industries during the 1968-81 period. The responses indicated:

- significant disparity between the goals of partners
- pervasive conflict in JVs
- inverse effect of the performance of the partner firms on the perceived conflict.

Hull et al. (1988) studied strategic partnerships between technology entrepreneurs in the United States and between large corporations in Japan and the United States. They identified several qualities that were closely related to the successful implementation of a strategic partnership: patience, flexibility, entrepreneurial autonomy, and avoidance of the "Not-Invented-Here" syndrome, which often requires a change in corporate culture.

STRATEGIC PERFORMANCE MEASUREMENT

Strategic performance measurement represents the most effective way of assessing the performance of a JV. Return on investment is not a sufficient goal in itself and cannot ensure the long term success of a JV. Financially successful JVs may turn out to be failures strategically, whereas financially disappointing JVs may turn out to be strategically successful. To be sure, it is difficult to measure the success of a JV in strategic terms; for this reason, return on investment is frequently the preferred criterion for evaluating JVs. But despite the difficulty of capturing the strategic contribution of a JV in quantitative terms, it is best to use strategic tools since a firm's primary objectives are strategic in nature. This approach will require some recognition that firm strategies change over time and that companies operate in a dynamic context. It is not clear how to measure the performance of a project when the project life cycle begins under one set of strategic goals and continues under another. This study will examine the issue of IJV planning and performance measurement in a dynamic rather than a static context.

It has been estimated that over half of the cooperative ventures forged since 1975 in the United States were ill-conceived at birth because the objectives of the JV were unclear, owners' capabilities were poorly matched, or owners aspired to achieve more than was possible in the industries in which their venture competed (Harrigan 1986). This finding suggests that the formation of JVs requires careful planning and reasonable objectives. Indeed, planning is a much more complex task in the case of IJVs than in the case of general business ventures.

Strategic control has most often been discussed in terms of measuring and improving the long- and short term strategic performance of the organization. Lorange (1985) recommended the use of the "critical success factors" methodology to identify appropriate, even customized measures of end results through which the organization's performance can be monitored. Results control may not always provide feedback that is useful to managers seeking to control and improve strategic performance over time; direct evaluation of the output of the strategic planning system may be needed as well as control of the end results. If managers do not accept particular measures of performance, or if they do not understand the relationship between their actions and the results being measured, control of results will not lead to improved performance.

One of the most comprehensive models of IJV success was developed by Perlmutter and Heenan (1986). In their model, the authors modelled six factors most likely to influence IJV success. The factors they categorized were:

- mission-- the idea that each partner believes the other to have something unique to offer
- strategy-- the idea that balancing cooperation with competition is critical to achieving strategic synergy
- governance-- the notion that parity, not power, should prevail in IJV governance and that any prospective IJV that resorts to dominance is inherently weak
- culture-- cited as the most important factor in IJV endurance; stresses the need for a common set of values, style, and goals, along with a strong national identity
- organization-- the notion that modern and changeable organizational structures are necessary because of complexities of multi-country management

- management-- the idea that managers must identify those operational issues most likely to cause friction, and must then establish unitary decision-making processes that assign to one central authority the ability to commit all partners.

Several common problems in IJVs are indicated by the Perlmutter-Heenan study. The three major categories are cultural incompatibilities, communication problems, and anti-trust attitude. The Perlmutter-Heenan model appears to suggest a strong role for commitment in the IJV in its initial stages, as well as in its maturation phase. In addition, recognizing the unique and difficult problems in managing IJVs, this model suggests a structure for avoiding disagreements, and establishes a mechanism to deal with the frequent changes that characterize an IJV. Finally, the author's mission category suggests the notion of shared success-- for any single partner to 'win,' all partners must 'win.'

Despite its relevance in outlining key factors in the strategic performance of the IJV, the Perlmutter-Heenan model suffers from some obvious defaults. First, the model lacks a theoretical emphasis on the role of the manager in IJV success. Clearly, the individual manager needs to have adequate talent to meet the specific challenges of managing a new enterprise, working together with an international partner, and making decisions as the leader of a whole new venture. A strong manager sends a message of commitment from the company indicating that the personnel sent to the new IJV are secure, not only through the venture, but also by virtue of their parent company. Second, the model, though comprehensive, is overly complex. For managers who seek to apply performance measurements in their daily operations, the model does not offer constructive guidelines. Third, and perhaps most important, there is to date no empirical data to support the theoretical conclusions of this model.

Empirical Studies of IJV Performance

A survey of the literature produces a set of factors that matter consistently in IJV performance regardless of the company characteristics, the industry type, and the level of national development and culture. This section summarizes the relevant literature in order to isolate the factors most often cited in IJV success. These factors will be tested in the analysis that follows.

In his empirical study of IJVs, Killing (1983) suggests that IJVs should be set up on a project basis with a definite termination date. He claims that projects can be managed successfully as IJVs because their objectives are clear-cut and divisible into discrete component parts. In other words, if IJVs are set up as a specific project, they will have a greater likelihood of success. The BIRD Foundation model has precisely this characteristic--namely, it creates IJVs based on a specific project with clearly specified objectives at every stage of the initiation, operation, and termination . In addition, the Killing study specifies the importance of a clear role for each partner, and as such, allows for the major managerial decisions to be made during the project's planning and design phase. This in turn minimizes the possibility of disagreements and problems during the IJV operation. Killing emphasizes the importance of having a clear-cut mechanism to terminate the IJV.

Killing claims further that if an IJV is to succeed, three main components must be in place-- namely, the choice of partner, the design of the IJV, and the management of the IJV. In addition, he makes specific mention of trust between partners and autonomy of operations as two factors promoting success. Killing finds that a lack of clear objectives often leads to reduced performance because of the conflicts it can create. And finally, Killing stresses the importance of coping with the cultural gaps between nations and firms and the negative impact that cultural differences can have in performance.

Beamish and Lane (1982) find that the commitment and neediness of partners were the two most important factors involved in the success of IJVs. They conducted a long term study of thirty-four IJVs between Canadian companies and LDCs, 61 percent of which had unsatisfactory performance. In a later study, Beamish (1985) uses data from twelve multi-national companies, and finds corroborating evidence in support of the role of commitment. Specifically, he tests four general types of commitment: commitment to international business, commitment to the IJV structure, commitment to the particular venture, and commitment to the partner. He finds that commitments to international business, the particular venture, and the partner are positively and significantly correlated

with success. On the other hand, commitment to the IJV structure is not correlated with success.

On the issue of commitment, Lorange and Roos (1989) categorize several company functions of commitment, namely commitment to the IJV by top management, financial function of the firm, product development function, production function, and marketing functions. They find that the degree of commitment among various key personnel in the parent firm, especially top management, financial, and marketing personnel, is positively correlated with IJV success.

Another measure of IJV performance that dominates the literature is the role of ownership and control. There is a strong theoretical link between ownership and the management control of JVs. Killing's (1983) survey strongly linked ownership and control. Seventy-six percent of the dominant-control ventures experienced a high level of ownership. Seventy-seven percent of the dominant-control JVs studied by Killing performed either satisfactorily or well, whereas only 45 percent of the shared-control ventures performed as such. A recent study by Chowdhury (1989) supports Killing's findings that dominant control is positively correlated with IJV success.

Beamish (1984) expands the set of variables from Beamish-Lane (1982) to include the ownership/control relationship among IJV partners. First, he finds strong links between ownership and management control of IJVs. Second, he finds that in the majority of IJVs between DCs and LDCs, shared ownership was far more common and, moreover, good for the performance of the IJV. In a later study, Beamish (1985) again finds that DC foreign dominant control led to lower performance relative to shared control in IJVs with LDC firms. Like Beamish, Tomlinson (1970) finds shared control to be associated with IJV success in his examination of 71 IJVs. In contrast to the studies of both Beamish and Tomlinson, Janger's (1980) study of 168 IJVs in DCs and LDCs finds no statistical relationship between shared or dominant control and IJV success.

In sum, the empirical literature is divided on the connection between ownership/control and IJV performance, although the relationship, if any, is certainly influenced by the status of the partnering firm as a developed or less developed nation.

PERFORMANCE: INDUSTRY LEVEL

Several studies have explored the role of industry characteristics and JV performance. Pfeffer and Nowak (1976) conducted a study of the direct motivation of market power by analyzing transaction patterns across industries and the degree of industry concentration. Of the 66 JVs investigated, 55.5 percent were between parents from the same industry. The authors concluded that parent firms from industries that have a high exchange of sales and purchase transactions and that are technically intensive tend to have more JVs. In addition, they found a higher incidence of JV creation when the partners came from the same industries of intermediate concentration. Their findings suggested that JVs are used to reduce uncertainty when oligopolistic rivalry is difficult to stabilize.

Porter (1990) cited several conditions for industry competitiveness from which guidelines may be inferred for IJV performance. First, in each nation, there must be several globally competitive firms within an industry in order to promote and encourage dynamic competition and constant innovation. Second, industries must constantly be upgraded in order to ensure high levels of productivity, technology innovation, and the exploitation of new economies of scale coming out of the international market. Third, a nation's unique environment must be matched to competitive advantage in particular industries. Finally, Porter advises patience-- competitive advantage in a nation's industries is created over a decade or more of attentive efforts, not over shorter business cycle horizons. The key for performance common to all the above factors is dynamism and the ability to innovate and upgrade.

E. International Joint Venture Foundations - A Public Enterprise

The theoretical paradigms presented in Part A of this chapter do not provide a completely satisfactory or comprehensive means of evaluating IJV performance. The theoretical approaches emphasize profit maximization, competitive position, and

efficiency; they do not stress the advancement of public welfare--an important objective for a public enterprise such as the BIRD Foundation.

The BIRD Foundation is a state-owned firm or "public enterprise"--that is, "an organization that produces and sells goods or services, and whose assets are owned not by private shareholders, but by a public agency." The management of the foundation is accountable to governmental agencies and so is open to direct political influence. The objective of the public enterprise (PE) is the general public interest, while the objective of a nonpublic enterprise is often maximization of profit. Thus the objectives of the BIRD Foundation should be targeted toward the general public interest as well as the maximization of profit.

The Rationale for the Existence of Public Enterprises

Rees (1984) argues that there are four basic sets of reasons for the existence of PEs:

- to "correct" market failure
- to alter the structure of payoff in an economy
- to facilitate centralized long term economic planning
- to change the nature of the economy from capitalist to socialist.

Vernon (1983) argues that the motives for the creation of PEs are somewhat different. They point to specific historical reasons for all specific acts of "nationalization": political sensitivity, bankruptcy, a wartime need, an attempt to promote a sector of the economy or to preserve that sector from foreign domination, and so on.

Market Failure

When an inferior resource allocation occurs in a market system, that is, when there exist other superior resource allocations given the resources and technological possibilities in the economy, there is a market failure. In a global economy, where a nation is no longer an independent economic entity, setting up an international enterprise to supply a good or service across national borders is a means of correcting a world market failure. Market failures tend to occur in the presence of monopoly and oligopoly, where significant externalities exist, or where a "common property" resource exists (Rees, 1984). An international PE specifically corrects market failure due to the existence of a "common

property" resource; in the case of the BIRD Foundation, this resource is technology. In the public policy literature, others argue that market failures tend to occur because of imperfect information and transaction costs as well.

The BIRD Foundation model suggests an extension of Rees' explanation of market failures. In an NIC or LDC economy, the private capital market is often not developed and investors in it are risk-averse; thus, new and growing firms may find it difficult to obtain adequate finance. Creating a BIRD-type foundation between DCs and NICs or LDCs is a compensation for the shortcomings of the private capital markets. In addition, a BIRD-type foundation functions as an information network center for companies across national borders; it makes information available to producers and so corrects the imperfect information in the global marketplace.

An international joint venture foundation, funded by the public sector and supporting the private sector economy, may then be regarded as a means of correcting market failures. This study will not discuss in detail the other reasons for the existence of public enterprises, namely, structure of payoffs, centralized planning, and socialization of production, since they are not directly related to the IJV foundation model. (For an in-depth discussion, see Rees, 1984.)

Performance of International Joint Venture Foundations

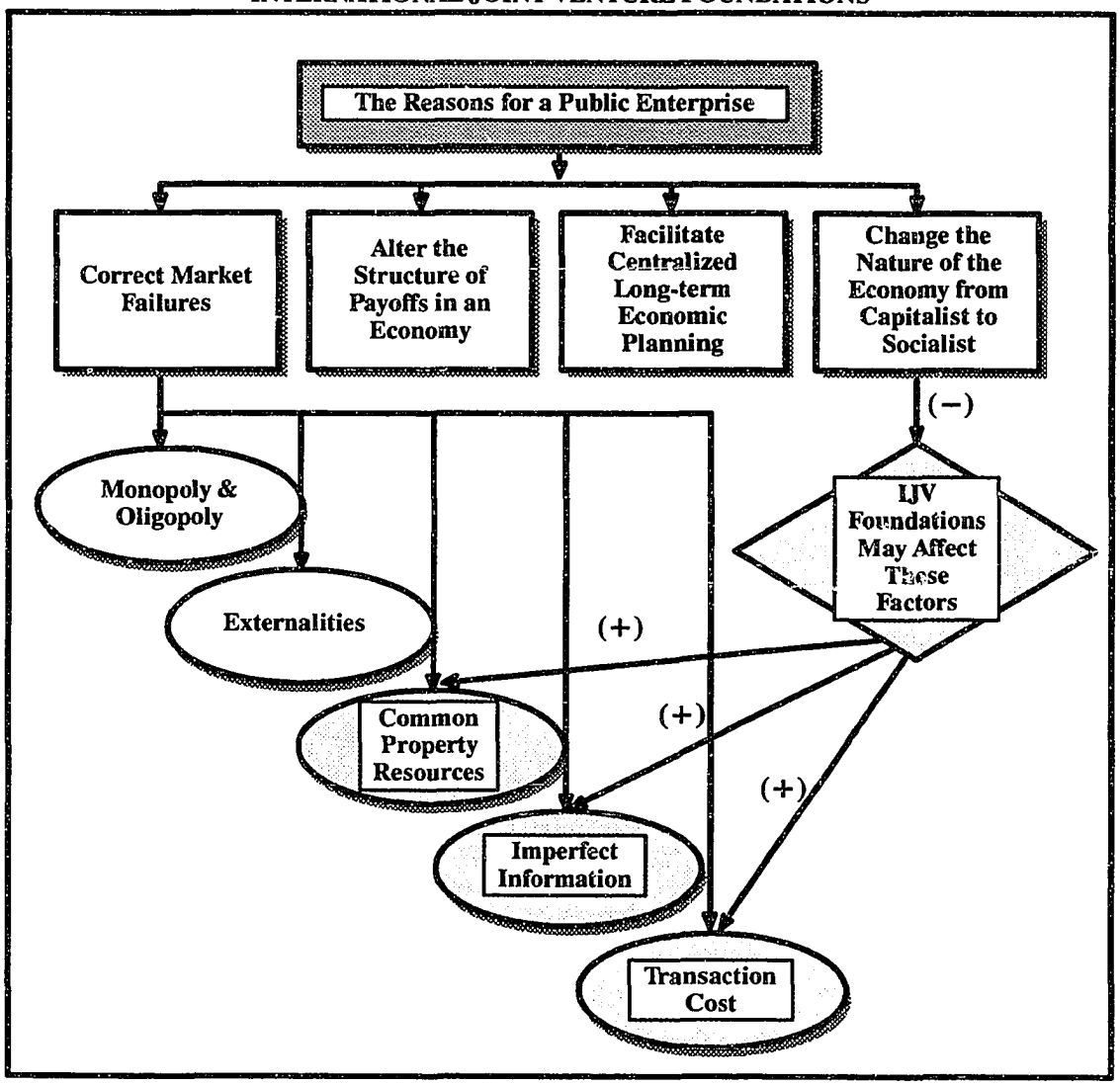
The economic literature offers two main explanations for the relatively poor performance of public entities:

- The objectives set by public entities are poorly defined, complex, and unstable; they tend to increase cost levels and reduce profits.
- Failures occur in the monitoring and control of public entities, allowing those within them to operate in their own interests. This weakness also leads to high costs and lower profitability.

Rees (1984) argues for a more appropriate concept of performance measurement --namely, "the extent to which a public entity achieves the objectives which have been set for it."

EXHIBIT 3.1

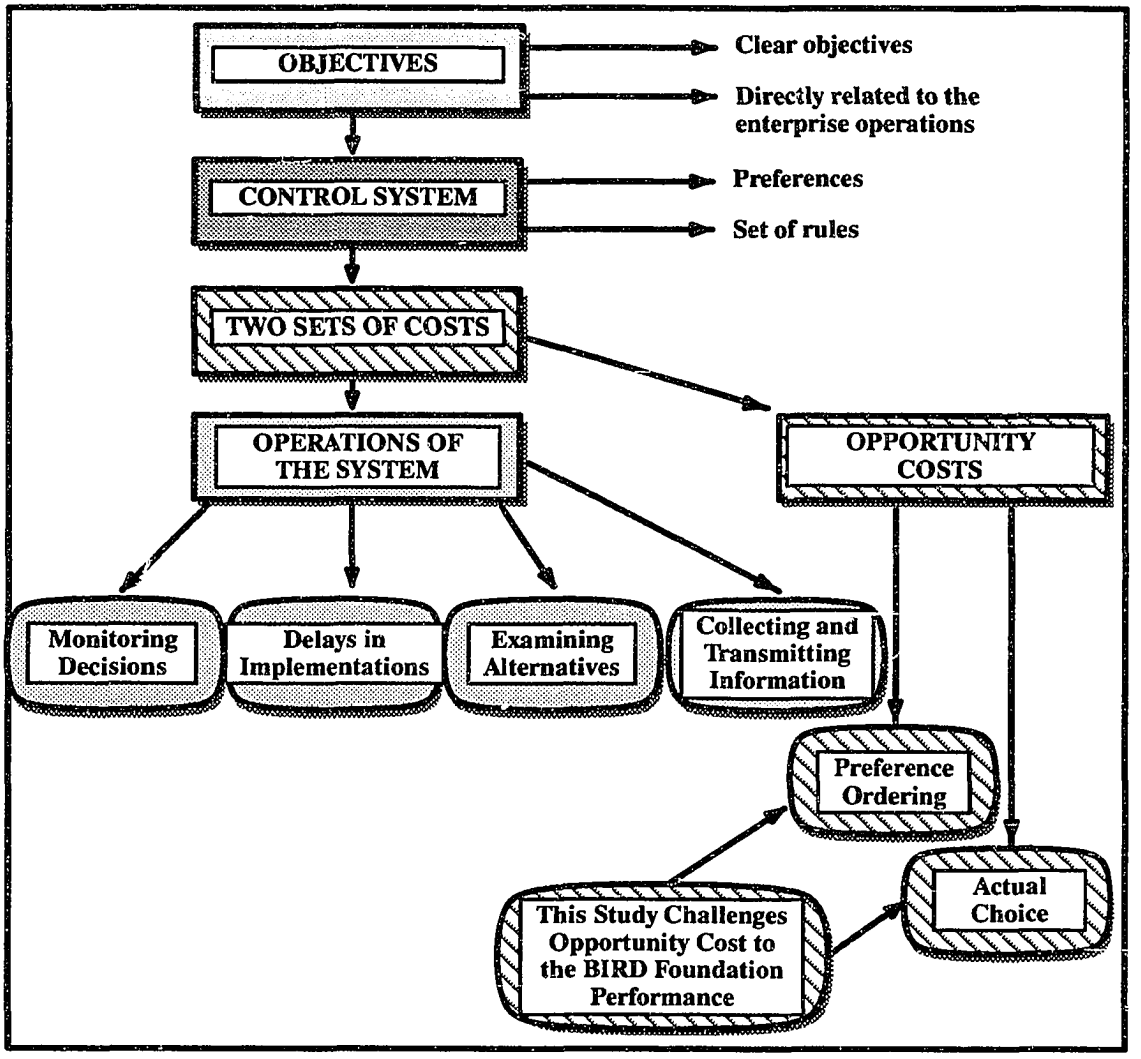
THE RATIONALE FOR A PUBLIC ENTERPRISE:
INTERNATIONAL JOINT VENTURE FOUNDATIONS



THE OBJECTIVES OF A PUBLIC ENTITY

A requirement for rational decision making in a public entity is a well-defined scale of preferences ranking the outcomes of alternative choices (Exhibit 3.2). The rationale for a clear set of objectives is to ensure that decisions are actually consistent with the preferences of the individual or group in whose interests those decisions are being made. A system of control consisting of sets of rules and preferences ensures the maximum efficiency of a public entity subject to its objectives.

EXHIBIT 3.2
OBJECTIVES OF PUBLIC ENTERPRISE

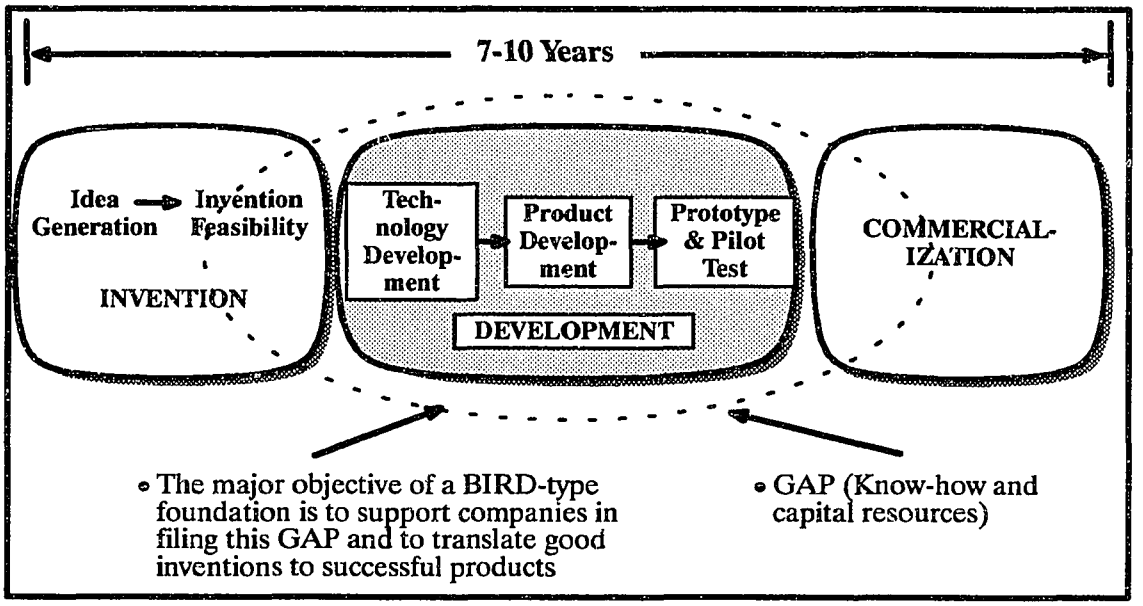


Rees (1984) argues that a system of control entails two sets of costs. The first consists of those costs associated with the operation of the system itself. Resources will be absorbed in monitoring decisions, collecting and transmitting information, and examining alternatives. In addition, delays in the implementation of decisions also impose costs.

The second set of costs stems from the noncorrespondence of decisions and preferences: that is when the choices actually made by the decision-maker are not the "best," and when the preference ordering of the choices is wrong. The second set of costs therefore represents essentially an opportunity cost. These costs could be measured by the difference between the potential value of the optimal decision and the value of the actual

decision. The classification of objectives is intended to bring some logical order to a confused scene, but it should be stressed that the relative emphasis given to these objectives differs across countries and, within a given country, across time. In addition, the objectives of an IJV foundation should extend beyond economic efficiency and profitability; otherwise, the foundation could appear to be performing poorly when actually it performs well.

EXHIBIT 3.3
THE BIRD FOUNDATION AND THE PRODUCT INNOVATION CYCLE



Source: U.S. Department of Commerce and dissertation survey

SUMMARY

This chapter has discussed a range of empirical and theoretical research intended to place this study of BIRD IJVs and the BIRD Foundation in a more structural context. With regard to the theory, although there are several mainstream economic and managerial theories through which IJVs are explained, no one theory captures fully this complex operational phenomenon. Similarly, although there is a substantial body of empirical research on JVs, similar work on IJVs is lacking. This lack is particularly acute in IJVs among companies in DCs and either LDCs or NICs. The literature that does exist does not present a clear set of motivations for, and interpretations of, IJV operations and performance.

CHAPTER IV: RESEARCH DESIGN AND METHODOLOGY

A. The Overall Methodology

The primary research strategy in this thesis is the case study. The author has conducted a case analyses of all subsystems of the BIRD Foundation: Israeli micro-level (companies), United States micro-level (companies), Israeli macro-level, United States macro-level, and the BIRD Foundation office (Exhibit 4.1-- BIRD Study Model). Although each entity is studied separately, the principal targets of the field research are the BIRD Foundation and its internal environment. An important subsidiary concern is the Israeli macro-level. This research is primarily exploratory. The data for this study were collected through personal interviews, questionnaires, on-site observation of the BIRD Foundation Office, and analysis of published reports. As indicated in earlier chapters, the existing research on IJVs and their successful implementation in a multinational context is limited. Consequently, the literature cannot provide a well-defined objective criteria to evaluate the successes or failures of the IJVs. This study will explore the performance criteria that can be applied to IJVs, drawing on the existing literature when possible.

The specific research design and analysis will be based primarily on the approach suggested in Yin (1984). The distinction advanced in Glaser and Strauss (1967) between grounded formal theory and grounded substantive theory is useful in defining the methodology of this study. Substantive theory is based on empirical inquiry, while formal theory consists of conceptual inquiry. This study of IJV foundations will focus on the substantive area of international joint-venturing rather than on the grounded formal theory of organizations and strategy.

The purpose of this study is to analyze and describe the process of economic development and entrepreneurship through the mechanism of international joint-venturing. The analysis center on the specific type of IJV supported by the BIRD model-- a foundation created by the public sector to support the private sector as part of a larger effort to foster economic development and growth.

Two general sources of data are used in planning and implementing this research, namely, field and documentary. The substantive analysis is based on an empirical evaluation of the BIRD Foundation and the joint-ventures involved in the program (Exhibit 4.2). The evaluation is based on responses to a questionnaire (presented in Appendix A) that was given to ninety-two Israeli companies and forty-eight U.S. companies engaged in joint projects supported by the BIRD Foundation. In addition, data are collected from interviews, observations, and internal BIRD Foundation reports. Finally, the research maintains an outward focus, entailing interviews with organizations and individuals in both Israel and the United States charged with the creation and oversight of BIRD operations.

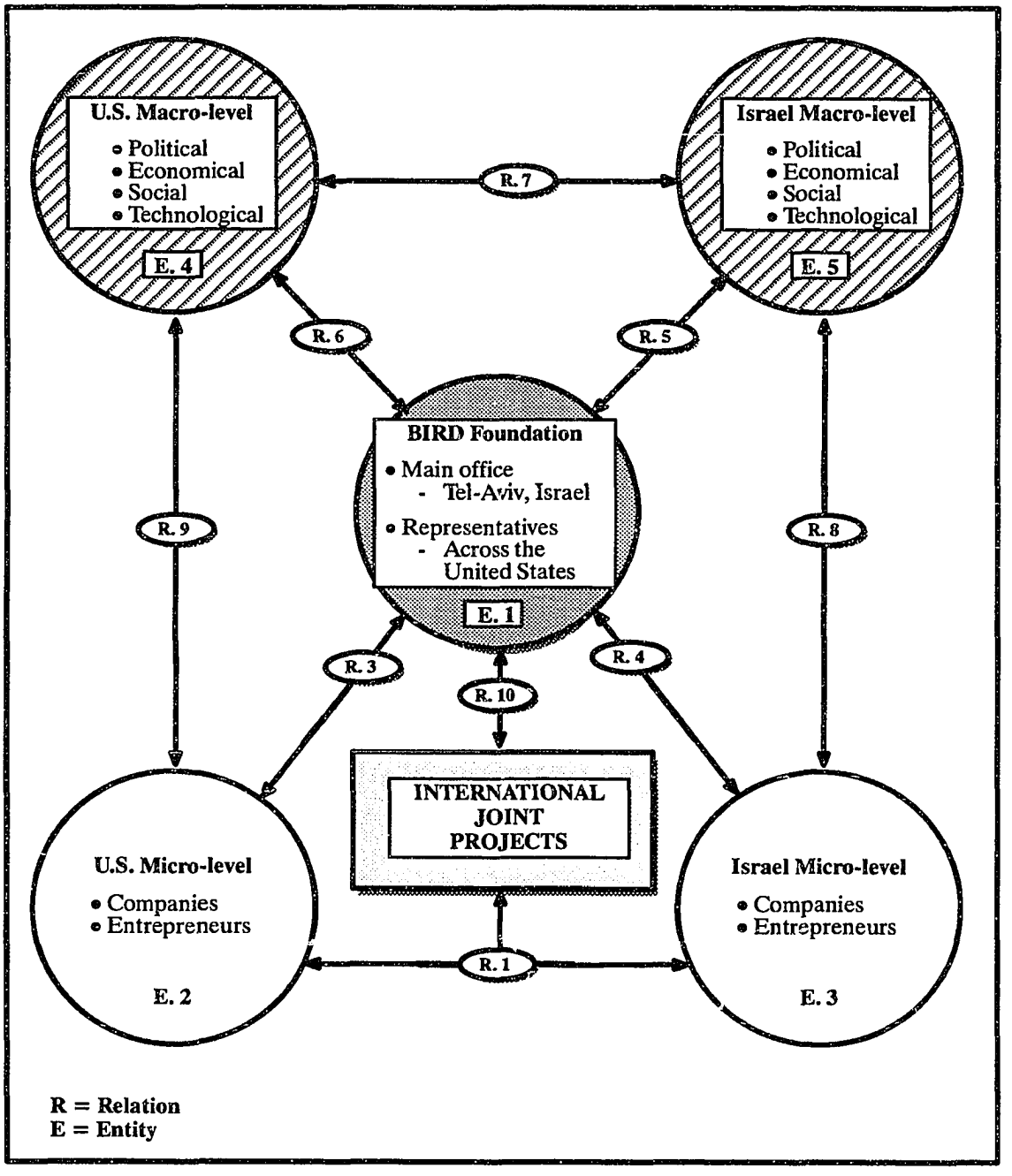
This research challenges previous research on the factors involved in the performance of IJVs and suggests new factors linked to the success of these ventures. Specifically, the model assesses the relationship between IJV success or failure and a range of company, industry, and country-specific factors. Several variants of the model are tested in this context to ensure the robustness of the statistical results. Finally, the author uses the empirical analysis of this research to draw some implications for firms, the BIRD Foundation, and international support mechanisms for LDCs and NICs.

B. The Case Study Method

A unique strength of the case study method is its ability to handle a broad variety of evidence -- documents, interviews, questionnaires, and observations. The study design is based on Yin's (1984) methodology and involves the following steps:

- preparing a complete set of research questions that will form the basis of the study
- advancing a set of propositions concerning the performance of the international joint ventures that will be tested in the empirical analysis
- defining the appropriate units of analysis in this study (Exhibit 4.1)
- developing logical linkages between the data, questions, and propositions that form this study
- developing a set of criteria for interpreting and generalizing the findings and their implications for the management of international joint ventures, the BIRD Foundation, and the mechanisms of foreign aid.

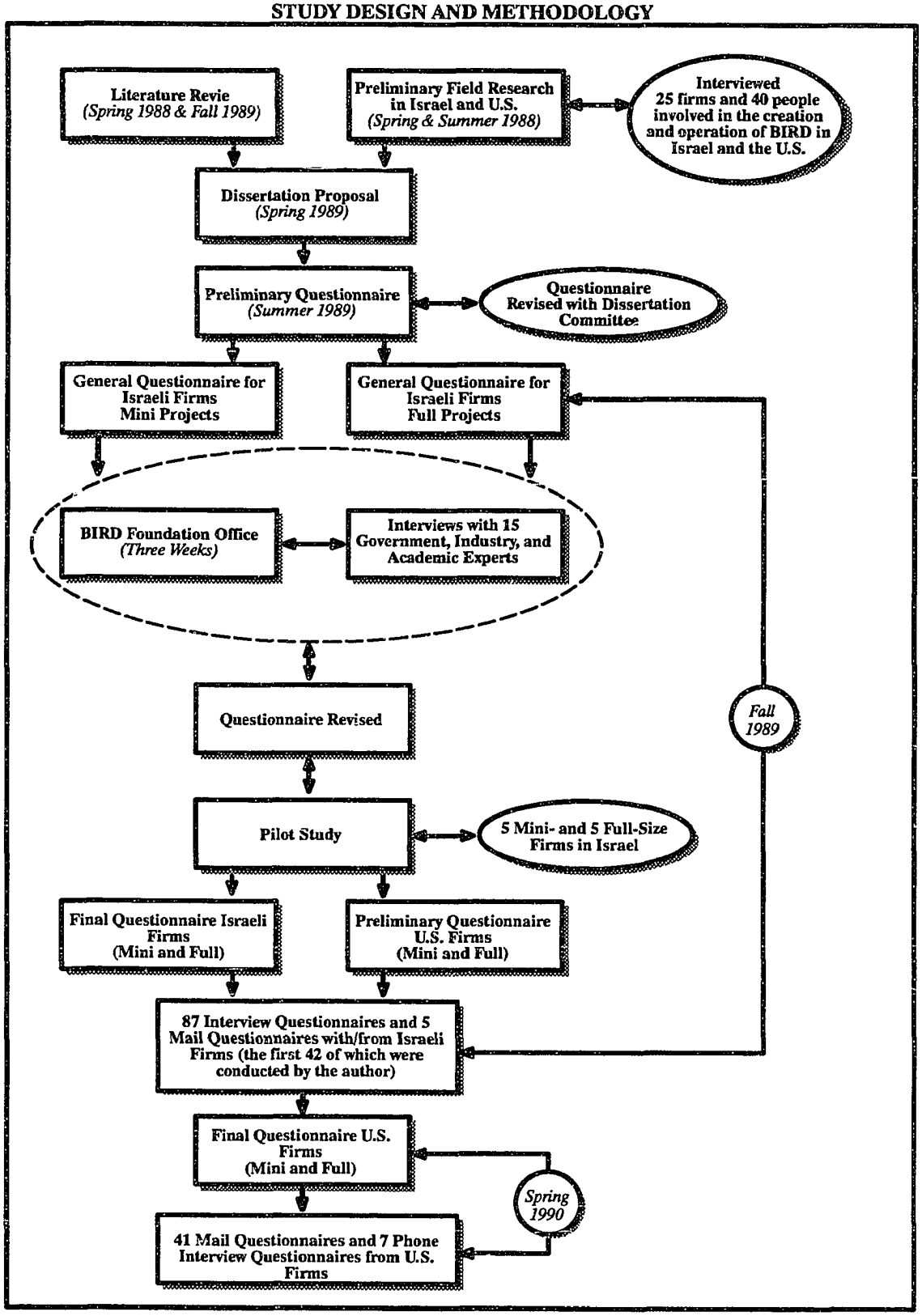
EXHIBIT 4.1
BIRD STUDY MODEL



An important component of the case study was an on-site visit to the BIRD Foundation office. Three weeks of interviews, observations, and reading of internal documents were invaluable--they enabled the author to define more clearly the units of analysis and to develop linkages between the initial findings and the preparation of the final questionnaire.

EXHIBIT 4.2

STUDY DESIGN AND METHODOLOGY



The case design can be divided into several stages (Exhibit 4.2). Preliminary field research involved interviews with BIRD Foundation management, individuals involved in the creation of the Foundation (Appendix C), and twenty-five Israeli firms participating in BIRD projects. The next stage involved the pre-testing of a preliminary questionnaire that had been reviewed by academic advisors, the BIRD Foundation, and industry personnel. The pilot study questionnaire and then administered to ten Israeli firms. Subsequently, two final questionnaires were prepared for Israeli and U.S. firms. Before administering these questionnaires, the author sent a letter to each firm that introduced and explained the research and encouraged the firms' participation. The final questionnaires were administered to the total BIRD population of 223 projects (each with an Israeli and U.S. partner) from 1979 to 1989. The final analysis included two additional projects that were initiated in 1990.

Exhibits 4.3 and 4.4 show the distribution of completed questionnaires relative to population. Completed questionnaires comprised 48% of the total BIRD population, 66% of total BIRD grant payments, 56% of BIRD sales, and 45% of BIRD royalties (Exhibit 4.5). A breakdown of completed questionnaires, presented in Exhibits 4.6 and 4.7, shows that the sample is quite representative across sectors. Exhibit 4.8 gives the distribution of completed questionnaires by country. Ninety-two companies responded in Israel, providing information on ninety-seven projects. For three Israeli projects, questionnaire responses were compiled from two sources within the firm. In sum, one-hundred questionnaires were completed in Israel. A list of Israeli companies and their project activity is presented in Appendix B.1. Forty-eight U.S. companies responded and provided information on fifty-one projects. One U.S. project had two completed questionnaires. The U.S. data base consists of a total of fifty-two observations. A list of U.S. companies and their project activity is presented in Appendix B.2.

C. Data Analysis

The completed questionnaires were organized for analytic purposes into three data bases-- an Israeli data base of 100 observations, a U.S. data base of 52 observations, and a

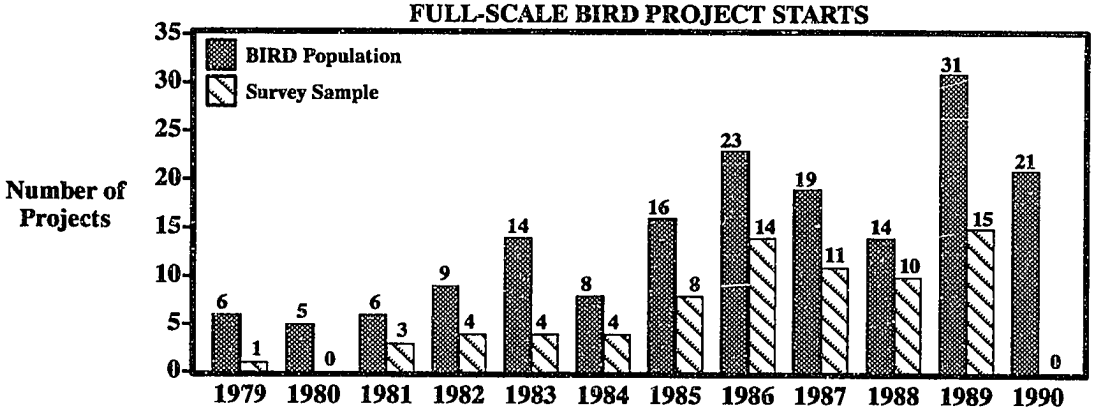
pooled Israeli-U.S. data base with 152 observations. From the pooled data base an alternative data base was constructed that eliminated the 38 Israeli-U.S. matches (projects where both partner firms responded) and 4 observations in which more than one response on a given project was received from the same company. These exclusions created a data base of 110 projects.

An analysis of means was conducted to summarize the responses of companies to various questions within the questionnaire and to highlight any systematic differences between the responses of Israeli and U.S. companies. Responses of Israeli and U.S. firms to questions concerning motives for choosing the partnership strategy, partner selection criteria, partnership problems and disagreements, specific partnership goals, and partnership performance were evaluated to test for statistical differences. Specifically, the Kolmogorov-Smirnov two-sample test was performed on these categories of responses. This is a nonparametric two-tailed test that is sensitive to differences in the distribution of two samples. The test involves calculating the cumulative distribution of responses to specific questions from the two country samples. For each interval, one cumulative step function is subtracted from the other and compared against a critical value of the test statistic. The specifics of the Kolmogorov-Smirnov two-sample test can be found in Seigel (1956).

The information generated from each questionnaire was used to create a scalar variable to measure the relative failure or success of the IJV. Missing information from questionnaires limited the number of failure/success variables to 82 projects. The failure/success variable was then used as the dependent variable in a multivariate regression model that formally tested the role of various company, industry, and country-specific factors in influencing IJV performance.

EXHIBIT 4.3

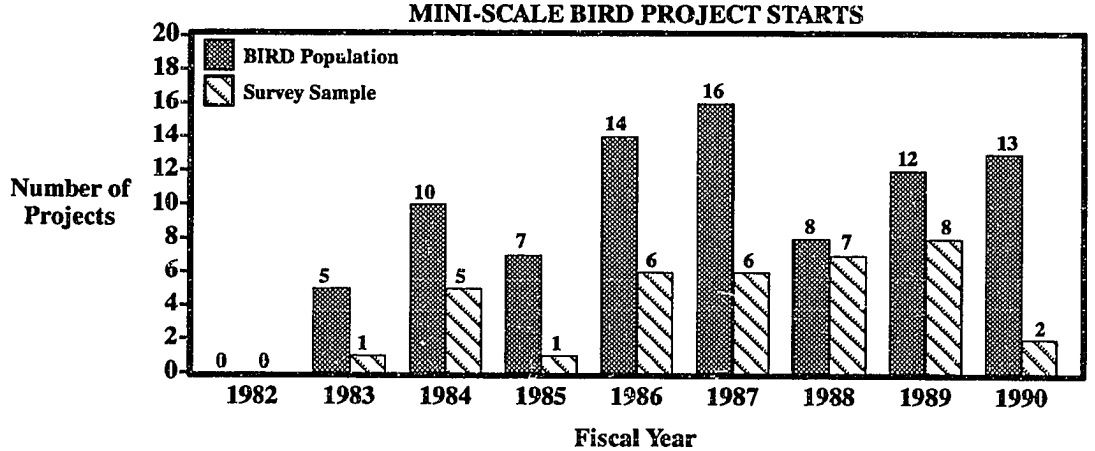
FULL-SCALE BIRD PROJECT STARTS



Source: Population data from the BIRD Foundation sample data from the dissertation survey

EXHIBIT 4.4

MINI-SCALE BIRD PROJECT STARTS



Source: Population data from the BIRD Foundation sample data from the dissertation survey

EXHIBIT 4.5

PROJECT INTENSITY -- SURVEY SAMPLE VS. BIRD POPULATION

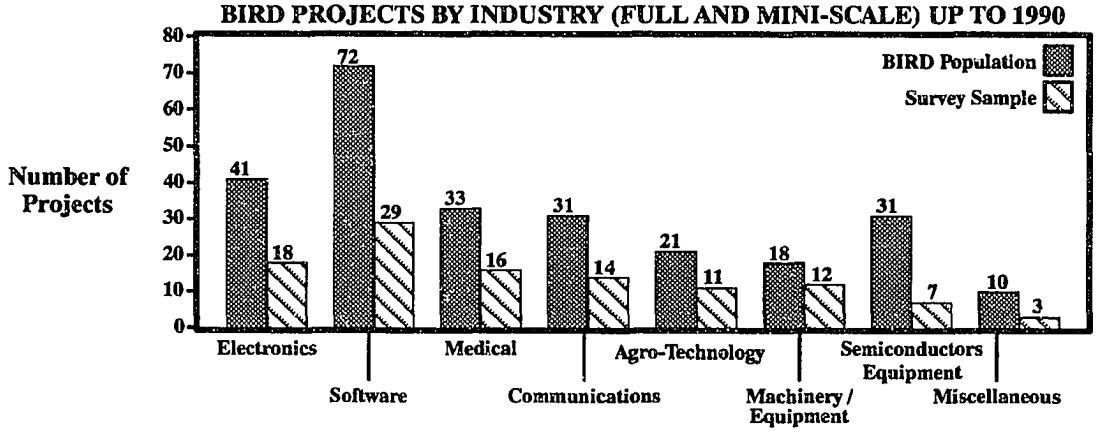
	BIRD POPULATION	SAMPLE	PERCENT SAMPLE / POPULATION
Number of Projects*	223	108	48%
Sales	$215,000,000	$120,000,000	56%
Royalties	$7,483,000	$3,376,000	45%
Grant Payments	$57,500,000	$38,000,000	66%

Data in thousands of dollars

* Statistical analysis includes 2 additional observations initiated in 1990. Percent sample to population based on this figure is 43 percent.

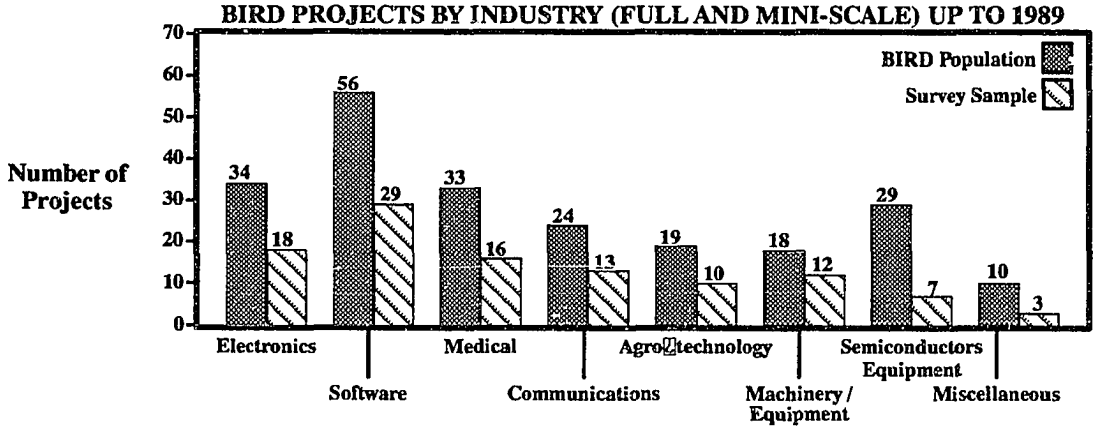
Source: BIRD Foundation status reports and dissertation survey

EXHIBIT 4.6
BIRD PROJECTS BY INDUSTRY (FULL AND MINI-SCALE) UP TO 1990



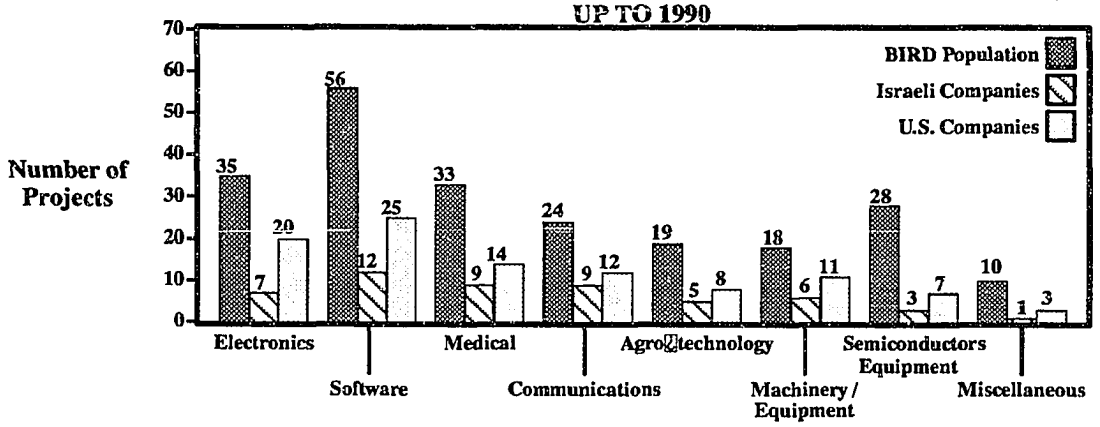
Source: Population data from the BIRD Foundation sample data from the dissertation survey

EXHIBIT 4.7
BIRD PROJECTS BY INDUSTRY (FULL AND MINI-SCALE) UP TO 1989



Source: Population data from the BIRD Foundation sample data from the dissertation survey

EXHIBIT 4.8
BIRD PROJECTS BY COUNTRY / INDUSTRY (FULL AND MINI-SCALE) UP TO 1990



Note: Total Israeli observations: 100 (97 projects, 92 companies) Total U.S. observations: 52 (51 projects, 48 companies)
Total BIRD population 1989: 223 projects

Statistical model building proceeded in the following stages:

- review of the literature to determine key factors influencing international joint venture performance
- correlation analysis to determine the univariate association between variable responses and the failure or success of the international joint venture
- stepwise regression on the data to select appropriate reduced form specifications for estimating the link between intercorrelated variables and the failure or success of the international joint venture
- regression analysis of the determinants of international joint venture performance.

The regression analysis, using both Israeli and pooled Israeli-U.S. data bases, enabled the author to identify the factors linked to IJV performance. The final stage of the empirical methodology involved relating these determinants of IJV performance to factors cited by other researchers in the field.

D. Study Questions

Two sets of key study questions have been explored in this research. One set of questions concerns the role of IJV foundations as a mechanism of economic development The other set of questions involve the performance of IJVs.

THE ROLE OF THE FOUNDATION

Key study questions concerning the role of the foundation are:

1. How important is government involvement in the BIRD Foundation? Specifically, this research will explore the government role in:
   - guaranteeing funding of the endowment
   - designing and constructing the foundation's model
   - evaluating the technological feasibility of projects
   - controlling the major decision-making processes.
2. How does the BIRD Foundation find and help entrepreneurs in both countries?
   - Does the BIRD Foundation improve the structure of the Israeli economy by encouraging private enterprise?
3. How does the BIRD Foundation target small, medium, and large companies that cannot develop and/or commercialize their innovations without outside help?

4. To what extent is sustained funding a major reason for the success of the BIRD Foundation? In particular this study explores:

    - the connection between funding and other support mechanisms such as marketing, management practices, networking, technological feasibility assessment, and business plan development
    - the extent to which international joint ventures would seek or accept nonfinancial support from the BIRD Foundation in the absence of funding.

5. What types of performance measures are most suited to international joint venture foundations?

    - Are these measures applicable to other public-private international joint venture foundations?
    - What type of measures might be needed in other settings?

6. Is the performance of the BIRD Foundation different from that of the Israeli Office of the Chief Scientist?

7. To what extent does the BIRD Foundation correct market failures that occur because of unused resources such as technology and marketing know-how, and imperfect information?

PERFORMANCE MEASURES FOR INTERNATIONAL JOINT VENTURES

Key questions concerning performance measures in this research include:

1. What are the key factors related to the performance of international joint ventures?

    - To what extent do these factors confirm or contrast with findings from other studies?
    - Is there a difference between the factors determining firm success in a developed country-- the United States-- and the factors determining success in a newly industrialized country-- Israel?

2. What factors influence companies' decision to embark on an international joint venture?

3. What are the key criteria in choosing a partner for the international joint venture?

4. What are the most typical problems and disagreements among partners in an international joint venture?

5. Does the industry influence the performance of a particular international joint venture?

    - Are international joint ventures in certain high-technology industries more likely to succeed?
    - What industry characteristics influence the performance of an international joint venture?

6. What is the role of common-ownership among international joint venture partners?

7. Do foreign partners (the U.S. in this study) experience less conflict and greater satisfaction with the international joint venture than host partners (Israel)?

The questions listed above are the centerpeice of the empirical investigation conducted in this study. Chapters 5 and 6 will use this set of questions as a base for analysis.

CHAPTER V: INTERNATIONAL JOINT VENTURES -- MICRO-LEVEL ANALYSIS

This chapter of the dissertation explores the determinants of failure and success in international joint-ventures (IJVs) at the micro-level. It uses the data generated from an extensive survey of Israeli and U.S. firms in order to link statistically the performance of IJVs to a set of company, industry, and national characteristics.

The first section of the chapter discusses the creation of the failure/success variable-- a measure of performance for each company in each project. This section describes in detail the method by which the dependent variable was constructed and the data from which it is based. The second section analyses the numerous variables studied in this investigation. Specifically, variable means and correlation statistics are presented to shed light on several important factors in the creation and operation of IJVs-- partner selection, IJV goals, significant problems and disagreements, and additional factors. The third section of the analysis presents results from a multivariate analytical model linking IJV performance to the various factors tested in this research. The creation of the model involves the use of stepwise regression techniques to isolate the principal determinants of IJV failure or success. Then the model is estimated using ordinary least squares (OLS) applied to the preferred model. Specific attention is given to ownership form, partner commitment, and industry type in evaluating the likelihood of IJV success. Finally, the analysis concludes with a summary of the empirical findings, and a commentary on their relationship to the results of other studies.

A. Failure and Success of BIRD International Joint Ventures: The Dependent Variable

ASSESSMENT OF THE FAILURE/SUCCESS VARIABLE

The Failure/Success (FAILSUC) variable has been constructed to measure the performance of BIRD IJVs. The FAILSUC variable is a subjective measure based on the set of variables listed in Exhibit 5.1 below:

Each company's performance was assessed according to these criteria and the following scales were assigned:

Category 1: Failed completely: The project met none of its technological, product development, or commercialization objectives.

Category 2: Partly succeeded in technological and product development but commercially failed: The project had some success in developing its technological objectives but failed to develop a successful product for any market.

Category 3: Succeeded in technological and product development with limited initial sales but probably will fail commercially: The IJV successfully developed the product, overcame all technological and technical problems, initiated some sales of the product and byproducts, but will probably not experience product sales of a sufficient magnitude to succeed commercially.

Category 4: Succeeded in technological and product development with successful sales and probably will succeed commercially: The IJV successfully developed the product, overcame all technological and technical problems, introduced a good product in a timely way and for the right market, initiated strong sales and probably will be commercially successful.

Category 5: Succeeded completely: The IJV successfully developed a product that has been a commercial success.

Category 0: Insufficient information: Too little information is available at the stage of this stage of the IJV project development to conclude whether the project will succeed or fail.

EXHIBIT 5.1

CONSTRUCTION OF DEPENDENT VARIABLE

INFORMATION	INFORMATION SOURCE
1. Total dollars INVESTED in and / or COMMITTED to the IJV	BIRD files / Questionnaire (I-11)
2. Total dollar SALES of products	BIRD files / Questionnaire (I-13)
3. Total dollar ROYALTIES received by BIRD	BIRD files
4. FOLLOW-UP business such as other IJVs or new subsidiaries	Questionnaire (I-29)
5. SATISFACTION of the company or companies involved	Questionnaire (28a to 28l)
6. COMMENTS from open questions	BIRD filed / Interviews / Questionnaire (I-30, I-31, I-35, II-8, open questions)

CATEGORIZATION OF COMPANIES BY FAILURE/SUCCESS CATEGORIES

Ninety-two Israeli companies completed questionnaires concerning 97 IJV projects supported by the BIRD Foundation, and 48 U.S. companies completed questionnaires concerning 51 IJV projects. The data set included thirty-eight matches, or responses from both the Israeli and the U.S. partners in a given IJV. Exhibit 5.2 shows the breakdown of these projects by performance category.

EXHIBIT 5.2

NUMBER OF COMPANIES IN EACH FAILURE/SUCCESS CATEGORY

	NUMBER OF PROJECTS SURVEYED		
	ISRAEL	U.S.	ALL MINUS MATCHES
Category 1: Failed Completely	16	9	17
Category 2: Failed Commercially	10	5	13
Category 3: Probably Failed Commercially	24	8	27
Category 4: Probably Succeeded Commercially	18	9	18
Category 5: Succeeded Completely	5	3	7
Category 0: Insufficient Information	24	17	28
Total	**97**	**51**	**110**

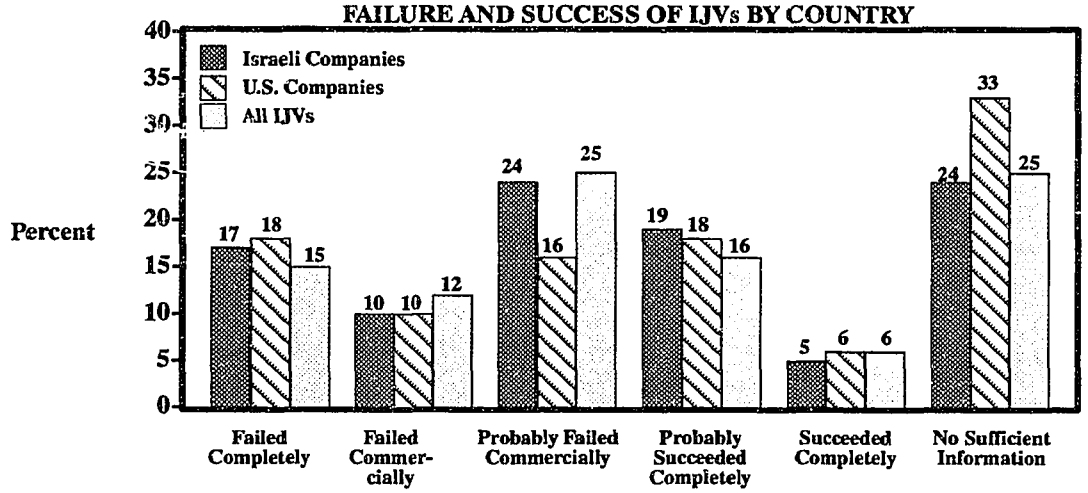
Note that the distribution of IJV performance is roughly similar across Israel and the United States, although greater than 30 percent of U.S. company responses provide insufficient information to construct the failure/success variable.

Exhibit 5.3 shows the percentage share claimed by each category of success. Like the preceding exhibit, it underscores the similarity across countries in the composition of the categories. The similarity is particularly evident between the Israeli and the pooled (Israeli and U.S.) data base. Small differences between the U.S. data base and the pooled and Israeli data may be due to the smaller sample of companies in the United States and the much greater number of observations with insufficient information. Finally, the relative homogeneity in the categorization of the failure/success variable across countries is further evidence that the dependent variable is well constructed.

THE QUALITY OF THE FAILURE/SUCCESS VARIABLE

The FAILSUC variable, though based on several objective criteria, is a somewhat subjective variable. Nevertheless, the fact that it is positively and significantly correlated with a variety of objective performance measures suggests that it is a reasonably good indicator of IJV performance (Exhibit 5.4).

EXHIBIT 5.3
FAILURE AND SUCCESS OF IJVs BY COUNTRY



Source: Dissertation survey

B. Analysis of Key Performance Measures in the Creation and Operation of the IJV

INTERNATIONAL JOINT VENTURES: BUSINESS STRATEGY

Exhibit 5.5 shows the mean response of Israeli and U.S. companies to several questions about their motives in choosing the IJV strategy. The exhibit reveals that the main motives of Israeli companies in entering an IJV have been access to foreign markets (4.17), and financial support from the BIRD foundation (4.13). In the United States, while financial support from BIRD was the most important motive for choosing the IJV strategy (3.82), access to market (1.86) was not an important consideration. In addition to financial support from BIRD, U.S. companies indicated that obtaining technology (3.39), and saving time in R&D (2.76) were relatively important considerations in entering into an IJV.

EXHIBIT 5.4

THE FAILURE/SUCCESS MEASURE AND OTHER SUCCESS VARIABLES

- ISRAELI COMPANIES -

VARIABLE NAME	VARIABLE	NUMBER OF OBSER-VATIONS	FAILSUC	
			CORRELA-TIONS	P-VALUE
FAILSUC	Failure / Success (Dependent Variable)	77	1.00	.0000
SALBD	IJV Sales reported by BIRD	75	.327	.0040
SALAC13	IJV Sales reported by Company	67	.373	.0020
ROYALTY	Royalties	70	.353	.0027
ROYGR	Royalties / Grant	70	.532	.0001
PRD28A	Product Development Completion	73	.462	.0001
SAL28B	Company Satisfaction- IJV Sales	56	.545	.0001
GSAL28C	Company Satisfaction- Sales Growth	48	.572	.0001
GEXP28D	Company Satisfaction- Export Sales	51	.556	.0001
ROI28E	Company Satisfaction- ROI	45	.669	.0001
GMS28F	Company Satisfaction- Market Share Growth	46	.551	.0001
FOR28G	Company Satisfaction- Access to Foreign Markets	59	.284	.0300

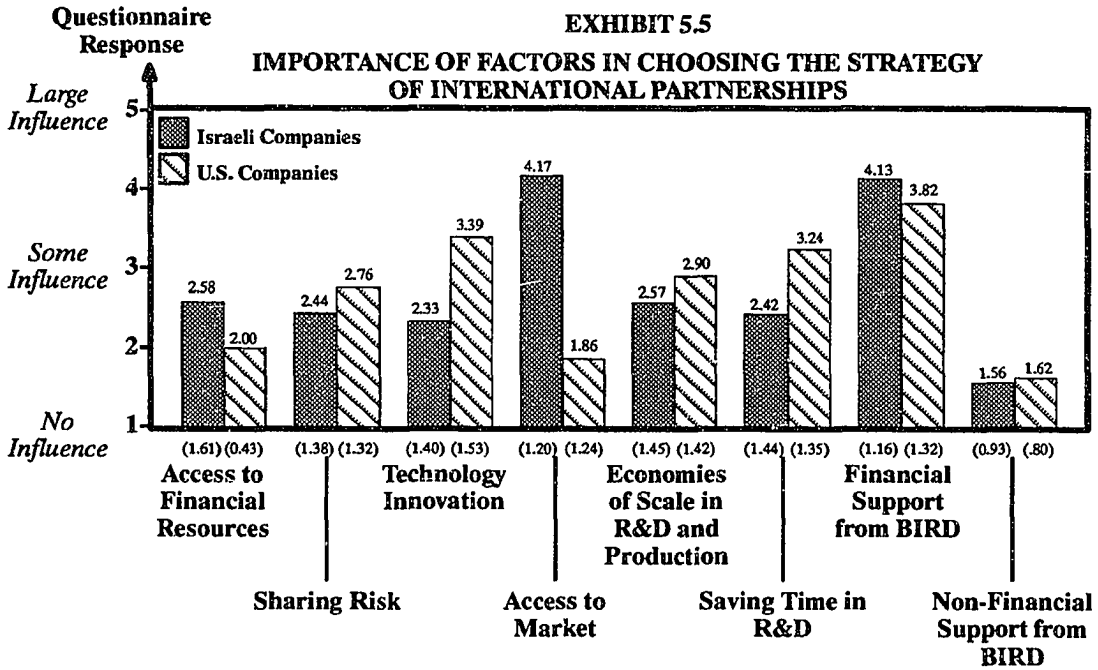
THE FAILURE/SUCCESS MEASURE AND OTHER SUCCESS VARIABLES

- U.S. COMPANIES -

VARIABLE NAME	VARIABLE	NUMBER OF OBSER-VATIONS	FAILSUC	
			CORRELA-TIONS	P-VALUE
UFAILSUC	Failure / Success (Dependent Variable)	36	1.00	.0000
USALBD	IJV Sales reported by BIRD	35	.446	.0073
USALAC13	IJV Sales reported by Company	33	.505	.0027
UROYALTY	Royalties	33	.390	.0250
UROYGR	Royalties / Grant	33	.493	.0036
UPRD28E	Product Development Completion	34	.516	.0018
USAL28F	Company Satisfaction- IJV Sales	26	.594	.0014
UGSAL28G	Company Satisfaction- Sales Growth	26	.546	.0040
UGEXP28H	Company Satisfaction- Export Sales	20	.538	.0140
UROI28I	Company Satisfaction- ROI	26	.480	.0132
UGMS28J	Company Satisfaction- Market Share Growth	23	.587	.0030
UACC28B	Company Satisfaction- Access to Israeli Markets	8	.664	.0720

EXHIBIT 5.5

IMPORTANCE OF FACTORS IN CHOOSING THE STRATEGY OF INTERNATIONAL PARTNERSHIPS

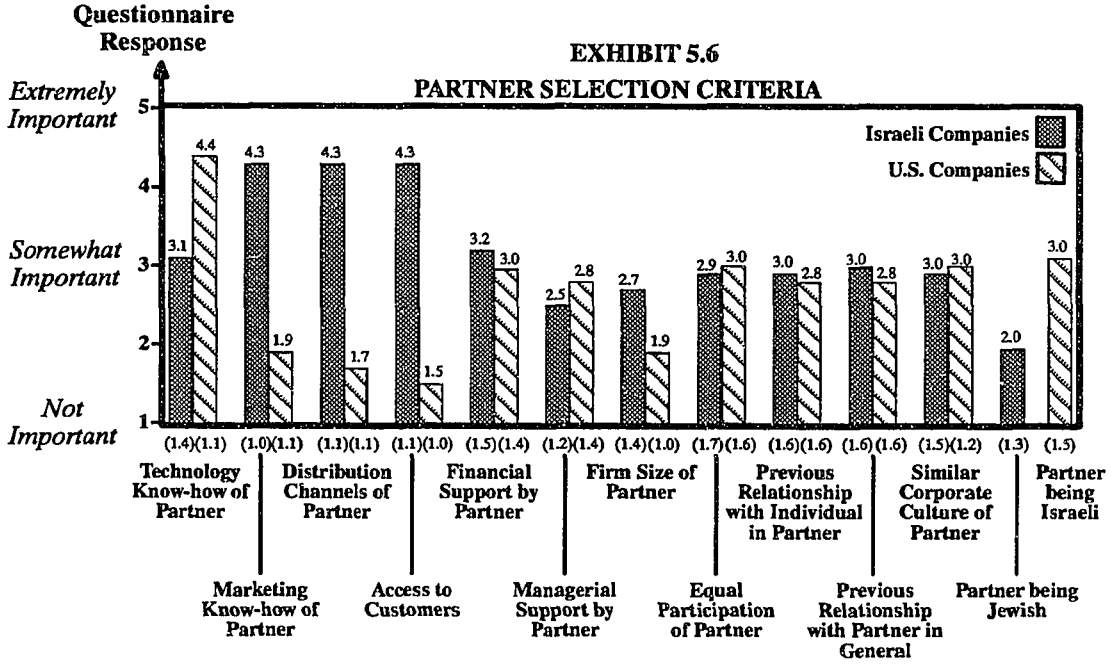


Source: Dissertation survey

Note: Numbers listed alone denote mean
Numbers listed in parentheses denote standard deviation

INTERNATIONAL JOINT-VENTURES: PARTNER SELECTION

Exhibit 5.6 summarizes the mean responses of Israeli and U.S. companies to questions about the *criteria they use in selecting partners.* Israeli companies chose partners primarily on the basis of marketing know-how (4.31), distribution channels (4.30), and access to customers of the potential partner (4.29). U.S. companies found each of these three factors to be relatively unimportant, and rated technology know-how (4.38) as the most important factor in partner selection. The fact that Israeli companies sought marketing capabilities and U.S. companies sought technological innovation and know-how suggests that BIRD partnerships are complementary ventures. It is interesting to note that while Israeli companies in general suffer from a lack of financial capital, the companies responding did not rank access to finance among the top three selection criteria.



Source: **Dissertation survey**

Note: **Numbers listed alone denote mean**
Numbers listed in parentheses denote standard deviation

INTERNATIONAL JOINT-VENTURES: DISAGREEMENTS AND PROBLEMS

The responses of Israeli and U.S. companies to the issue of *key problems and disagreements* in the partnership are summarized in Exhibit 5.7. Presented with a scale companies could chose to respond at the extremes that there was no problem (a value of 0) or a very serious problem (and chose a value of 5). Given this ranking, projects where problems are slight receive relatively low overall means, whereas projects where problems are severe receive high means. For the Israeli companies, the principal problems related to the partner's commitment (1.49), personal communications (1.26), and ability to deliver agreed-upon share (1.23). The data seem to suggest that most of these problems occurred first in the product development phase and later in the marketing phase. The problems cited most often by the U.S. companies related to the ability of the partner to deliver (1.55), personal communication (1.42), the partner's commitment (1.24), and trust (1.04). On average, U.S. companies indicated more problems in the IJV than did Israeli companies.

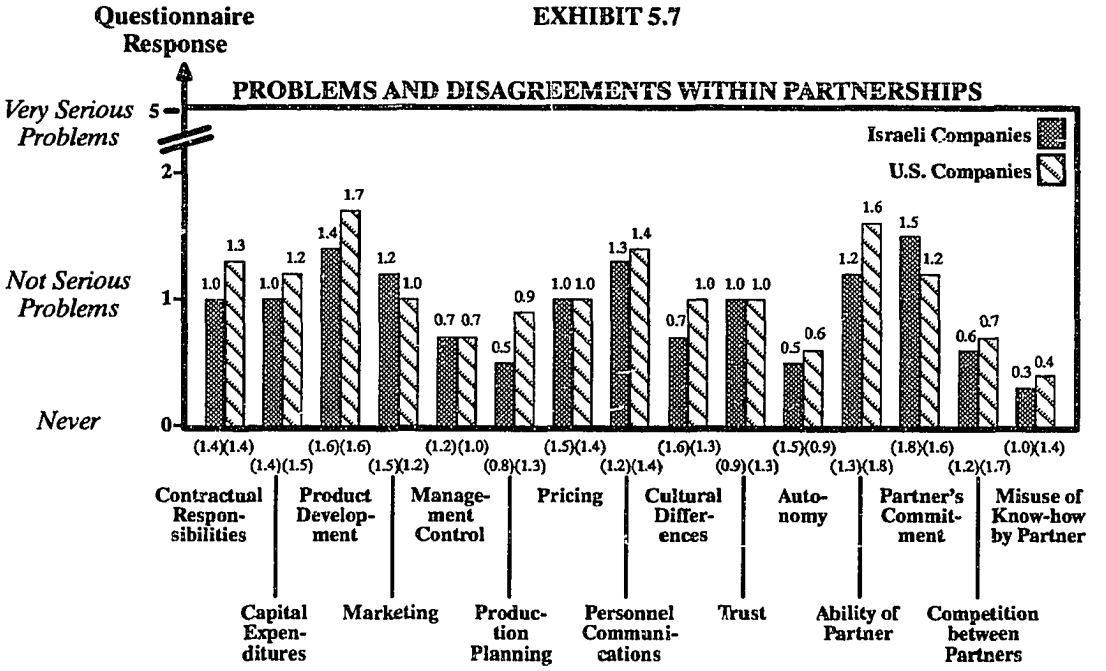


EXHIBIT 5.7

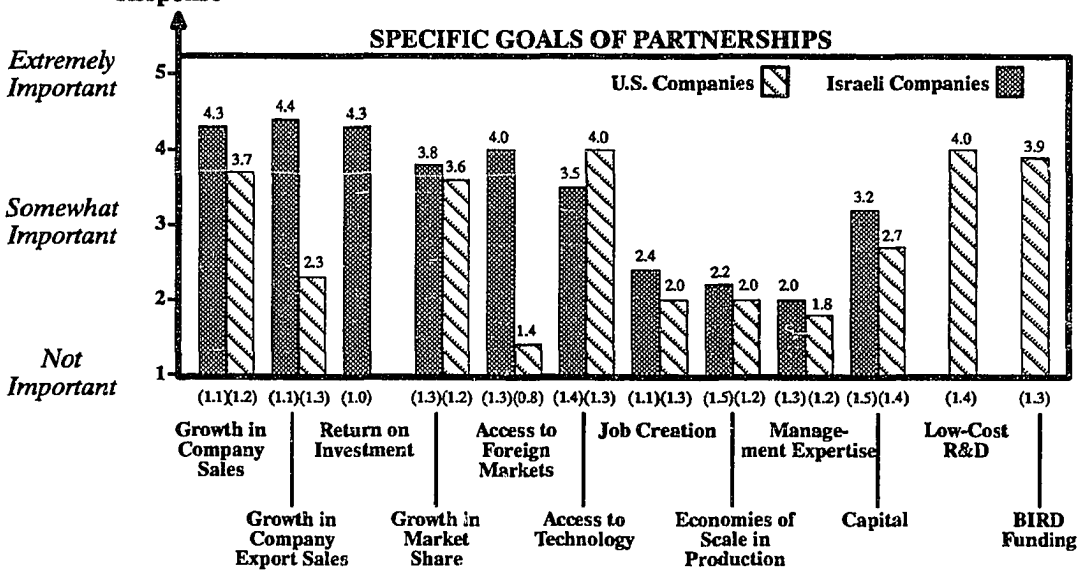
Source: Dissertation survey
Note: Numbers listed alone denote mean
Numbers listed in parentheses denote standard deviation

Note that previous also found a connection between commitment problems and IJV performance (Beamish and Lane, 1982; Beamish, 1988; Lorange and Roos, 1989). The statistical significance of commitment in predicting IJV success will be evaluated in the analysis that follows.

International Joint-Ventures: Specific Goals of Projects

Exhibit 5.8 summarizes the responses of companies to the question of *partnership objectives*. For the Israeli companies, both technological innovation (3.8) and product development progress (3.4) were important goals. By contrast, the acquisition of management expertise from the U.S. partner (2.03) was not an important objective. This suggests that Israeli companies may not take full advantage of the potential gains to be acquired from partnership with their better managed U.S. counterparts. For the United States, the three most important objectives were access to low cost R&D (3.95), technology (4.00), and BIRD funding (3.90).

EXHIBIT 5.8



Source: **Dissertation survey**

Note: **Numbers listed alone denote mean**
Numbers listed in parentheses denote standard deviation

INTERNATIONAL JOINT-VENTURES: PERFORMANCE OF PROJECTS

Israeli companies were least satisfied with export sales growth (2.51), return on investment (2.42), and overall sales growth (2.52) accruing from the IJV (Exhibit 5.9). This result is particularly troubling in that Israeli firms cited advances in these three areas as their chief objectives in entering the partnership. U.S. companies reported satisfaction with access to funding from the BIRD Foundation (4.33) and with technology innovation (3.78), both of which were strong among their stated objectives.

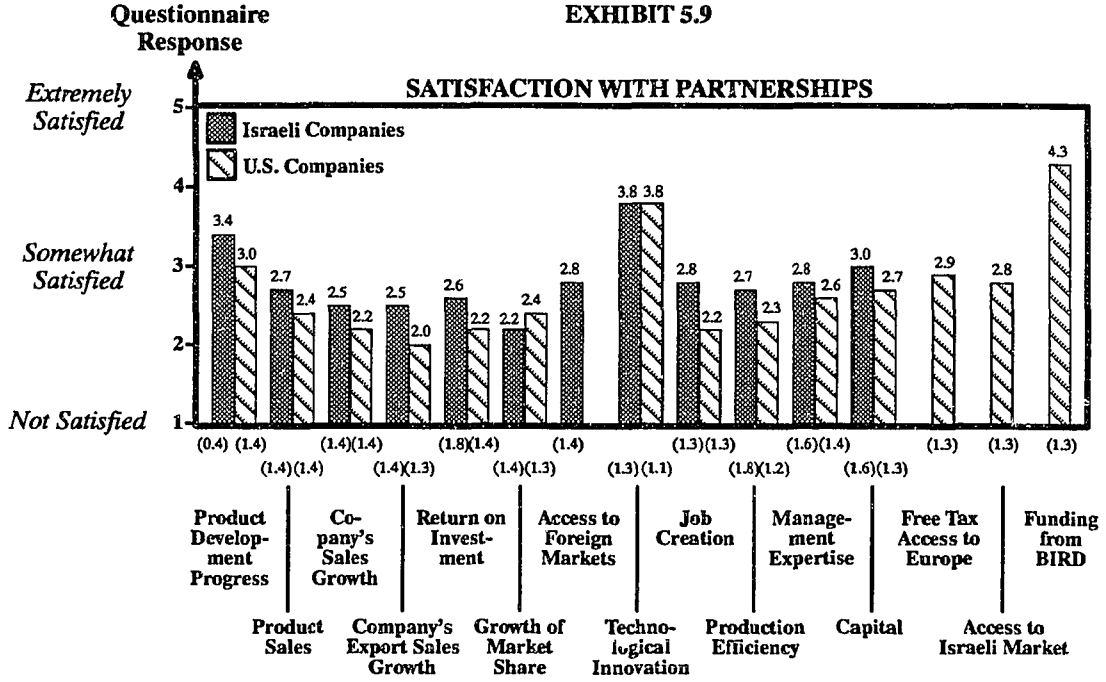
DIFFERENCES BETWEEN ISRAELI AND U.S. RESPONSES: A TWO-SAMPLED TEST

To evaluate the degree to which the Israeli and U.S. company responses are statistically similar (drawn from the same underlying population distribution or from populations with the same distribution), the Kolmogorov-Smirnov two-sample test was performed (Seigel, 1956). This is a nonparametric two-tailed test sensitive to differences in the distributions from which the two samples are drawn-- for example, differences in central tendency, dispersion, and skewness.

If the Israeli and U.S. samples are drawn from the same underlying population distribution, then the cumulative distribution of the two samples will be similar. By contrast, if the two samples come from different population distributions, then the

cumulative distribution from the Israeli and U.S. responses will be relatively far apart. The test uses the intervals 1 to 5 from the questionnaire to calculate the cumulative distribution of responses of Israeli and U.S. companies. For each interval, one step function is subtracted from the other, and the largest of these differences is the focus of the test statistic. The specifics of the Kolmogorov-Smirnov two-sample test can be found in Seigel (1956).

EXHIBIT 5.9



Source: Dissertation survey

Note: Numbers listed alone denote mean
Numbers listed in parentheses denote standard deviation

The test was performed on the responses of Israeli and U.S. firms to the questions about motives for choosing the partnership strategy, partner selection criteria, partnership problems and disagreements, specific partnership goals, and partnership performance. All differences were evaluated at the .001 level and were normalized to account for instances of no response.

In eleven of fifty-six cases tested, responses of Israeli and U.S. firms met the test for rejection of the null hypothesis (that is, the value of the normalized differences in the cumulative step function exceeded the critical value at the .001 level). In rank-order of

significance from largest to smallest normalized difference (Norm-D), the questionnaire responses meeting this criteria are displayed in Exhibit 5.10.

EXHIBIT 5.10

KOLMOGOROV-SMIRNOV TWO-TAILED TEST STATISTICS

VARIABLE NAME	QUESTION: IMPORTANCE OF...	QUESTION #	KOLMOGOROV-SMIRNOV STAT. (NORM-D)
CUS21D	Access to customers of partner as SELECTION FACTOR	21d	4.34
DISS21C	Channels of distribution of partner as SELECTION FACTOR	21c	4.23
MKTG21B	Marketing know-how of partner as SELECTION FACTOR	21b	4.19
DIS19D	Market access in choosing IJV STRATEGY	19d	4.03
FOR27E	Access to foreign markets as specific IJV GOAL	27e	3.67
GEXP27B	Growth of export sales as specific IJV GOAL	27b	3.49
TECH21A	Technological ability of partner as SELECTION FACTOR	21a	2.48
GSALS27A	Growth of sales as specific IJV GOAL	27a	2.37
JEW21L	Partner being Jewish (for Israeli companies) or Israeli (for U.S. companies) as a SELECTION FACTOR	21l	1.96
TEC19C	Obtaining technological know-how in choosing IJV STRATEGY	19c	1.95
TIM19F	Saving time in R&D in choosing IJV STRATEGY	19f	1.77

Exhibits 5.11 through 5.21 present the distribution of responses of Israeli and U.S. companies to questions in which responses were found to differ significantly according to the two-tailed test. In the broad area of the motives for choosing the IJV strategy, Israeli and U.S. responses differed significantly on several points, namely the importance of gaining market access (Exhibit 5.14), obtaining technological know-how (Exhibit 5.20), and saving R&D time (Exhibit 5.21). In sum, these differences suggest that while Israeli

companies sought new channels of distribution and new customers in pursuing the IJV strategy, U.S. companies hoped to gain technological knowledge.

As for the criteria applied in choosing a partner, Israeli and U.S. companies differed in five of twelve possible categories. Specifically, factors that were influential in Israeli selection of a U.S. partner but did not figure prominently in U.S. selection were gaining access to customers (Exhibit 5.11), obtaining distribution channels (Exhibit 5.12), and obtaining market know-how through the partner (Exhibit 5.13). The technology know-how of the Israeli partner was again of great importance in U.S. firms' partner selection decisions (Exhibit 5.17). Among the variables summarizing IJV goals, only access to foreign markets received very different ratings from Israeli and U.S. firms. Whereas market access was relatively important to Israeli firms, it was significantly less important to U.S. firms.

In sum, the specific nature of the differences between U.S. and Israeli firm responses lends additional support to the notion that U.S.-Israeli high-technology IJVs are complementary in nature. While the small, technologically innovative but organizationally immature Israeli firm looks to the large U.S. partner's marketing resources, the U.S. firm seeks technological innovation in pursuing the partnership strategy.

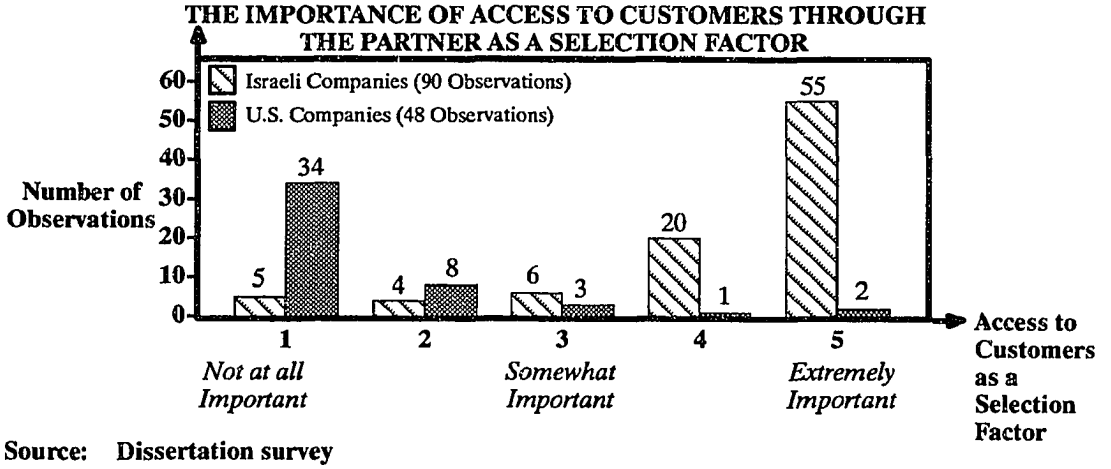
An additional source of difference in partner selection criteria related to the choice of partner for reasons of nationality/ethnicity. While U.S. firms stated that their choice of partner was influenced by the firms' location in Israel, Israeli firms indicated that Jewish management or ownership did not figure importantly in their partnership decisions.

It is of some note that none of the disagreement and problem variables and none of the variables summarizing the firm's satisfaction with the IJV were found to differ significantly between Israeli and U.S. firms. This result suggests that Israeli and U.S. firms perceived the performance of the IJVs (their problems and their merits), in consistent ways. This finding may also be taken as an indication of the robustness of the various performance measures within the questionnaire.

INITIATION OF CONTACTS

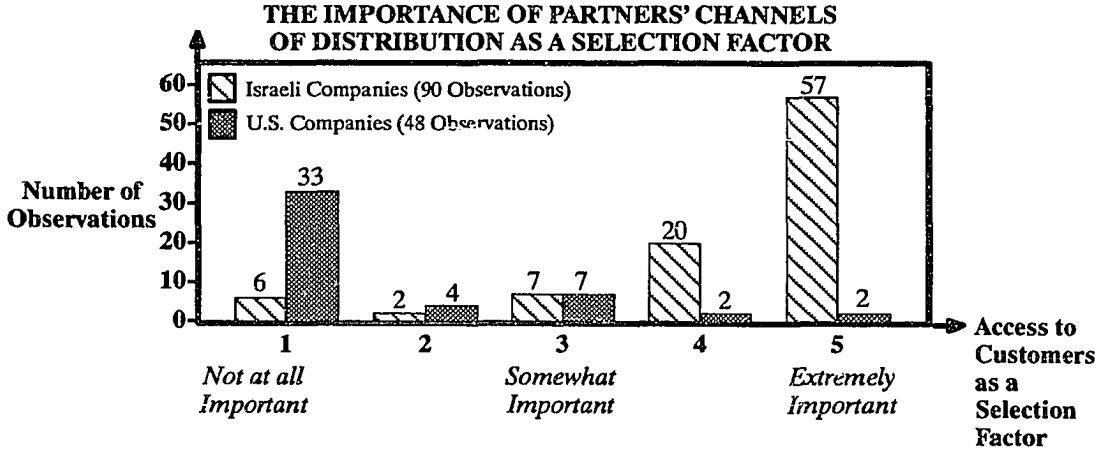
In the Israeli data base, 70 of the 95 responses to the question of the initiation of contact (74%) indicated that the Israeli company initiated the contact with the U.S. partner. The U.S. company initiated the contact in only 14 of 95 cases (15%), 9 of which occurred after 1986. Only 3 of the 95 IJV contacts were initiated by the BIRD Foundation. In the U.S. data base, 34 of 47 contacts (72%) were initiated by the Israeli partner, 10 (21%) by the U.S. company, and 3 (7%) by the BIRD Foundation.

EXHIBIT 5.11



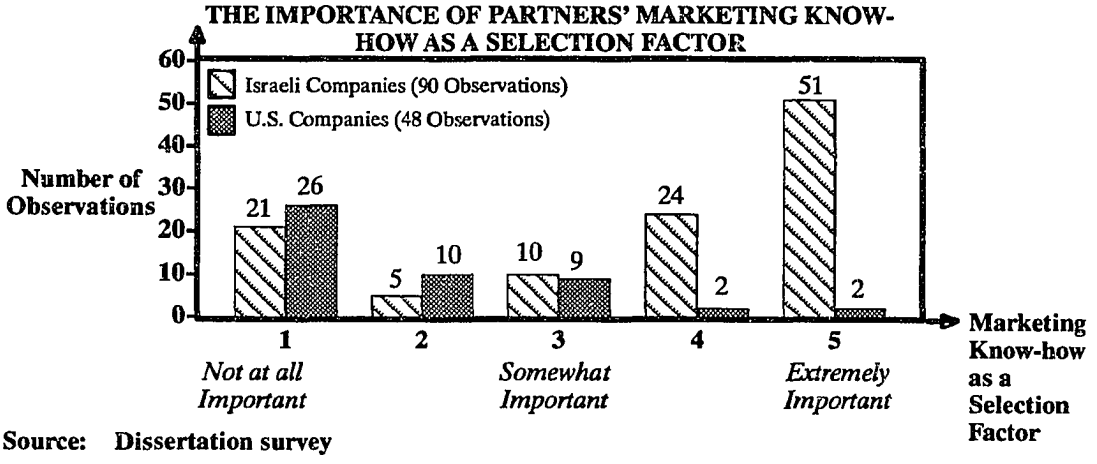
Source: Dissertation survey

EXHIBIT 5.12



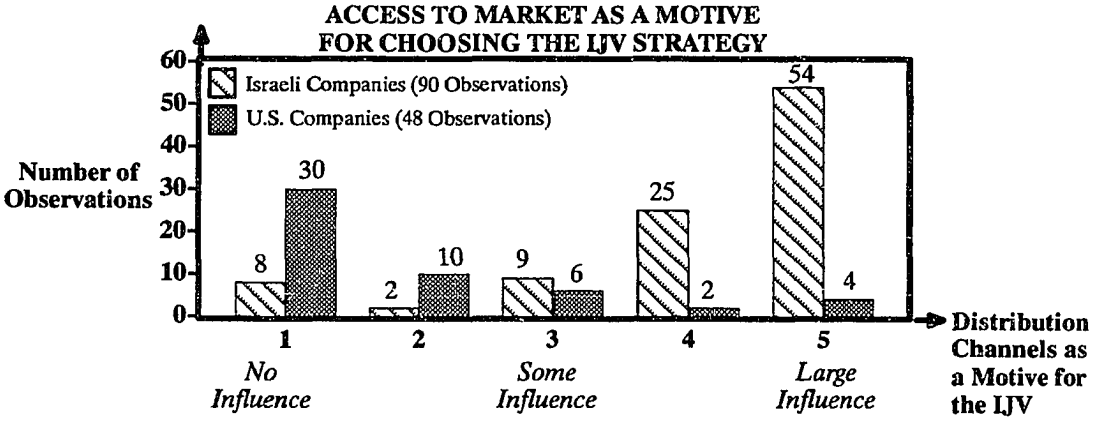
Source: Dissertation survey

EXHIBIT 5.13



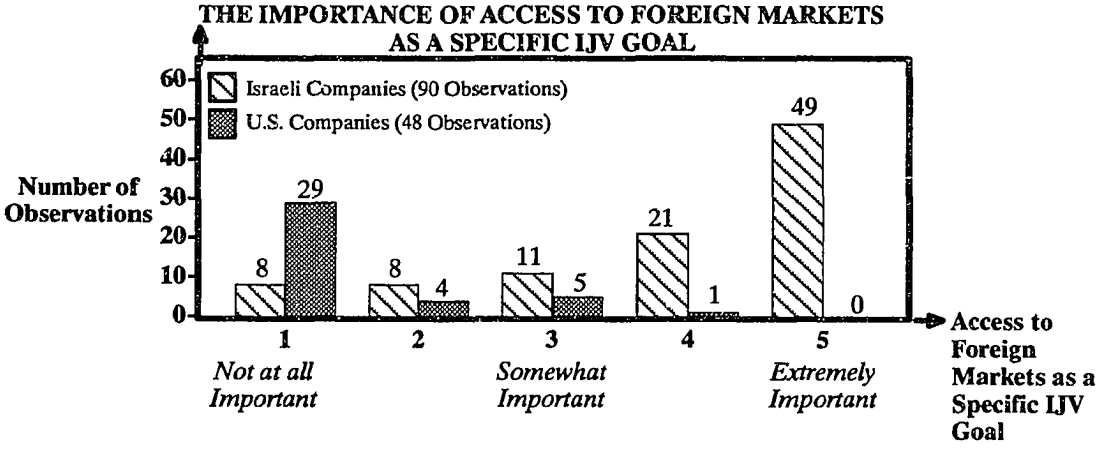
Source: **Dissertation survey**

EXHIBIT 5.14



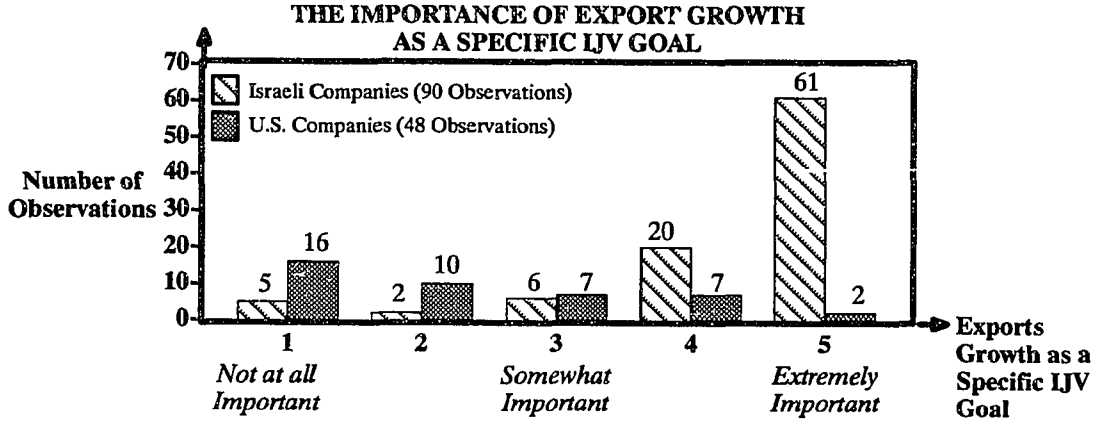
Source: **Dissertation survey**

EXHIBIT 5.15



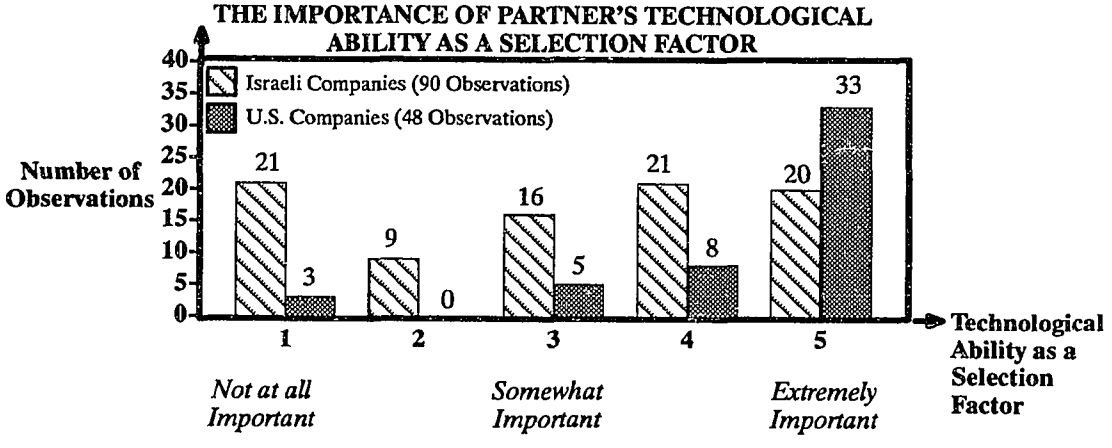
Source: **Dissertation survey**

EXHIBIT 5.16



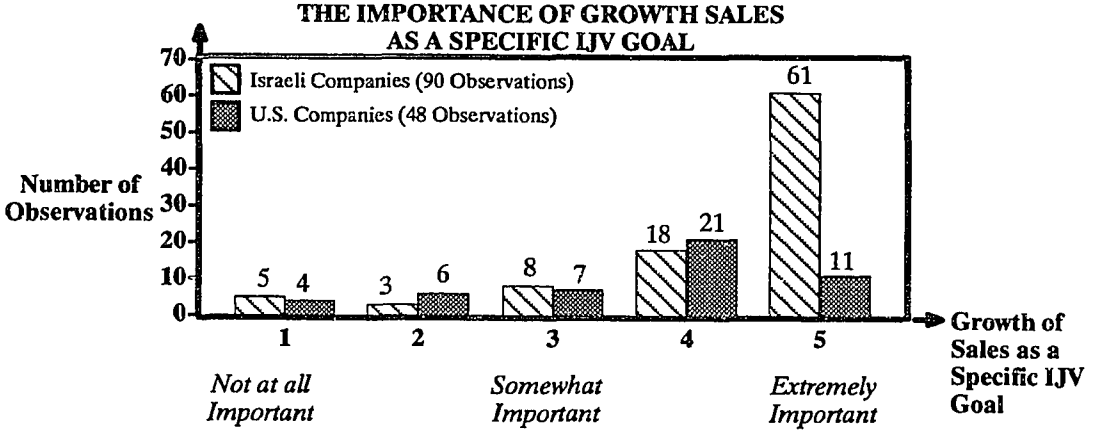
Source: **Dissertation survey**

EXHIBIT 5.17



Source: **Dissertation survey**

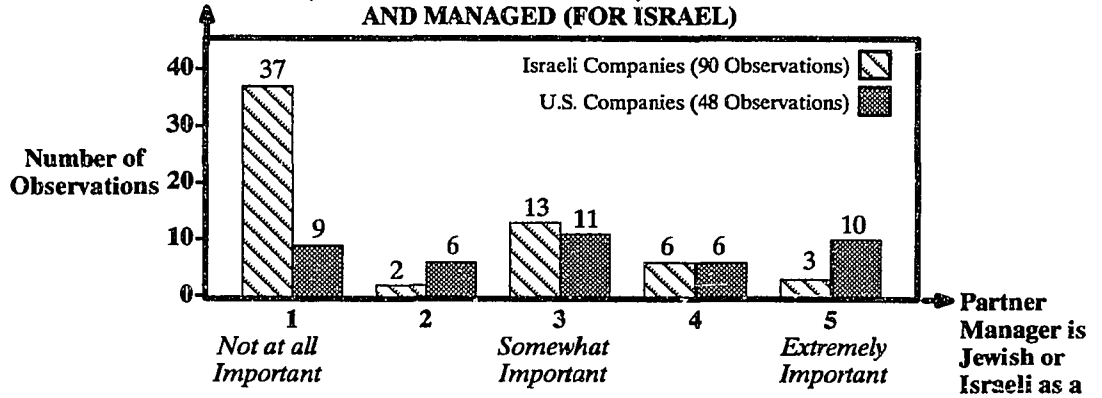
EXHIBIT 5.18



Source: **Dissertation survey**

EXHIBIT 5.19

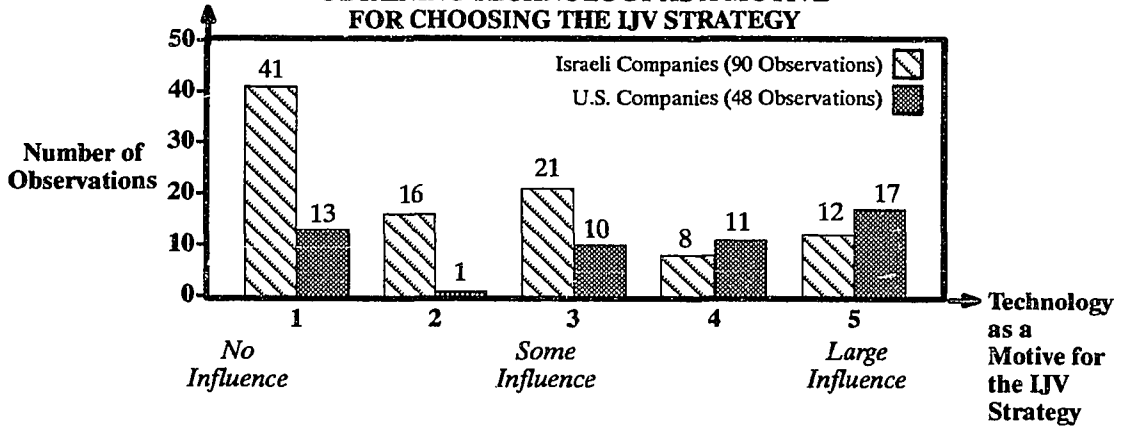
THE IMPORTANCE OF PARTNER COMPANY BEING ISRAELI (FOR THE UNITED STATES) OR JEWISH-OWNED AND MANAGED (FOR ISRAEL)



Source: **Dissertation survey**

EXHIBIT 5.20

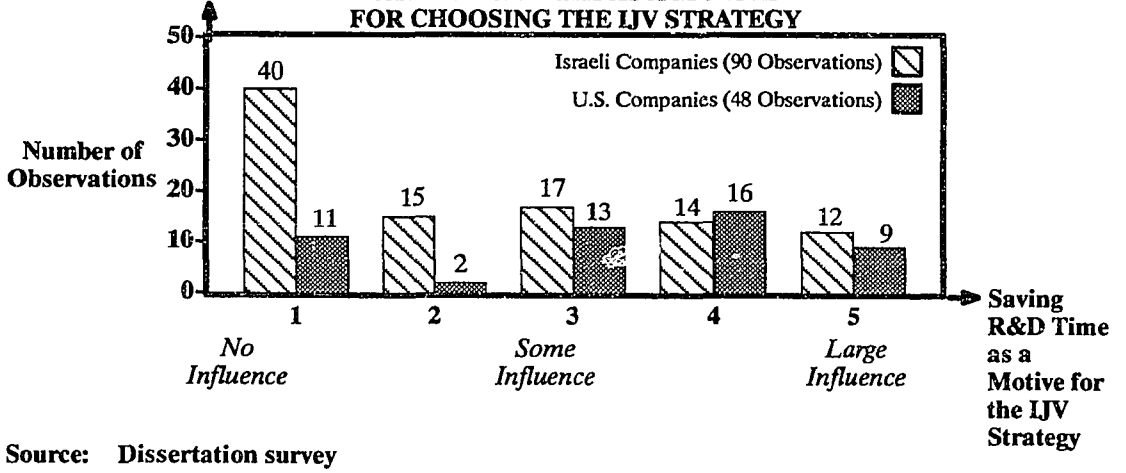
OBTAINING TECHNOLOGY AS A MOTIVE FOR CHOOSING THE IJV STRATEGY



Source: **Dissertation survey**

EXHIBIT 5.21

SAVING R&D TIME AS A MOTIVE FOR CHOOSING THE IJV STRATEGY



Source: **Dissertation survey**

These responses suggest that the BIRD Foundation had not yet fulfilled one of its key operational objectives, namely "to operate as a networking center for Israeli and U.S. partnerships and initiate contacts among potential partners between the countries." Although the BIRD Foundation Director, Dr. Ed Mlavsky, and its Associate Director, Mr. Ira Grinberg, spend a considerable amount of time searching for new Israeli and especially U.S. companies, they have not been very successful in initiating contacts between Israeli and U.S. companies. The BIRD foundation however, claims greater success in the last several years in initiating successful partner contacts. In addition, it appears that Israeli companies initiate most of the IJVs with their U.S. counterpartners either because of critical need for a U.S. partner, or because Israeli companies understand the U.S. market better than U.S. companies understand the Israeli market.

Partner Initial Contributions to the IJV

Exhibit 5.22 lists company reactions to a series of questions designed to determine the assignment of partner responsibility for primary initial contribution to the venture in a number of categories. The data suggest two main conclusions about initial partner contributions in high-technology IJVs between Israeli and U.S. companies:

- Technology innovations and entrepreneurial ideas were usually generated by the Israeli partners (61 and 63 percent, respectively) according to both Israeli and U.S. companies.
- The various marketing functions usually originate with the U.S. partner (61 percent), and the perception of this was roughly the same across countries.

In sum, the responses suggest that in Israel there is a relative wealth of technological innovation and entrepreneurship that does not translate into the commercialization of products. On the other hand, in the United States there is a need for technology innovation and entrepreneurial ideas.

IJV Partners' Functions

Market Definition

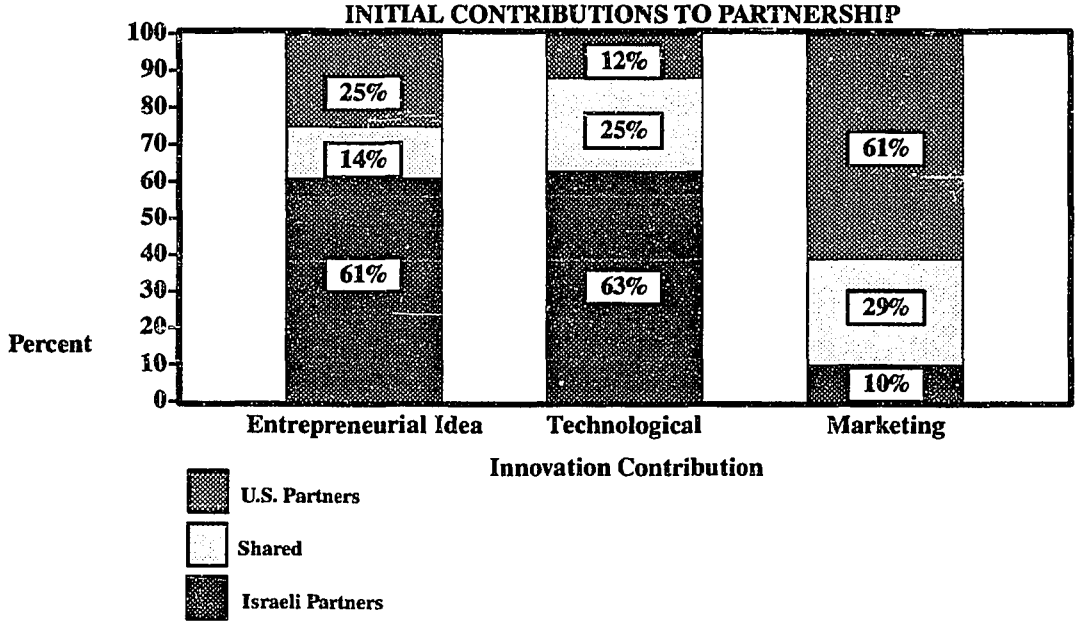
The responses charted in Exhibit 5.23 indicate that in 55.3% of the IJVs studied, the U.S. partner firm had the main responsibility for the definition of the market (83 of 150

responses). In only 41 of 150 IJV responses (27.3%) was the market definition function shared by both the Israeli and the U.S. partners.

Ideally, the process of market definition should be shared in an IJV because of the implications of this process at every stage of the product life cycle. Partners not involved in this process may be unaware of changes that occur in the market and consequently less able to adapt appropriately and quickly.

EXHIBIT 5.22

INITIAL CONTRIBUTIONS TO PARTNERSHIP



Source: Dissertation survey

RESEARCH AND DEVELOPMENT

Exhibit 5.23 indicates that in 65% of the IJVs studied the R&D was conducted solely or mainly by the Israeli partner (98 out of 151). In no case was the R&D function conducted solely by the U.S. partner. This finding is not surprising given Israels' relative advantage in providing innovative and low-cost R&D.

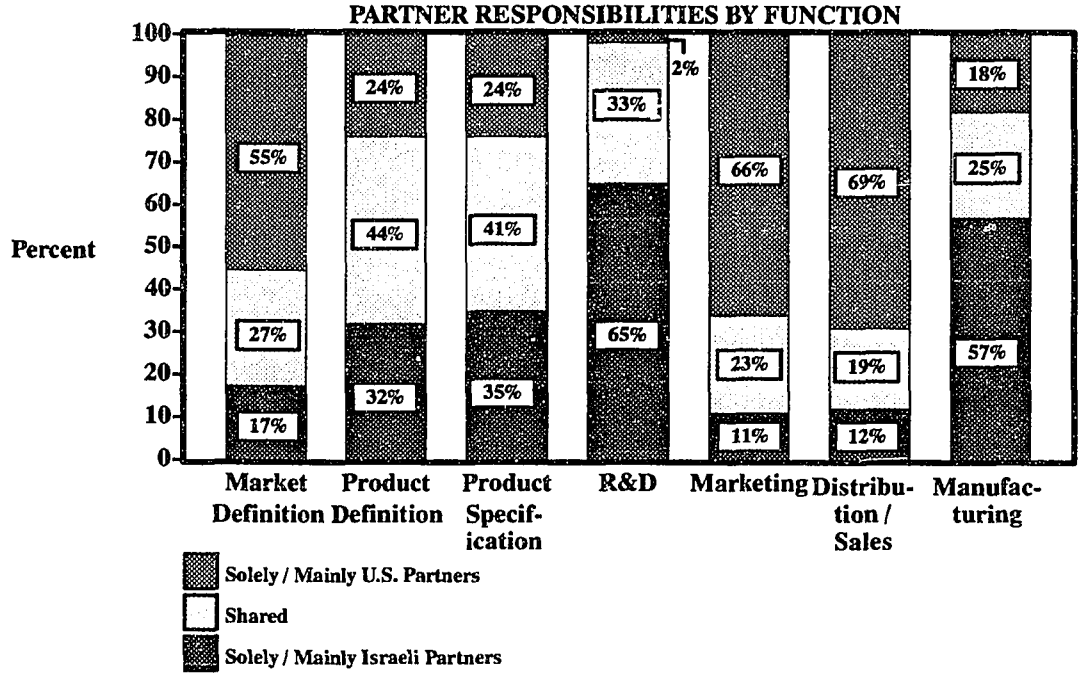
MARKETING

In 66% of the observations (99 of 149), companies claimed that the marketing function was conducted solely by the U.S. partner (Exhibit 5.23). The Israeli partner, by contrast,

was never the sole "marketing" partner, suggesting that U.S. companies have not yet taken advantage of Israel as a "free tax bridge to the European Community." (Israel could be used as a free tax bridge between Europe and the United States because Israel has free trade agreements with both the United States and the European Community.) These results imply that BIRD could be more pro-active in educating U.S. companies to take advantage of the unique marketing position that Israel enjoys.

EXHIBIT 5.23

PARTNER RESPONSIBILITIES BY FUNCTION



Source: Dissertation survey

Note that the dominance of the marketing function of the U.S. partner is parallel to that of the R&D role of the Israeli partner (66% vs 65%). This is a further indication that BIRD IJVs are complementary in nature.

CORRELATION WITH IJV PERFORMANCE

The failure/success variable was not significantly correlated with any of the IJV function variables. The absence of a significant correlation suggests that the country in which the function is performed is not a likely predictor of IJV success.

THE RESEARCH AND DEVELOPMENT TIME PHASE

In the Israeli data base (97 projects), the average time reported spent on R&D was 23.65 months (reported as actual in 80% of the IJVs and expected in the remaining 20%). In the U.S. data base (51 IJVs), the average time reported spent on R&D was 21.1 months. Exhibit 5.24 presents the average time spent on R&D by industry classification for the 110 IJV projects studied. In the software industry, the average R&D time is relatively low. This finding is of some note given that the software industry has been more successful than other industries. The relationship between R&D time and IJV performance is tested in the empirical models that follow.

EXHIBIT 5.24
AVERAGE TIME SPENT ON R&D BY INDUSTRY CLASSIFICATION

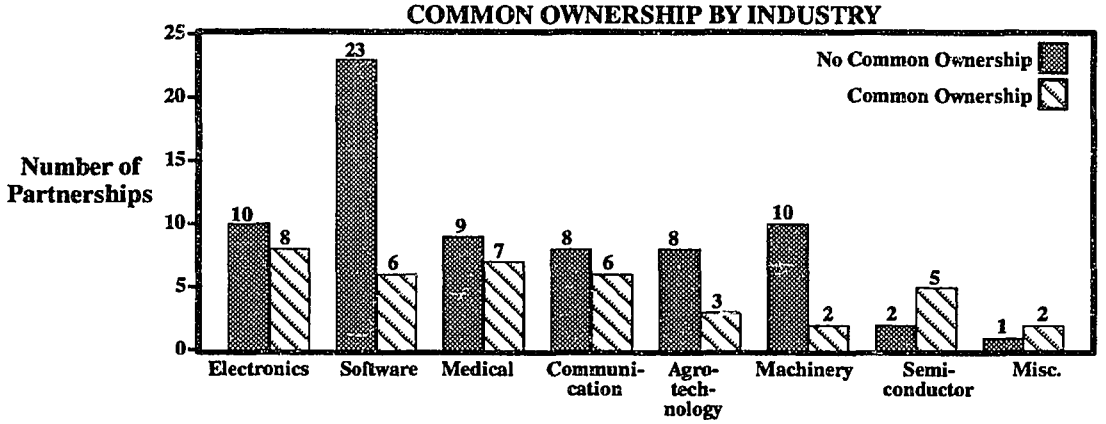
INDUSTRY	NUMBER OF OBSERVATIONS	R&D MEAN TIME (MONTHS)
1. Electronic Equipment & Instrumentation	16	17.3
2. Software Packages & Systems	26	18.4
3. Medical Products & Equipment	16	30.7
4. Communication Equipment	14	20.0
5. Agrotechnology	11	32.0
6. Machinery & Equipment	12	24.5
7. Semiconductor Devices & Equipment	7	29.0
8. Miscellaneous	3	13.7

OWNERSHIP AND CONTROL

This section describes the type of ownership characterizing IJVs in the survey. As indicated in Exhibit 5.25, 71 of 110 projects (64.5%) involved partnerships between companies with no common ownership, whereas 39 (35.5%) involved companies with some kind of affiliation. Exhibit 5.26 summarizes the relationship between ownership form and industry in the survey of all 110 projects. It shows that in the software industry, IJVS between companies with no common ownership predominated. In all other industries, a mix between common ownership and no affiliation was more common. This result may be of note given that firms in the software industry performed better, on average, than firms in other industries.

EXHIBIT 5.25

COMMON OWNERSHIP BY INDUSTRY



Source: Dissertation survey

Overall in the BIRD survey there are:

- 71 partnerships between companies with no common ownership
- 39 partnerships between companies that have some kind of common ownership (mostly partnerships between companies and their subsidiaries)

An analysis of the mean performance of IJVs between companies with common ownership and no common ownership suggests that common ownership projects (mean of FAILSUC is equal to 3.0) perform somewhat better than do no common ownership projects (mean of FAILSUC is equal to 2.7). This confirms the BIRD Foundation's claim that common ownership projects are more successful. However, a careful analysis reveals that these differences in means are insignificant. (The weighted standard deviation of the FAILSUC variable is 1.23). The connection between performance, ownership, and industry is evaluated statistically in the regression models below.

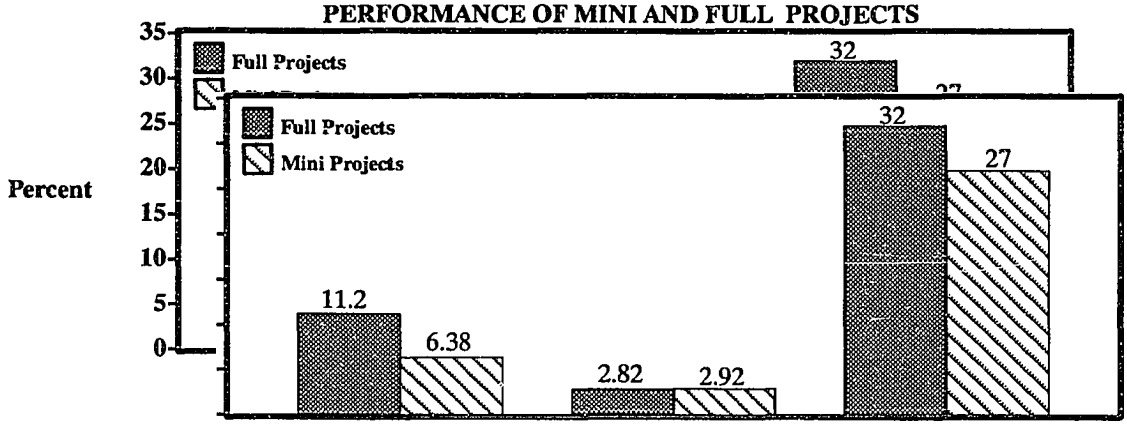
Previous research has found a connection between the form of ownership and the control of the IJV (Beamish, 1988; Killing, 1983). Common ownership between two IJV partners usually is an indication of majority control of the IJV by the parent company. In most BIRD IJVs between companies with common ownership, one of the partners, usually the parent company, has majority control in the IJV decision making. In addition, researchers have established a connection between ownership/control and the performance of the IJV (Tomlinson, 1970; Janger, 1980; Killing, 1983; Schaan, 1985; Beamish, 1984, 1988). While some of the studies found dominant control (common ownership) to be

correlated positively with performance, other studies found a positive correlation between shared control (no common ownership) and performance.

PERFORMANCE BY SCALE OF PROJECT

To the extent that the performance of IJVs is correlated with the scale of the venture, it may be reasonable to expect differences in the performance of BIRD sponsored mini and full-scale projects. In this analysis, 56 full-scale projects and 26 mini-scale projects offer sufficient information to construct the failure/success variable. Exhibits 5.26 and 5.27 use several measures of IJV performance to assess the success of projects by scale. Exhibit 5.26 shows that full-scale projects are somewhat more successful than mini-scale projects when gauged by both the failure/success variable (with values of 4 and 5 classified as successful and values of 3 or less classified as failures) and the royalties-to-grants measure. These data suggest either that full-scale projects are more likely to succeed or that the BIRD Foundation is selecting and investing more wisely in projects of larger scale. The significance of this effect will be evaluated in the empirical analysis below.

EXHIBIT 5.26
PERFORMANCE OF MINI AND FULL PROJECTS



Source: Dissertation survey

PERFORMANCE BY INDUSTRY CLASSIFICATION

Exhibit 5.28 summarizes the relationship between industry classification and the performance of the venture as measured by the failure/success variable for all 110 projects studied. The dissagregation by industry suggests sizeable industry effects in IJV performance. The software industry was relatively successful. Although success rates also

appear to be high in both communications equipment and semiconductor devices, the small sample prevents any firm conclusions. The machinery and equipment sector performed relatively weakly in this data.

EXHIBIT 5.27

PERFORMANCE INDICATORS OF MINI AND FULL PROJECTS

VARIABLE	FULL PROJECTS	MINI PROJECTS	TOTAL
Number of Projects	56	26	82
BIRD Grant Payments	$28,929,096	$2,277,965	$31,207,061
Total Sales of Project	$114,723,001	$4,974,000	$119,697,000
Total Royalties Received	$3,230,773	$145,293	$3,376,066
Royalties / Grants	11.20%	6.38%	10.80%
Royalties / Sales	2.82%	2.92%	2.82%
Success Ratio	32% (18/56)	27% (7/26)	30% (25/82)

EXHIBIT 5.28

AVERAGE TIME SPENT ON R&D BY INDUSTRY CLASSIFICATION

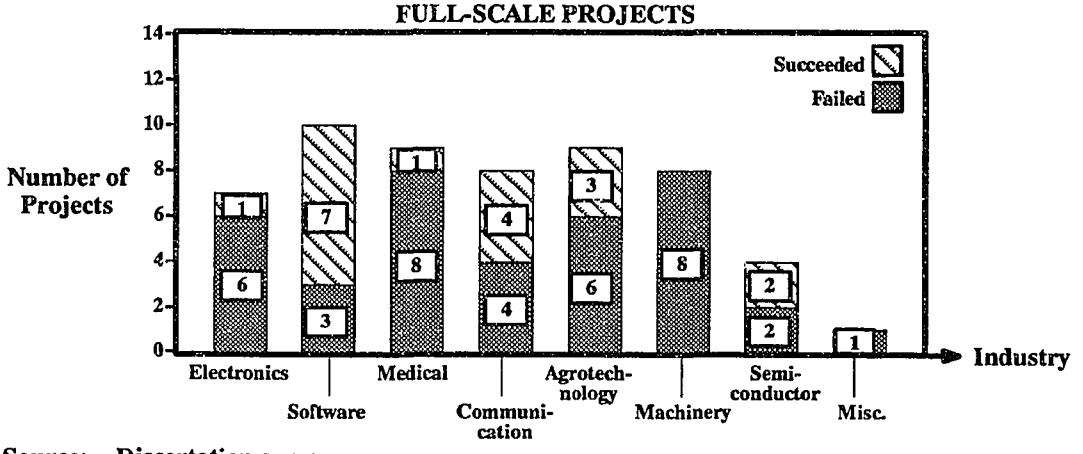
INDUSTRY	NUMBER OF OBSERVATIONS		SUCCESS RATIO (SUCCESS / SUCCESS + FAILURE)	
	Israel	U.S.	Israel	U.S.
1. Electronic Equipment & Instrumentation	12	7	.25	.43
2. Software Packages & Systems	21	8	.45	.50
3. Medical Products & Equipment	12	7	.20	.14
4. Communication Equipment	7	6	.57	.33
5. Agrotechnology	8	3	.38	.33
6. Machinery & Equipment	10	3	.10	.33
7. Semiconductor Devices & Equipment	4	1	.50	1.00
8. Miscellaneous	2	0	.00	--
TOTAL*	75	35	--	--
AVERAGE	--	--	.32	.37

*** Differences arise between the number of companies and the number of observations because the Israeli data base includes two companies that have two observations each, and the U.S. data base, one company with two observations.**

Exhibits 5.29-5.31 take project scale into account in assessing the relationship between the failure/success variable and industry type. For all projects, the largest share of success occurred in the software industry (10 of 23). But within the software industry, full-scale projects had a greater rate of success (7 of 10) than did mini-scale projects (3 of 13).

EXHIBIT 5.29

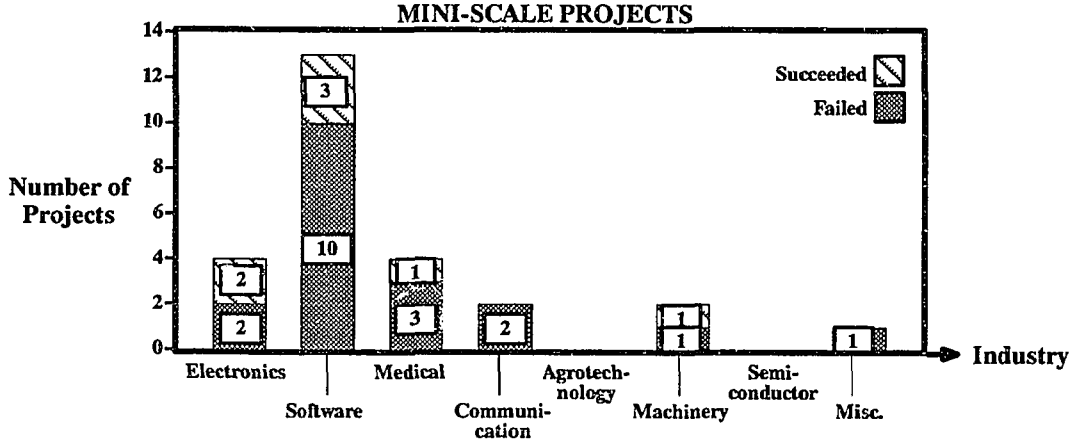
SUCCESS AND FAILURE OF BIRD PROJECTS BY INDUSTRY
FULL-SCALE PROJECTS



Source: Dissertation survey

EXHIBIT 5.30

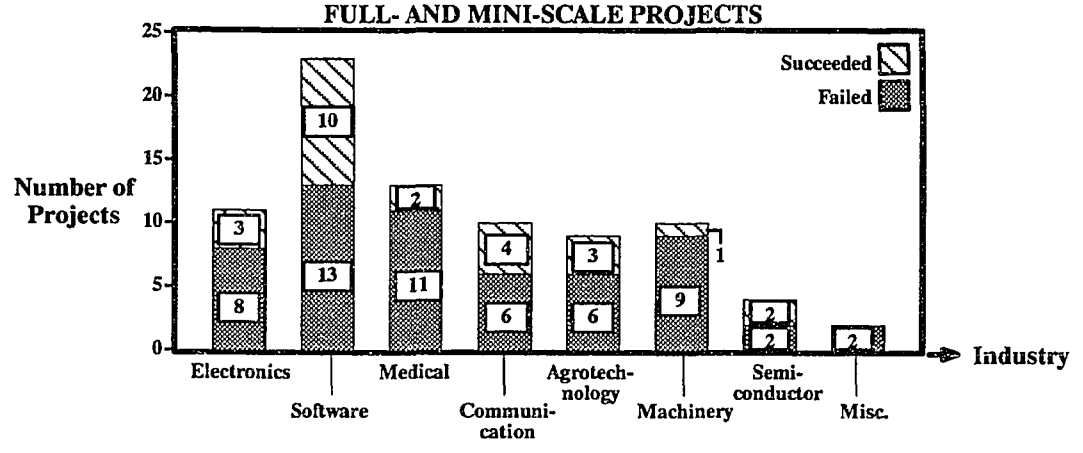
SUCCESS AND FAILURE OF BIRD PROJECTS BY INDUSTRY
MINI-SCALE PROJECTS



Source: Dissertation survey

EXHIBIT 5.31

SUCCESS AND FAILURE OF BIRD PROJECTS BY INDUSTRY
FULL- AND MINI-SCALE PROJECTS



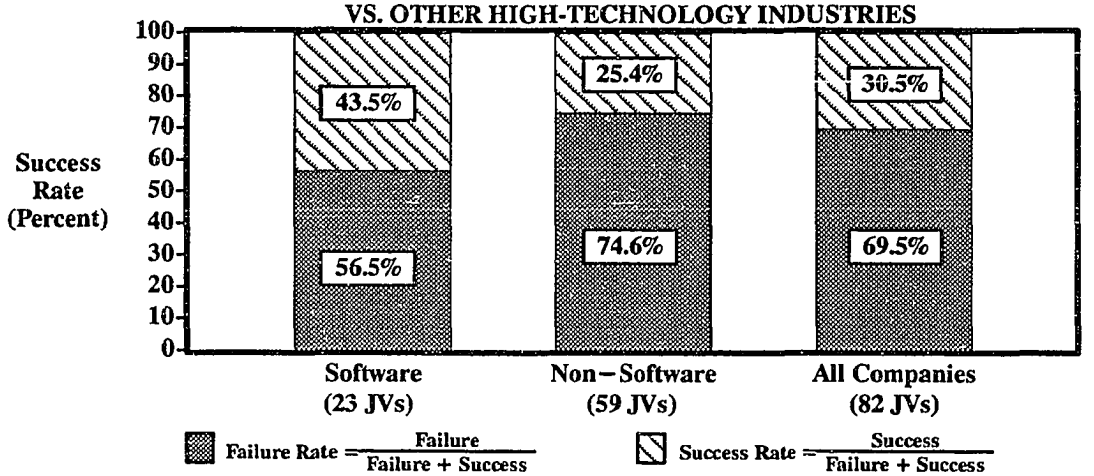
Source: Dissertation survey

Exhibit 5.32 aggregates the industry-specific data to differentiate between software and other high-technology sectors. As the exhibit makes clear, projects that were introduced in the software industry had a higher overall success percentage (43.5%) than did projects in other high-technology sectors (25.4%) or in industry overall (30.5%).

Finally, Exhibits 5.33 and 5.34 use several alternative measures of project performance to test the strength of the success distinction found in the software sector. The tendency for the software sector to outperform other high technology sectors is strengthened by the alternative measures. Specifically, projects in the software industry had a royalty-to-grant ratio of 21% and a royalty-to-investment ratio of 8.4% while the corresponding figures for other high-technology sectors were 5.2% and 2.1%.

In sum, the data uniformly demonstrate that the software industry outperformed other industries. The significance of this association will be explored in detail in the regression analysis below.

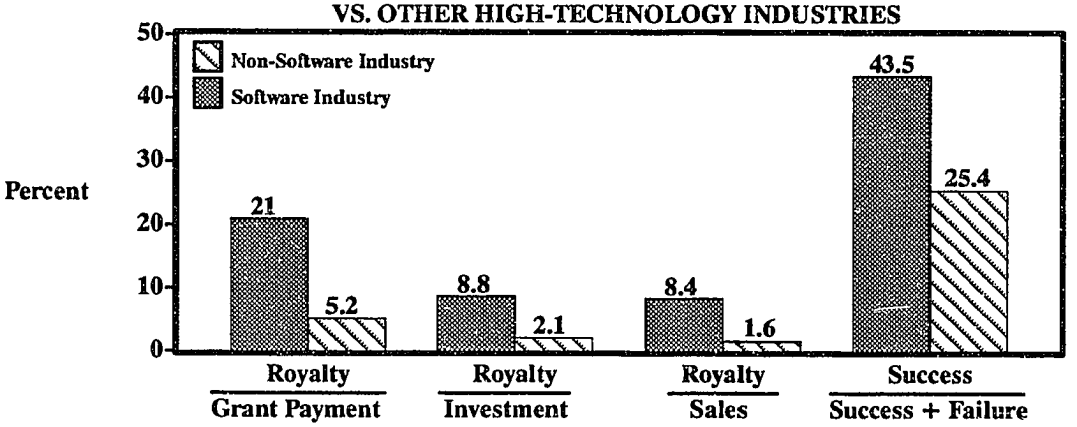
EXHIBIT 5.32
SUCCESS RATES OF IJVs IN THE SOFTWARE INDUSTRY VS. OTHER HIGH-TECHNOLOGY INDUSTRIES



Source: Dissertation survey

EXHIBIT 5.33

SUCCESS RATIOS OF IJVs IN THE SOFTWARE INDUSTRY
VS. OTHER HIGH-TECHNOLOGY INDUSTRIES



Source: Dissertation survey

EXHIBIT 5.34

SUCCESS INDICATORS OF IJVs IN THE SOFTWARE INDUSTRY
VS. OTHER HIGH-TECHNOLOGY INDUSTRIES

VARIABLE	SOFTWARE IJVs	NON-SOFTWARE IJVs
BIRD Grant Payments	$8,497,974	$30,824,388
Total Invested in the IJVs	$20,030,254	$77,965,558
Total Sales of Projects	$21,025,000	$98,672,000
Royalties Received by BIRD	$1,771,443	$1,604,623
Royalty / Grant %	21.0%	5.2%
Royalty / Investment %	8.8%	2.1%
Royalty / Sales %	8.4%	1.6%
Success Projects / Success + Failure Projects*	43.5%	25.4%

Source: Dissertation survey

All data are from 110 IJVs studied in survey
*** Success and failures are from 82 of the IJVs.**

ANALYSIS FROM THE WRITTEN PORTION OF THE QUESTIONNAIRE

This section summarizes the responses of Israeli and U.S. companies to portions of the questionnaire that asked for more elaborate written responses, and additional comments made by firms in personal interviews. The comments of firms provide additional qualitative data useful in assessing IJV performance.

GREATEST ACHIEVEMENT OF BIRD PARTNERSHIPS

From its creation, the BIRD Foundation has been emphasizing the importance of the commercialization phase in the product life cycle and its link to product development and

technology innovation. As Exhibits 5.35 and 5.36 demonstrate, 50% of the Israeli companies and 53% of the U.S. companies that responded indicated that their single greatest achievement in the partnership occurred during the technological innovation and product development phase. In a majority of these partnerships, successful technological innovation and product development did not lead to successful commercialization.

Thirty-eight percent of the Israeli companies indicated successful commercialization as their single greatest achievement in the partnership, while only 21% of the U.S. companies indicated the same. Given a relatively high degree of homogeneity between Israeli and U.S. data bases (in terms of industry composition, size, and similarity of response in objective categories), this difference may suggest that Israeli and U.S. companies do not define commercialization success in the same way.

One interpretation of this difference is that U.S. companies may have higher expectations from the IJV and define success more in terms of profit, return on investment, or other financial benefits. By contrast, Israeli companies appear to be relatively more satisfied with successful development of the product and some sales. Israeli companies reported that they found the BIRD experience to be critical for learning about the U.S. market-place and the needs of its customers. Participation in an IJV taught them the importance of marketing, and how to translate a successful technological innovation into a successful product and better manage the process of commercialization (see Appendix for comments by Israeli companies).

While 11% of the U.S. companies found BIRD funding to be their single greatest achievement in the partnership, not a single Israeli company mentioned BIRD funding as an achievement. This result suggests that BIRD funding attracts U.S. companies to do business in Israel and that BIRD has become a successful instrument for motivating U.S. companies to enter business relationships with Israeli partners. (One of BIRD's operational objectives is "to attract new U.S. companies into joint projects with Israeli companies.")

EXHIBIT 5.35

GREATEST ACHIEVEMENT
QUOTATIONS FROM ISRAELI COMPANIES

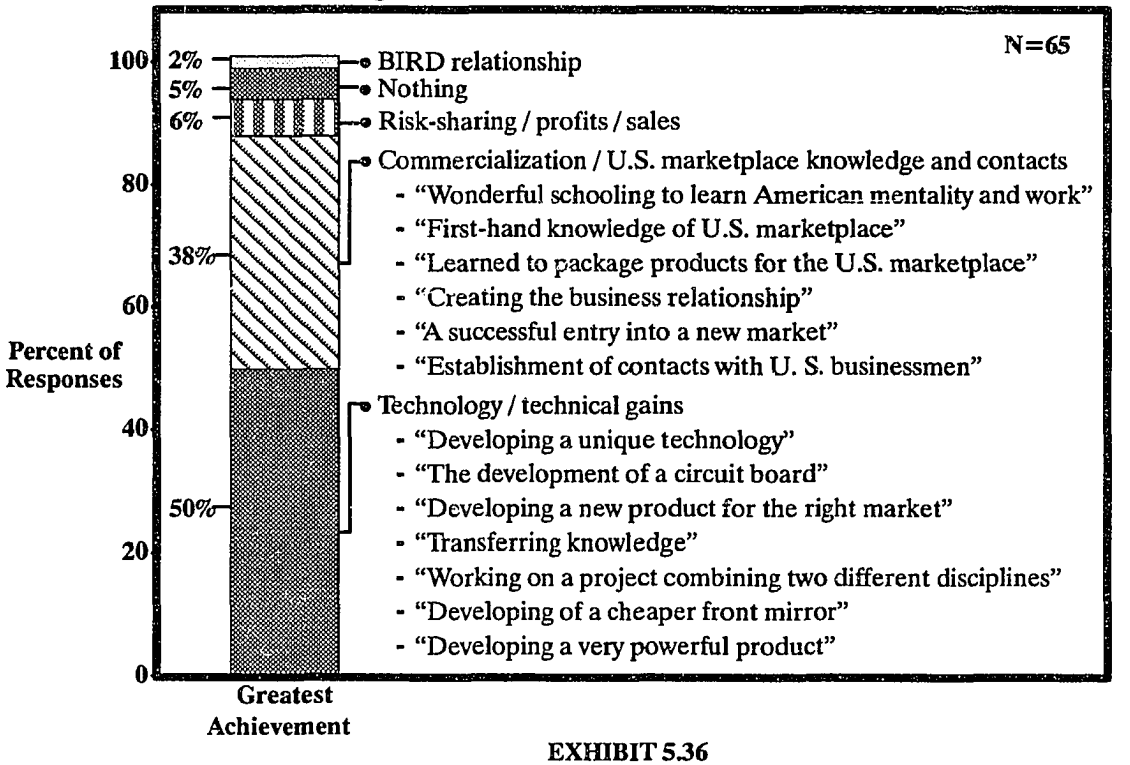
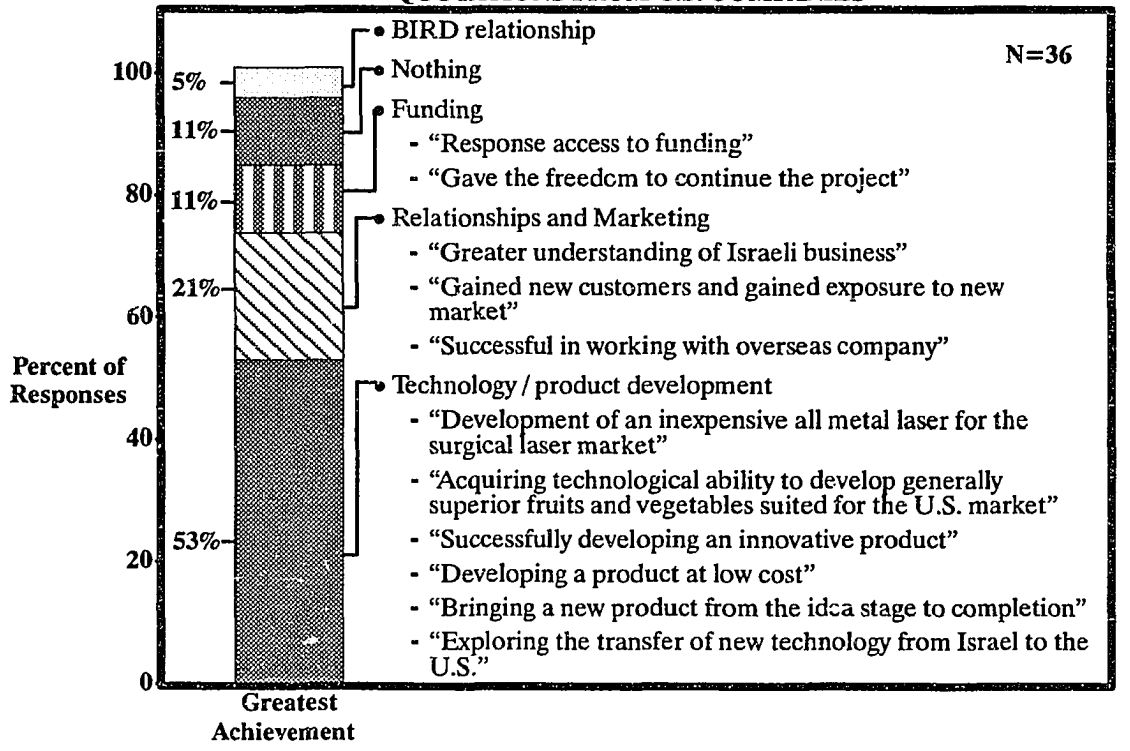


EXHIBIT 5.36

GREATEST ACHIEVEMENT
QUOTATIONS FROM U.S. COMPANIES



GREATEST DISAPPOINTMENT OF BIRD PARTNERSHIPS

U.S. companies indicated that their single greatest disappointment in the IJV related to problems they experienced in working with their Israeli partners (Exhibits 5.37-5.38). This commented on the Israeli partner's lack of serious commitment to the project in statements such as "the partner product was disappointing technically," or there was an "inability of the Israeli partner to take their commitment to the project seriously." Israeli companies also identified their partner relationship as their single greatest disappointment. They pointed to a lack of commitment by their U.S. partners-- the same criticism that was leveled against Israeli firms-- but gave more emphasis to problems arising from the greater size of U.S. firms. They noted that U.S. companies abandoned partnerships because of corporate "hickups" and complained of constant changes in U.S. corporate strategy and management by pointing to a "one-sided decision of the U.S. partner to abandon the project" and statements that the "partner did not stand up to its commitment according to agreement."

Many U.S. firms cited as well delays in product development and delivery as serious problems. For example, one company responded, "the single greatest disappointment of the partnership was slow delivery made by the Israeli partner." Israeli companies must pay special attention to the issue of delivering the product on time, and must work to correct the negative image they have acquired because of the delay. This image hurts both Israeli firms and the foundation.

From a larger perspective, the criticisms voiced by both sides suggest a need to reexamine partnership relations in general. Participants in the IJV should invest greater effort in planning, specifically Israeli companies, and should clarify their respective roles and responsibilities at the outset. If they take such preliminary steps, they will have more realistic expectations about partner performance and may be better able to ensure their commitment to the IJV.

EXHIBIT 5.37

GREATEST DISAPPOINTMENT
QUOTATIONS FROM ISRAELI COMPANIES

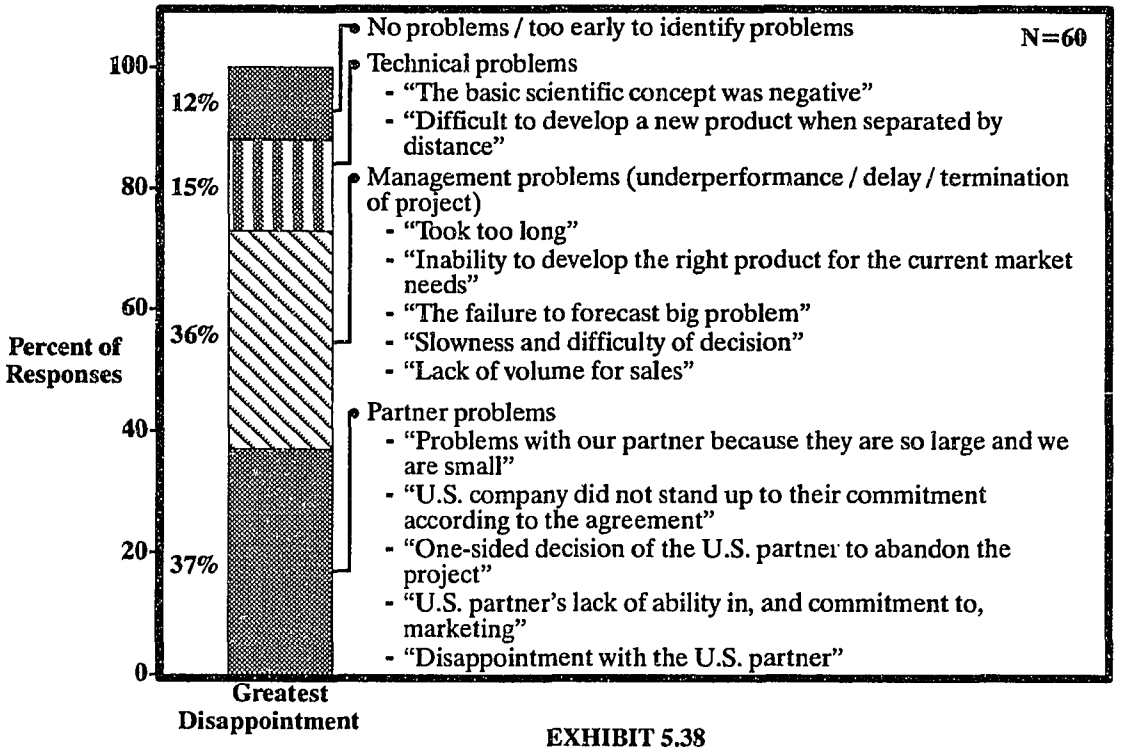
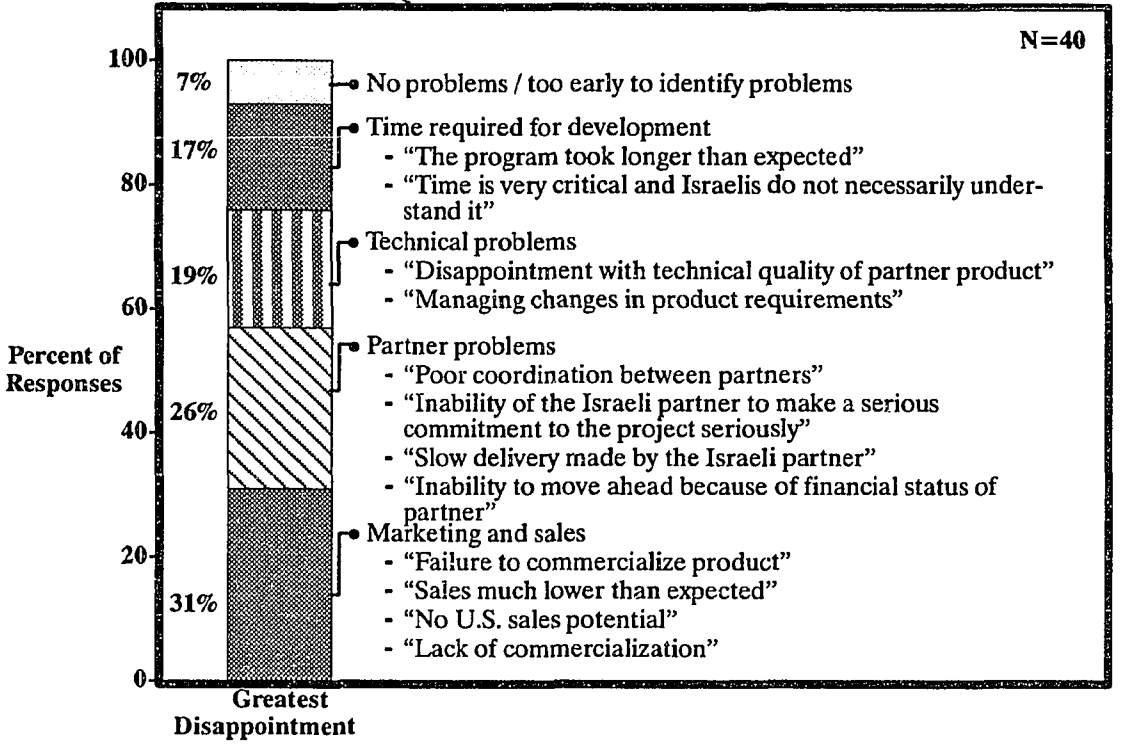


EXHIBIT 5.38

GREATEST DISAPPOINTMENT
QUOTATIONS FROM U.S. COMPANIES



GREATEST LESSONS OF BIRD PARTNERSHIPS

Since the greatest disappointment of both Israeli and U.S. companies related to problems with their partner, it is not surprising to find that the greatest lesson drawn from the IJV experience by Israeli companies (35%) and U.S. companies (45%) was the importance of choosing the right partner and building better relationships with the partner (Exhibits 3.39 and 3.40). Both Israeli and U.S. companies indicated a need to "be more selective in choice of partner" given the "existence of communication and cultural problems" or the "importance of having strong project managers in both companies involved."

EXHIBIT 5.39
GREATEST LESSON
QUOTATIONS FROM ISRAELI COMPANIES

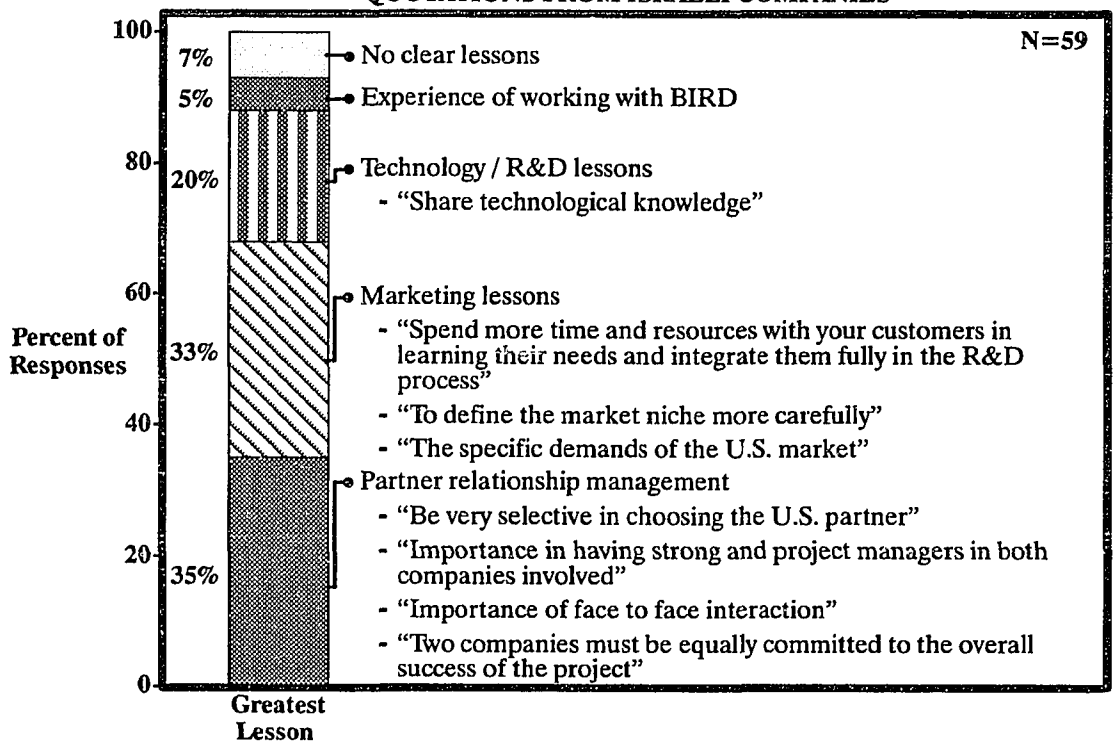
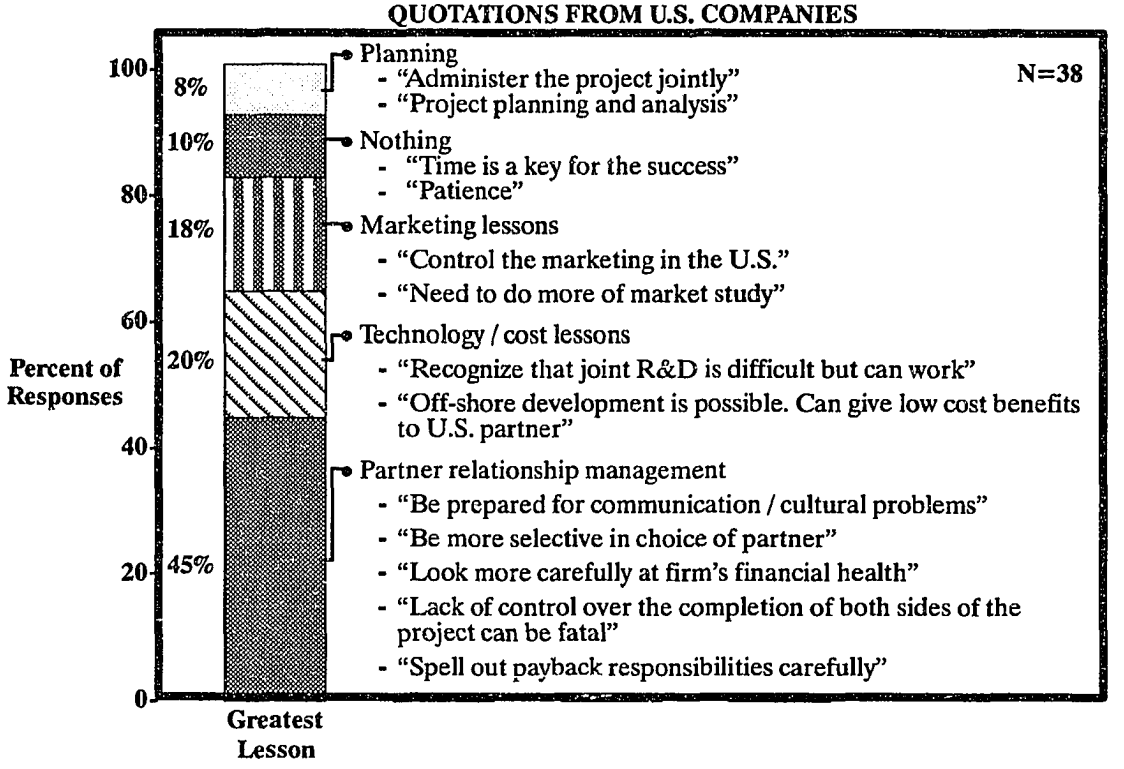


EXHIBIT 5.40
GREATEST LESSON
QUOTATIONS FROM U.S. COMPANIES



C. Regression Analysis

A multivariate model evaluating the relationship between BIRD IJV failure/success and a variety of key factors is presented in this section. Where possible, Israeli and U.S. data bases are treated separately, since it is reasonable to believe that the determinants of IJV success may differ in these two countries. These differences may be due to the diverse character of market size, maturity in business practice, and business culture in the United States and Israel. The relatively small number of U.S. companies and the frequency with which data are missing in the U.S. information set, however, makes some modifications necessary: the analysis uses an Israeli data base and a pooled data base of Israeli and U.S. companies with explicit country-specific controls to evaluate significant differences between the determinants of IJV success in the United States and Israel. The Israeli data base consists of 100 observations concerning 97 projects. Of these 97 projects, only 77 observations are used in the statistical analysis because of insufficient information about project performance. The U.S. data base consists of 52 observations concerning 51

projects. Of these 51 projects, only 36 observations are used in the statistical analysis because of insufficient information about project performance. Finally, the pooled data base consists of observations from both the Israeli and U.S. samples, with 152 observations concerning 110 projects (the data base includes 38 matches). Of the 110 projects, only 82 observations have sufficient information about IJV performance.

Model Specification

A formal model of the factors influencing IJV performance must control for multiple factors simultaneously. Several factors combine to make the choice of model design somewhat difficult. First, much of this research is exploratory in nature, and the existing literature sheds little light on the factors likely to determine BIRD IJV success. Second, there is a relatively wide range of variables in the data base that may be included in the formal statistical model, and the variable responses are likely to be highly correlated among each other. Third, relative to the number of variables, both the Israeli data base (77 observations of FAILSUC) and the U.S. data base (36 observations of FAILSUC) are small. The size of the data bases suggests the importance of parsimony in model specification.

Given these considerations, a formal process was used to select key variables in the final model. Specifically, stepwise model selection techniques were used on a subset of questionnaire responses based on the following criteria. First, questionnaire responses were included in the stepwise procedure if they were found to be correlated with the failure or success variable at the 90 percent confidence level. In addition, variables were included in the model if they had been cited in previous studies as instrumental in IJV success, even though they were not necessarily highly correlated with the FAILSUC variable.

This screening method reduced the sample of variables to twenty-two variables from the original questionnaire, to be used in either the Israeli or pooled data base models. This subset included eight "control" or objective variables, five strategy-related variables, six problem variables, two project goals-related variables, and one selection variable. The

eight control variables included (i) R&D time spent by the company in the JV (LRD33), (ii) the company's total number of employees (TOTEMP4h), (iii) common ownership among partners in the IJV (OWN16), (iv) previous IJV experience of the company involved in this IJV (JVEXP9a), (v) the company's reported revenues as of 1989 (REV895a), (vii) the age of the company (YEAR2), and (viii) industrial classification of the company (INDCLAS). The five IJV strategy variables tested for selection in the model were (i) to gain access to channels of distribution (DIS19D), (ii) to share risk (RIS19b), (iii) to develop technology (TEC19c), (iv) to save time in R&D (TIM19f), and (v) to gain access to finance (ACF19a). The six problem variables captured the company's response to a question asking about specific problems encountered in the IJV and included (i) problems with capital expenditure (Dol26b), (ii) problems with management (MGT26e), (iii) problems with trust (TST26j), (iv) problems with cultural differences (CLT26i), (v) problems with autonomy (AUT26k), and (vi) problems with the partner's commitment (CMT26m) to the IJV. The specific project goal variables included goals of (i) access to technological innovation (TEC27f) and (ii) jobs creation (JOB27g). The final variable included in the model was a selection factor indicating whether the company had chosen a particular IJV because of a previous contact with an individual in the partner company (INDC21i).

The results from the stepwise regression run on various groupings of the data were used to narrow further the set of variables to be included in the final model specifications. Variables were included if in any stage of the stepwise they had a t-value of 1.00 or greater, or if they were of interest for other reasons, such as comparisons with results in the existing literature. This procedure was conducted for each of the pooled and Israeli data bases.

Empirical Results

The formal model to be estimated is of the form:

$$(\text{FAILSUC})_{cin} = F(X_{cin}, Y_n, Z_i)$$

where (c) indexes the company, (i) indexes the industry, and (n) indexes the nation/country, X represents company-specific responses, Y represents country-specific

effects, and Z represents industry-specific effects that are independent of company or country. The dependent variable throughout the analysis is the FAILSUC variable described in detail in the beginning section of the chapter.

Pooled Data Base

Exhibit 5.41 presents results from the preferred reduced form specification that makes use of the stepwise elimination procedure described above. (Appendix E.1 provides results from the crude model consisting of all highly correlated variables before the application of the stepwise regressions). Column 1 of the exhibit shows that the most important determinants of IJV performance in the pooled data base are the technology motive for pursuing the IJV strategy (TEC19c), problems with commitment of partners to the IJV (CMT26m), and jobs creation in the home country as an important IJV goal (JOB27g). Specifically, the data indicate that IJVs motivated in large part by a strong motive to develop technology were more likely to fail as were IJVs undertaken by companies that saw jobs creation as one of their most important goals. Problems with commitment of partners to the IJV had the most significant negative effect on IJV success; where firms indicated that commitment problems were severe, the IJV was more likely to fail. Specifically, if two companies are identical in all responses other than their response to the commitment problem, and one company does not see commitment as a serious problem (equal to 1 in the questionnaire) while the other company sees commitment as a serious problem (equal to 5 in the questionnaire), the model predicts that the company with the serious commitment problem will have a value of FAILSUC nearly one full point below that of the other company. It is of some interest that a dummy variable, set equal to one if the project involves some form of common ownership (in most cases full subsidiaries) and zero if there is no common ownership, is not significant in predicting IJV performance.

Column 2 shows the results of the same tests when industry dummy variables are included to control for industry-specific differences (industry categories include electronics, software, medical, communication, agriculture, machinery and equipment, semiconductors, and miscellaneous). Although the inclusion of industry dummy variables reduces the importance of the technology motive (TEC19c) and jobs creation goal

(JOB27g) in predicting the failure or success of the IJV, the commitment variable remains significant in predicting IJV success. Moreover, the increment to the adjusted R-squared from the models in columns 1 and 2 shows the joint significance of industry in explaining IJV success (F-statistic equal to 8.87).

Columns 3 and 4 of the exhibit repeat the analysis in the first two columns but substitute the mean value of each of the independent variables for missing observations in order to increase the number of independent observations. The addition of the mean substituted values strengthens the results slightly. Specifically, both the technology motive for IJV strategy (TEC19c) and the jobs creation goal (JOB27g) are now significant at the 95 percent level. The inclusion of industry dummy variables in column 4 reduces the significance of each of these variables as before, although the commitment variable continues to retain its importance. The incremental contribution of each of the independent variables to the overall explanatory power of the model further confirms the dominance of the commitment variable in predicting IJV failure or success in all cases. (Appendix E.2 describes the partial and model adjusted R-squared from a stepwise regression of each of the models in columns 1-4).

Note that U.S. interaction terms, included to test for the presence of statistically significant country effects, were found to be insignificant at the 90 percent level in all cases and were therefore excluded from the equations in Exhibit 5.41. A dummy variable controlling for whether the IJV was a full-scale or mini-scale project was also insignificant in all specifications, as was a dummy variable to control for matched U.S.-Israeli responses (the 38 cases of matches in the pooled data).

In sum, the pooled results show clearly that problems with commitment of partners to the IJV operation are highly associated with IJV failures. These results are consistent with those in Beamish and Lane (1982), Beamish (1984), Lorange and Roos (1989), and Thomlinson (1970). Moreover, these effects are independent of industry or country, at least at the level of aggregation available in this analysis. In addition, the pooled results suggest that industry exerts an important independent influence on IJV performance even after controlling for firms motives, goals, or problems.

EXHIBIT 5.41

DETERMINANTS OF SUCCESSFUL INTERNATIONAL JOINT VENTURES
POOLED DATABASE

DEPENDENT VARIABLE: FAILURE OR SUCCESS OF THE IJV (FAILSUC)

VARIABLE NAME[1]	VARIABLE	(1)	(2)	(3)	(4)
OWN16DUM	Common ownership between partners	.111 (.385)	−.092 (−.312)	.134 (.508)	−.076 (−.276)
DIS19D	Accessing channels of distribution and customers as an IJV strategy	−.068 (−.802)	−.053 (−.651)	−.037 (−.497)	−.013 (−.173)
RIS19B	Sharing risk as an IJV strategy	−.000 (−.001)	−.062 (−.634)	.039 (.419)	−.028 (−.299)
TEC19C	Obtaining technology as an IJV strategy	−.176** (−1.963)	−.117 (−1.333)	−.172** (−2.156)	−.119 (−1.492)
ACF19A	Access to BIRD support as an IJV strategy	−.038 (−.387)	−.002 (−.018)	−.076 (−.878)	−.067 (−.804)
TST26J	Problems with trust in the IJV	−.087 (−1.028)	−.102 (−1.217)	−.057 (−.738)	−.068 (−.897)
CMT26M	Problems with commitment in the IJV	−.207*** (−2.684)	−.217*** (−2.702)	−.250*** (−3.580)	−.274*** (−3.072)
JOB27G	Jobs creation as the IJV's specific goal	−.184* (−1.738)	−.115 (−1.074)	−.207** (−2.096)	−.145 (−1.436)
INDDUM	Industry dummy variables	No	Yes	No	Yes
R^2		.122	.215	.169	.224
N		92	92	110	110

Note: Coefficient estimates appear with T statistics in parentheses.

1 **All the above models were tested including U.S. interactions. Because none of the U.S. interactions were significant at the 95 percent confidence level, columns 1-4 represent results excluding these interactions.**

* **90% confidence level**
** **95% confidence level**
*** **99% confidence level**

Finally, it is of some note that the ownership variable in Exhibit 5.41 is insignificant in all specifications, given that some studies have found a statistically important link between common ownership and IJV performance. Specifically, Thomlinson (1970), Beamish and Lane (1982), and Beamish (1984), find common ownership (shared control) to be associated positively with IJV success. By contrast, Killing (1983), and Chowdhury (1989), in their studies of IJVs between firms in developed countries, find a negative association. Finally, Janger (1980), finds no correlation between ownership and IJV performance.

THE SOFTWARE INDUSTRY

The mean performance of IJVs was consistently higher in the software industry than in other high technology industries. To evaluate the extent to which these differences persist once account is taken of other factors that influence IJV performance (and that may be correlated with the project being in the software industry), a software dummy variable was incorporated in the basic model to allow for different effects of software and non-software IJVs. The results of these specifications are given in Exhibit 5.42. Column 1 shows that IJV performance in the software industry was not statistically different from that in other industries once account is taken for such factors as commitment, the technology motive, and the jobs creation goal. Column 2 repeats the test but substitutes the mean values of the independent variables for missing observations (industry and ownership are never missing); in these results, the software factor grows in importance but remains statistically insignificant.

Columns 3 and 4 of the exhibit use a somewhat different set of data to test the model. Specifically, the regressions in these columns are performed on a data set that excludes U.S. responses to projects in which an Israeli partner has already responded, as well as duplicate responses by individuals in the same company in the same project. The total number of observations (and projects) in this restricted pooled data base is 110. (Because industry assignment is not subjective, it will not vary across Israeli and U.S. respondents from the same project. The data set restricted to projects-- as opposed to observations-- may therefore be more appropriate given the focus of this test.) Note finally that the

restriction of the data set to 110 projects does not alter qualitatively any of the empirical results presented above.

EXHIBIT 5.42
SOFTWARE VS. OTHER HIGH TECHNOLOGY INDUSTRIES
POOLED DATABASE

DEPENDENT VARIABLE: FAILURE OR SUCCESS OF THE IJV (FAILSUC)

VARIABLE NAME	VARIABLE	(1)	(2)[2]	(3)[1]	(4)[1, 2]
SOFTDUM	Software dummy variable	.384 (1.237)	.350 (1.332)	.493 (1.371)	.502* (1.698)
OWNDUM	Common-ownership dummy variable	.111 (.385)	.149 (.567)	.095 (.276)	.125 (.415)
DIS19D	Accessing channels of distribution and customers as an IJV strategy	−.076 (−.906)	−.036 (−.476)	−.032 (−.271)	.009 (.092)
RIS19B	Sharing risk as an IJV strategy	−.004 (−.039)	.030 (.325)	.025 (.204)	.052 (.478)
TEC19C	Obtaining technology as an IJV strategy	−.157* (−1.732)	−.157** (−1.969)	−.073 (−.657)	−.051 (−.475)
ACF19A	Access to BIRD support as an IJV strategy	−.017 (−.169)	−.075 (−.386)	−.056 (−.504)	−.138 (−1.452)
TST26J	Problems with trust in the IJV	−.105 (−1.229)	−.069 (−.377)	−.088 (−.888)	−.071 (−.801)
CMT26M	Problems with commitment in the IJV	−.201*** (−2.614)	−.253*** (−3.644)	−.188** (−2.128)	−.229*** (−2.923)
JOB27G	Jobs creation as an IJV goal	−.159 (−1.487)	−.186* (−1.866)	−.192 (−1.448)	−.206* (−1.738)
R^2 (Adjusted)		.127	.175	.073	.143
N		92	110	66	82

Note: Coefficient estimates appear with T statistics in parentheses.

1 **Excludes U.S. observations from pooled data base when observations from Israeli and U.S. companies relate to the same project.**
2 **Substitutes variable means for missing data.**
* **90% confidence level**
** **95% confidence level**
*** **99% confidence level**

As column 3 indicates, the restricted data set increases the predictive power of the software variable in explaining IJV success, although the variable remains insignificant at the 95% level. The mean substitutions in column 4 strengthen these results somewhat, and suggest that software companies might be better suited for BIRD IJVs. The coefficient on the software dummy, while insignificant, is positive in all specifications.

Israeli Data Base

It is conceivable that determinants of IJV performance may differ across countries in ways not captured by the country-specific dummy or interaction terms. Accordingly, country-specific models should be estimated if at all possible. Unfortunately, the U.S. data base lacks a sufficient number of observations of the failure/success variable to allow for any meaningful test of the determinants of IJV performance. This section summarizes an analysis of the determinants of IJV success for the Israeli data base consisting of 100 observations on 97 projects.

Exhibit 5.43 contains estimates from the preferred Israeli specification indicated by the stepwise procedure. (Appendix Table E.3 contains estimates from the Israeli data including all of the independent variables tested in the stepwise elimination procedure.) Included in the model are variables found to be highly predictive of the performance of the IJV from the stepwise procedure, as well as a series of "control" variables accounting for non-response related differences across firms. Controls include firm size variables (the natural log of total employment [LNEMPT4H] to control for size [the ln of total revenues was included in alternate specifications with the same qualitative effect]), a variable to measure the age of the company (YEAR2), and industry dummy variables. Two additional variables included in preliminary specifications to control for previous IJV experience of the company (JVEXP9a) and the length of the R&D stage (LRD33) were found to be insignificant in all cases and are excluded from the models presented.

Column 1 shows that firms that indicate a serious problem with partner commitment in the IJV are more likely to fail. Specifically, the coefficient estimate on the commitment variable (.343) suggests that a one-unit change in the serious of the commitment problem

reduces the value of the IJV success variable (FAILSUC) by about 6 percent. Also less likely to succeed are Israeli companies that indicated an above-average problem with trust of the partner. Treating individual contact with a person in the partner company as a relatively important criterion for partner selection is also negatively associated with IJV success. By contrast, there is a positive relationship between firm size as given by employment and the likelihood of IJV success, and between company age and IJV success. Finally, note that projects that had common ownership had a statistically lower likelihood of success in the venture. This finding contrasts with the virtual similarity in performance means by ownership-form (3.0 for common ownership firms and 2.7 for non common ownership firms, with a weighted standard deviation of 1.23). Presumably this discrepancy is due to the relationship between ownership-form and at least one of the additional variables in the multivariate model.

In column 2, industry dummy variables are added to the model to control for industry-specific effects. Although the inclusion of industry controls eliminates the effect of company size and age on IJV success, both commitment and trust problems remain statistically negatively linked to IJV success, and the negative effect of individual contact as a selection factor is strengthened slightly. In this specification, the effect of common ownership on IJV performance continues to be negative and significant, even after controlling for industry, company size, company age, and significant company responses. Industry-specific effects are important as well in predicting IJV performance (F-statistic equals 1.71).

Columns 3 and 4 of the exhibit present the same regressions after substituting the sample means for missing values of the independent variables. Mean substitution in the Israeli case increases the number of observations substantially and, with the exception of the effect of common ownership (which remains negative but becomes statistically insignificant), does not change qualitatively any of the fundamental relationships of the previous two models (Appendix E.4 contains the partial and model R-squared from the stepwise procedure). The fact that the common ownership variable is insignificant and much smaller in absolute value in the model with more firm observations, indicates that

the negative association found in the first two columns is not robust. (The common ownership variable is never missing; the change in significance may indicate that the smaller sample is somehow misrepresentative of the larger sample performance of common ownership companies.)

EXHIBIT 5.43
DETERMINANTS OF IJV SUCCESS
ISRAELI DATA

VARIABLE NAME	VARIABLE	(1)	(2)	(3)[1]	(4)[1]
OWN16DUM	Common ownership between partners	−.898** (−2.404)	−.768** (−2.032)	−.290 (−.951)	−.312 (−.986)
LNEMPT4H	Natural log of number of employees	.343*** (2.735)	.107 (.747)	.255** (2.346)	.129 (1.150)
YEAR2	Age of company	.037* (1.755)	−.003 (−.112)	.025 (1.492)	.010 (.480)
CMT26M	Problems with commitment in the IJV	−.320*** (−3.880)	−.370*** (−4.478)	−.253*** (3.389)	−.261*** (−3.485)
TST26J	Problems with trust in the IJV	−.198** (−2.219)	−.198** (−2.265)	−.129 (−1.606)	−.132* (−1.679)
INDC21I	Previous relationship with an individual leading to partner selection	−.201* (−1.904)	−.211** (−2.106)	−.234** (−2.513)	−.204** (−2.222)
INDDUM	Industry dummy variables	No	Yes	No	Yes
R^2		.332	.429	.234	.313
N		48	48	77	77

Note: Coefficient estimates appear with T statistics in parentheses.

1 **Substitutes variable means for missing observations.**
* **90% confidence level**
** **95% confidence level**
*** **99% confidence level**

In sum, there is a strong and statistically significant negative relationship between IJV performance and partner commitment in the Israeli data. In addition, there is a significant negative relationship between IJV performance and partner trust, a finding consistent with results presented in Peterson and Schwind (1977) and Killings (1983). The Israeli results show a role for firm size and age as a positive link to IJV success. Finally, the results suggest a negative association between common ownership and IJV success although this result is not robust to alternative specifications This correlation is consistent with the results of Killing (1983) who finds no common-ownership (dominant control) to be positively linked with IJV success, using data on IJVs among developed countries. These results however, are inconsistent with the findings of Thomlinson (1970) and Beamish (1988), who use data on IJVs between developed and less developed countries.

The Role of Commitment

The factor that seems to be most significant in predicting BIRD-IJV performance is the commitment variable: an IJV is more likely to fail when one participant indicates that the commitment of the partner is a serious problem. Interestingly, commitment dominates all of the other problem variables, as well as other categories of variables in explaining IJV performance. This section analyses the relationship between the commitment variable and other variables in the questionnaire in order to isolate those factors that co-vary with commitment (a full description of these results is found in Appendix E.5).

Commitment is highly positively correlated with nearly all of the variables summarizing company response to problems and disagreements in the IJV. Specifically, it is most strongly correlated with the ability of the partner to deliver the agreed-upon share (DEL26L, with a correlation statistic of 0.584 and a p-value of 0.0001). In addition, deterioration of trust in the partnership is highly associated with commitment problems (TST26J, 0.346; 0.0001).

Commitment problems are statistically negatively associated with nearly all of the satisfaction variables. This finding suggests both that commitment is a very serious problem and that the data are internally valid. Another measure of internal consistency is

the fact that companies with serious commitment problems indicated a reluctance to pursue IJVs with the same partner either with (SB29B, -0.445; 0.0001), or without (SNB29A, -0.395; 0.0001) the BIRD Foundation.

It is interesting that survey respondents with serious problems in partner commitment indicated that their firm would not have implemented the IJV without the BIRD grant (NUSP3A, .318; 0.0105). Israeli companies that embarked on an IJV mainly in order to obtain funds from the BIRD were more likely to develop performance problems. The results suggests that the BIRD Foundation should monitor its grant outlays to ensure that companies pursue the IJV because of a strong belief in the venture's success rather than a simple desire to receive the BIRD grant.

In the future, managers who plan and operate IJVs should work strategically to encourage commitment to the venture. Building commitment within their own firm and in their partner firm should enhance the likelihood of success.

SUMMARY

The results from a formal statistical model linking IJV performance to a variety of factors show that problems with partner commitment constitute the strongest and most significant determinant of IJV performance. This effect is independent of industry and other controls and is characteristic of both U.S. and Israeli companies. In addition, the model suggests embarking on an IJV with a strong motive of obtaining technology could impair the success of the venture. One explanation of this finding is that obtaining superior technology does not ensure instant success-- companies need to focus as well on the commercialization process.

In the case of Israeli companies, the empirical findings point to several additional determinants of IJV success. First, IJV success appears to be positively associated with both company size and age, suggesting more favorable IJV results in larger and older firms. Second, trust between the partners in the IJV is correlated significantly with IJV success. Third, IJVs are less likely to succeed if the participating companies select their partners on the basis of a previous relationship with an individual in the partner company.

Finally, although more tentatively, the results point to a negative association between IJV success and common ownership.

Also of interest are the factors that were not linked to performance in this study. In contrast to the argument of Franko (1971), previous experience in a joint venture was not found to be a significant factor in IJV performance. The time spent during the R&D phase, the relative number of R&D employees, and the partner country initiating either the business idea or technology innovation also did not significantly affect the IJV performance.

CHAPTER VI: MACRO-LEVEL ANALYSIS - THE BINATIONAL INDUSTRIAL RESEARCH & DEVELOPMENT FOUNDADATION

A. Introduction and Issue Statement

The BIRD Joint Venture program is a binational industrial research and development foundation established ten years ago between the United States and Israel. The objective of the foundation is to promote and support non-defense industrial research and development activities of mutual benefit to Israel and the United States. The scope of cooperation includes all applied scientific activities used in the process by which an innovation becomes a commercial product, including but not limited to product engineering and manufacturing start-ups. The means by which the foundation hopes to achieve its goals are simple and pragmatic: within reasonable limits, BIRD shares costs with each partner in a U.S.-Israeli company team that seeks to develop and commercialize any innovative technological product or process that may yield a profit to each of the companies. BIRD's share of the costs has varied from between 40% to 50% of the total approved expenses in such projects, depending upon the availability of resources and the competition for funds.

There are three categories of BIRD funded projects: full-scale projects, which have a total budget (for both companies) of between 200,000 and 3,000,000 dollars and a total duration of three years or less; mini-projects, introduced in 1983, which have a total budget of less than 200,000 dollars and a duration of one year or less; and tests of feasibility for new concepts, which have a budget of 60,000 dollars or less. The BIRD Joint Venture program between the United States and Israel represents an entirely new model of joint ventures, with the stated objectives of developing technology and promoting entrepreneurship in both countries.

In its first ten years of existence, BIRD has funded 106 full-scale projects and 50 mini-projects and tests of feasibility. Out of these, 44%, or 69 projects, have led to sales of the new product, of which 18 had sales of over one million dollars and 2 had sales of over 100 million. Since 1979, BIRD has executed funding contracts of over 50 million dollars, with an average of 45% share of project costs, and has itself actually invested 43 million

dollars in these projects. These projects have led directly to sales of over 500 million dollars and indirectly to much greater sales, through the furthering of technology and industry in both nations.

In addition, more than 90 U.S. companies have initiated serious contacts with Israeli companies through the BIRD program. As a result, 44 U.S. and Israeli companies have established subsidiaries or enhanced companies in the other nation.

It is also important to recognize other contributions, such as the positive impacts on the economies of both nations and the creation of several thousand jobs. The success of BIRD suggests that the model may lend itself to replication in new industries and, possibly, to expansion in other settings. For example, there is a great potential in Israeli industry that has not been explored by the world market. Systematic research in a joint venture situation could help Israel to expand into markets worldwide, as well as to promote joint ventures in other nations. Thirty-nine countries have already approached the United States Department of Commerce to establish similar programs, and agreements have been signed with both India and France thus far.

B. BIRD Creation Process

In order for Israel to increase its standard of living, reduce inflation and dependence on foreign nations, and ultimately achieve economic independence, it must pursue export-led growth. Without such export growth, the nation cannot continue to import the raw materials and industrial components needed for production. However, Israel is too small to achieve an efficient scale of production in a wide variety of industries by serving its domestic market alone. In addition, Israeli innovations in the economic and technological spheres have captured the attention of scientists, businessmen, and government officials worldwide. Thus, the rapid development of technologically advanced industries, the development of entrepreneurship and small businesses, and an emphasis on research and education are crucial to preserving a stable economic future for Israel.

In addition, it has long been realized that Israel, though small, is of extreme strategic importance to the United States. Israel's strategic value to the United States derives from

its unique geographic position. Israel is located at a midpoint between Europe and the Persian Gulf. From a defense planning viewpoint, it has access to three theaters: the Persian Gulf, the Mediterranean, and NATO's southern and central fronts. Compared with the continental U.S., Israel is one-seventh the distance to the gulf and one-half the distance to Germany.

A second advantage is Israel's relatively stable political position. While virtually every other nation in the region is subject to overthrow by coup, revolution, or a drastic change in political orientation, Israel's stability is deeply rooted in sound political principles. Moreover, Israel's strategic interests and the values of its people are permanently aligned with those of the Western world, most especially with those of the United States. The alliance between the United States and Israel is not merely the imposition of a government; it reflects an agreement between the people for the two nations. Finally, Israel is advanced socially and technologically, and is therefore further aligned with the Western world.

In the United States, small business has been the mainstay of growth over the last decade. Today, over 90% of new jobs are created by small companies. However, small businesses often find themselves in an increasingly difficult situation. The increasing costs of developing new technologies along with rapid technological obsolescence calls for greater international collaboration to reduce costs and increase efficiency. However, the complexities of international business operations present obstacles for many smaller firms. Hence, these smaller firms may choose to forego profitable opportunities to internationalize their businesses.

The danger in foregoing these opportunities is indicated in a statement made by Dr. D. Bruce Merrifield, former Assistance Secretary in the Office of Productivity Technology and Innovation (OPTI) in the United States Department of Commerce "technology now has no boundaries; a good idea does not care who has it. Technology is the dominant factor in the world economy." The concerns that many firms have about exporting technology and jobs to other nations may not be valid, because rapid dissemination of technology is inevitable. If the United States economy is unable to capture new technology at reasonable

costs, another nation will, and the United States will (perhaps permanently) lose its competitive edge.

In addition, the United States needs to seek a mechanism for supporting developing nations that would bypass the perennial problem of aid monies falling into the pockets of government officials, not into the hands of the people or the free market. Israel was chosen to be the first partner country in the BIRD program because the United States wanted the program to be successful and serve as a springboard for similar projects in different settings. In transferring resources to LDCs through IJVs the United States could overcome the "not invented here syndrome." Products that are developed through a mutual IJV between LDCs and DCs are more likely to be perceived of as shared efforts. In addition, in cases where legal restrictions prevent access to certain countries, IJVs may be the only feasible access to the local market.

International Partnerships for the Commercialization of Technology (INPACT)

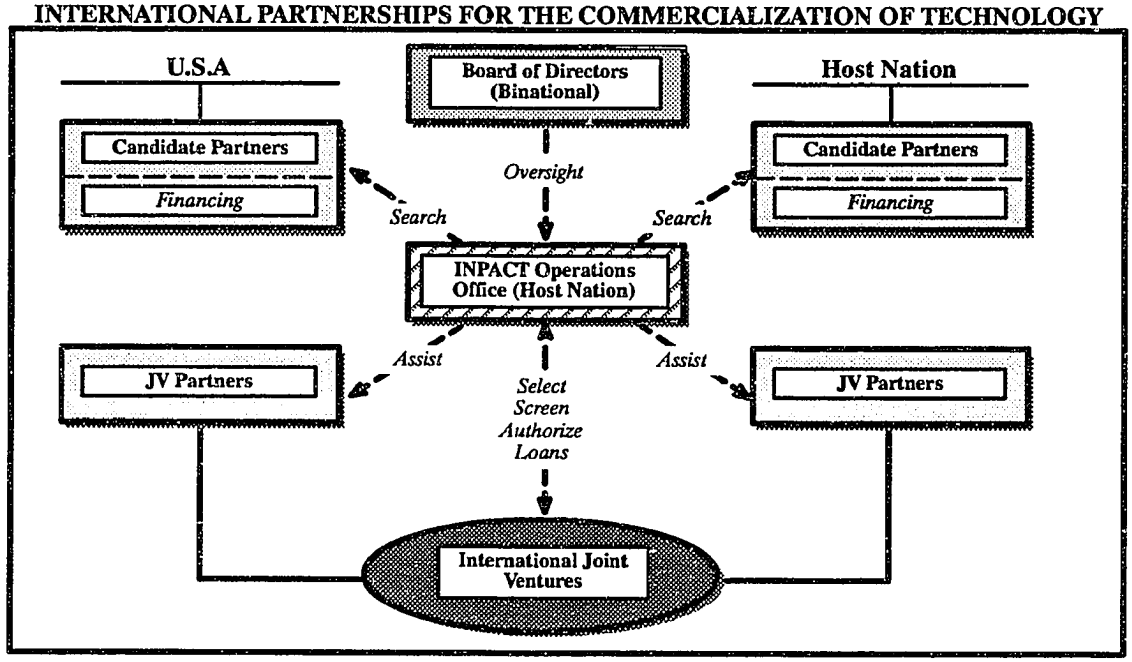
The INPACT Model (Exhibit 6.1) is an extension of the BIRD model to be implemented between the United States and other countries (INPACT: U.S. Department of Commerce, 1988). It was created in response to the tremendous success of the BIRD model. Founded on the principles of the BIRD model, the INPACT model assumes that U.S. and foreign nations can each profit from cooperative entrepreneurial activities. It is targeted (like BIRD) at small- and medium-sized businesses. The U.S. role is limited to four activities-- namely, to support the creation of bilateral agreements, to provide technical assistance, to assist in identifying information networks, and to assist in computer and non-computer-based project screening.

Though the first of the INPACT programs, namely the U.S-Israeli BIRD, is financed by an endowment provided by both governments, future programs will seek financing from other sources, including loans from investment banks, development banks, and international aid organizations. In all cases, at least half of the project capital will come from the IJV partners. Most INPACT ventures are closer to the commercialization phase,

where funding sources are limited, and therefore are likely to yield returns fairly quickly after the initial investment.

EXHIBIT 6.1

INPACT
INTERNATIONAL PARTNERSHIPS FOR THE COMMERCIALIZATION OF TECHNOLOGY



Source: U.S. Department of Commerce

ISRAEL'S TECHNOLOGY INFRASTRUCTURE

The combination of a lack of natural resources and an abundance of human capital encouraged the creation of a strong scientific and technological infrastructure in Israel. There are currently over fifty thousand scientists and engineers in Israel, of which about ten percent are engaged in industrial R&D. Supporting the basic infrastructure is the presence of several world-class universities and research centers, governmental policy that encourages R&D, and a growing number of successful high technology firms that are contributing over fifty percent of Israel's industrial exports (or twenty-five percent of total Israeli exports). Since 1978, exports of Israel's high-technology industries have grown from nearly three hundred thousand dollars to about three billion dollars to date.

Foreign firms have already capitalized on Israel's comparative advantage in the high-technology area. Currently there are about two hundred foreign firms operating in Israel's high-technology sector. The presence of the BIRD Foundation is important for

attracting new foreign firms to Israel, as well as keeping firms that have already located in Israel from leaving. The free trade agreements currently in place between Israel and the European Economic Community, and between Israel and the United States, further promotes the export driven high-technology industry in Israel. The BIRD Foundation is capitalizing on Israel's relative competitive advantage in the high-technology sector by promoting partnerships among Israeli and U.S. technology firms.

The Jewish Factor

The Jewish lobby in the United States figured prominently in the decision to make Israel the first nation to share a bilateral industrial agreement with the United States. While Israel was considered a candidate by virtue of its superior technological infrastructure, the choice of the Jewish state for the first such partnership clearly had political implications.

By contrast, the ethnicity factor does not play a significant role in the implementation and performance of BIRD projects. The analysis in Chapter V shows that when an Israeli firm seeks a U.S. counterpart, it does not consider explicitly whether the U.S. firm management is Jewish. U.S. firms place a somewhat higher value on the ethnicity factor because of their commitment to Israel. Personal interviews with BIRD staff, the U.S. National Institute of Standards and Technology personnel, and several key U.S. and Israel advisors to the Foundation, further indicated that the ethnicity factor is not critical in the partner selection or successful execution of the project.

C. BIRD Creation and Operations

The realization that more innovative models of international cooperation are needed is not new. The United States did not wish to initiate just another program of foreign aid extended by a major power to a developing nation. Despite the obvious differences between the United States and Israel in terms of size, wealth, and industrial prowess, the model was to be based upon the idea of cooperation between two governments and economies to produce tangible economic benefit to both.

Promoting collaboration between complementary U.S. and Israeli technology-based companies would help to ensure that U.S. entrepreneurial and technological skills translate into businesses benefiting both economies. In all instances, cooperation between the two parties would be based upon what each was best equipped to contribute for the mutual benefit of both. Thus, in the majority of projects, the R&D would be conducted in Israel, so that the venture might benefit from the wealth of relatively low-cost, innovative talent available there. The United States partner would most often contribute previous technological experience and knowledge of marketing and distribution to the venture, areas in which the United States is relatively strong.

The Official Agreement

These ideas for cooperation translated into the creation of the BIRD Foundation. The concept of the BIRD Foundation between the United States and Israel was developed in the United States-Israel Advisory Council. The council was formed in 1976, during President Carter's administration, by Dr. Patsy Mink, then Assistant Secretary of State. The notion was to form a council of experts consisting of fifteen individuals from each nation in the areas of technology, academia, business, and venture capital. The council would meet on an ad hoc basis to discuss and promote ways of supporting the Israeli economy. The well known members of the Council, past and present, included: Dr. Jordan Baruch, Dr. Jack Goldman, Dr. D. Bruce Merrifield, Dr. Pathy Mink, and Dr. Ed Mlavsky from the United States, and Mr. Dan Tolkovsky, Mr. Uzia Galil, and Ministers Moshe Arens and Gidon Pat from Israel. The initiator was Dr. Jack Goldman, the Vice President for technology at Xerox at the time. The concept as a whole was developed in the council.

In 1976, the initial agreement, emphasizing R&D collaboration, was signed. Later, the emphasis was expanded to encompass both R&D and commercialization. In the United States, approval and support were needed from the U.S. Senate, the Congressional Appropriations Committee, and key personnel in the Office of Management and Budget. Dr. Fred Bergson, an official in the Treasury Department at the time, was very active in getting the appropriations approved by Congress.

The BIRD Foundation Handbook, which contains the agreement establishing the foundation and the principles of operation, was based on two previous agreements signed by the United States and Israel: these two earlier agreements had created the Binational Science Foundation and the Binational Agricultural Research and Development Foundation (BARD-F). In March 1976, the agreement that created the basis for the BIRD Foundation was signed by both governments.

The BIRD Foundation Director: Dr. Ed Mlavsky

The success of an organization often obscures the importance of the people who worked hardest and often in anonymity to ensure that success. Many models are based on the organization alone and devote relatively little attention to the quality of the personnel recruited to help the entity thrive and grow.

A notable exception to this trend is the work of Starbuck (1978, 1983). Indeed, Starbuck's work highlights the uniquely important role of individuals in the evolution of the firm. According to Starbuck (1983), most organizations ultimately fail to survive over long periods of time because decision making often becomes inbred, nonreflective, and most of all nonresponsive. Organizations, Starbuck claims, amplify the general human propensity to create behavioral programs. These programs are "as action generators;" they require no information stimulus because they are instinctively activated through job assignments, clocks, calendars, and established routines.

According to Starbuck (1978), the behavioral programs of firms do not originate because of specific needs. They are often traditional, copied from other organizations, taught in schools of management, or legitimated by managerial literature and lingo. Because action generators are stable and nonadaptive, they remain in place for long periods of time. Indeed, as Starbuck (1983) asserts, most managers prefer variation to outright change. The inability of organizations to survive derives, in part, from the fact that variations may, in certain environmental contexts, be inadequate. Managers often choose variations and interpret results within the framework of their current beliefs and vested interests (embodied in the action generators in place at the firm), so that

misperceptions not only persist, they accumulate. Organizational reluctance to "unlearn"-- forget that which is no longer appropriate practice and move on-- is ultimately what dooms organizations to fail.

In extremely hierarchical organizational structures, action generators are especially strong and numerous because top managers can block the actions proposed by subordinates. Typically, top managers in these settings have strong vested interests and are more likely to be held responsible if things go wrong. In addition, reorganization can threaten their dominance. The techniques of top management may be out-dated and the knowledge of top managers about a firm's operations and problems may be distant. Information to these managers is filtered and designed to please, and thus top managers may be unaware of, or unwilling to change, outdated action generators in operation at the firm.

The importance of top managers extends beyond their role as decision makers. In setting the behavioral programs, they impart to lower level managers and employees the same behavioral practices that become routinized in the operations of the firm. In such a setting, when the top management retires or is removed, the firm will continue to practice with the existing action generators and will show a similar resilience to innovation. Only when whole teams of managers vacate, or when ownership at the firm is replaced, will the action generators that have impeded change be removed.

The importance of individuals in organizations is demonstrated with clarity in the case of Dr. Ed Mlavsky, executive director of the BIRD Foundation. Dr. Mlavsky has held this position from 1979 to the present. Although many officials interviewed in this study have praised Dr. Mlavsky's performance, their remarks cannot fully capture his immense contribution in shaping and guiding the BIRD Foundation.

The BIRD Foundation is relatively young and nonbureaucratic in its organization. In comparison with the Israel Office of the Chief Scientist (IOCS) which is older, larger, and more bureaucratic, the BIRD Foundation is adaptive and innovative. Dr. Mlavsky has done much to encourage a more open organizational structure and adaptive behaviors. An

innovative thinker, he has demonstrated a genuine enthusiasm for information, results, and change. During his tenure, the organization has remained relatively non-hierarchical, and Dr. Mlavsky has demonstrated a willingness and desire to share ideas with individuals at all levels of the foundation's operations. Because of his desire to delegate responsibilities, train employees, and spread leadership within the organization, the BIRD Foundation will be better prepared to operate effectively after his departure. Most importantly, Dr. Mlavsky, because of his adaptability, has allowed the organization to operate with few action generators (Starbuck 1978, 1983) of the sort that oppose creative thinking and change, and could ultimately threaten the success of the BIRD Foundation.

The Endowment Factor

The BIRD Foundation is financed through an endowment of one hundred and ten million dollars contributed equally by both governments. The existence of an endowment that ensures long-term financial stability and independence for the foundation is a critical factor for several reasons.

First, the endowment ensures that the foundation is not controlled or interrupted in its operations by other government agencies. This permits the foundation to operate in a highly professional manner, without fear of conflict of interest-- almost like a venture capital firm investing and supporting the most competitive projects in the marketplace.

Second, it gives the foundation a level of stability that allows it to conduct long-term planning. A longer term horizon allows the foundation to manage its funds according to the availability of suitable projects. This flexibility enhances the proportion of successful projects. In addition, projects themselves are likely to take many years to reach fruition and should therefore be managed over the long term. The fact that the foundation is endowed implies that it can wait for several years before receiving project royalties.

Third, because of its endowment, BIRD management can concentrate its efforts on operational issues, mainly project selection, networking, follow-up evaluations, and project supervision.

Fourth, companies engaged in partnership with the BIRD foundation are guaranteed to receive committed monies over the duration of the project, and in a timely way. Assured funding gives potential participants confidence to embark on a joint-venture.

The First Joint Venture

The U.S.-Israeli council members considered several potential joint ventures that would mark a successful beginning of the foundation support. It was committed to supporting only those ventures with the greatest likelihood of success, given the high visibility of the first ventures. After an extensive search, six companies agreed and were chosen to pioneer the program.

The first year saw phenomenal success. Of the six initial joint ventures, four achieved sales. One of them, a joint-venture between Telrad Communications and Electronics Industries, Ltd. and Pentacom, Inc., developed the KEY BX family of programmable key telephone products. The venture has enjoyed sales of over 100 million dollars, with more than 300,000 Key BX stations installed in the United States, as well as a significant presence in 30 other nations. BIRD is proud to have been a catalyst to this development, a model example of the innovations that can be achieved through binational joint ventures.

Another of the initial projects, a joint venture between Motorola Israel Ltd. and its parent company Motorola, Inc., produced a full line of computerized irrigation control systems for use in agriculture. The systems were adopted and applied with enormous success in uses as diverse as golf courses, parks, institutional gardens, and highway surrounds.

One of the initial projects that did not fare so well was the proposed development of a viscosity measurement system by Ovutime, Inc. and Iscar, Ltd. The failure of this project was mainly due to the U.S. company, which was badly underfinanced and heavily debt-ridden. The company collapsed, and the joint venture necessarily fell with it. Dr. Mlavsky claims that because of the more rigorous selection process now used by BIRD, the foundation would not invest in such a company today.

D. BIRD Evaluation Process of Companies

BUSINESS PLAN EVALUATIONS: THE APPROVAL-REJECTION PROCESS

Exhibit 6.2 charts the BIRD process of business evaluation. The process of receiving BIRD funding begins with the emergence of a business idea. In most cases, the idea is generated by an Israeli entrepreneur or company, and is technology driven. The BIRD is well known in Israel, where the foundation office is located, and is well established in the high technology industry.

The entrepreneur or company often comes to realize the need for an international partner for several reasons-- namely, project financing, risk-sharing, entry to a foreign market, or the acquisition of technology. Because the Israeli business environment lacks these features, the BIRD foundation plays a vital role in facilitating their acquisition. There are two ways for entrepreneurs or companies to seek BIRD assistance. They may approach BIRD with a business and seek the foundation's help in finding a partner, or they may find a partner themselves and then approach BIRD. The latter is the route preferred by the BIRD Foundation, because a project proposed by two partners is more likely to be feasible. Nevertheless, the BIRD Foundation does act as a networking center that assists companies in locating a partner.

Following an initial meeting between the participants and BIRD staff, the foundation conducts a preliminary evaluation of the proposed joint project. Specifically, the BIRD assesses the merits of the plan by looking at the degree of technological innovation, technical support, market potential, financial ability, management capability, previous company performance indicators, and the ability of the venture to commercialize R&D. If the project meets the standards in the above areas, BIRD gives the company guidelines for developing a formal business plan. Usually the process of developing a business plan takes two to three months. It is an integrated process in which the company often receives guidance from BIRD.

Once the BIRD receives the formal business plan, it distributes the plan to the Israeli Office of the Chief Scientist (IOCS) and the U.S. National Institute of Standards and

Technology (NIST). Both IOCS and NIST concentrate on the technological feasibility of the project in their reports. After the BIRD receives comments from each of these sources it conducts its own internal review of the business plan. At this stage the Foundation undertakes a thorough analysis, considering in addition to the factors listed above the future cash-flow anticipated from the venture, the company's overall competitive performance and its ability to carry out the proposed project, and the likelihood that the partners will both benefit over the course of the entire project.

The BIRD office completes the review process and sends the results to three board members in each country. The final project approval is conditional on the consent of four of the six board members. For most projects, the final process of approval is conducted twice annually, with BIRD staff and the foundation board members from both countries.

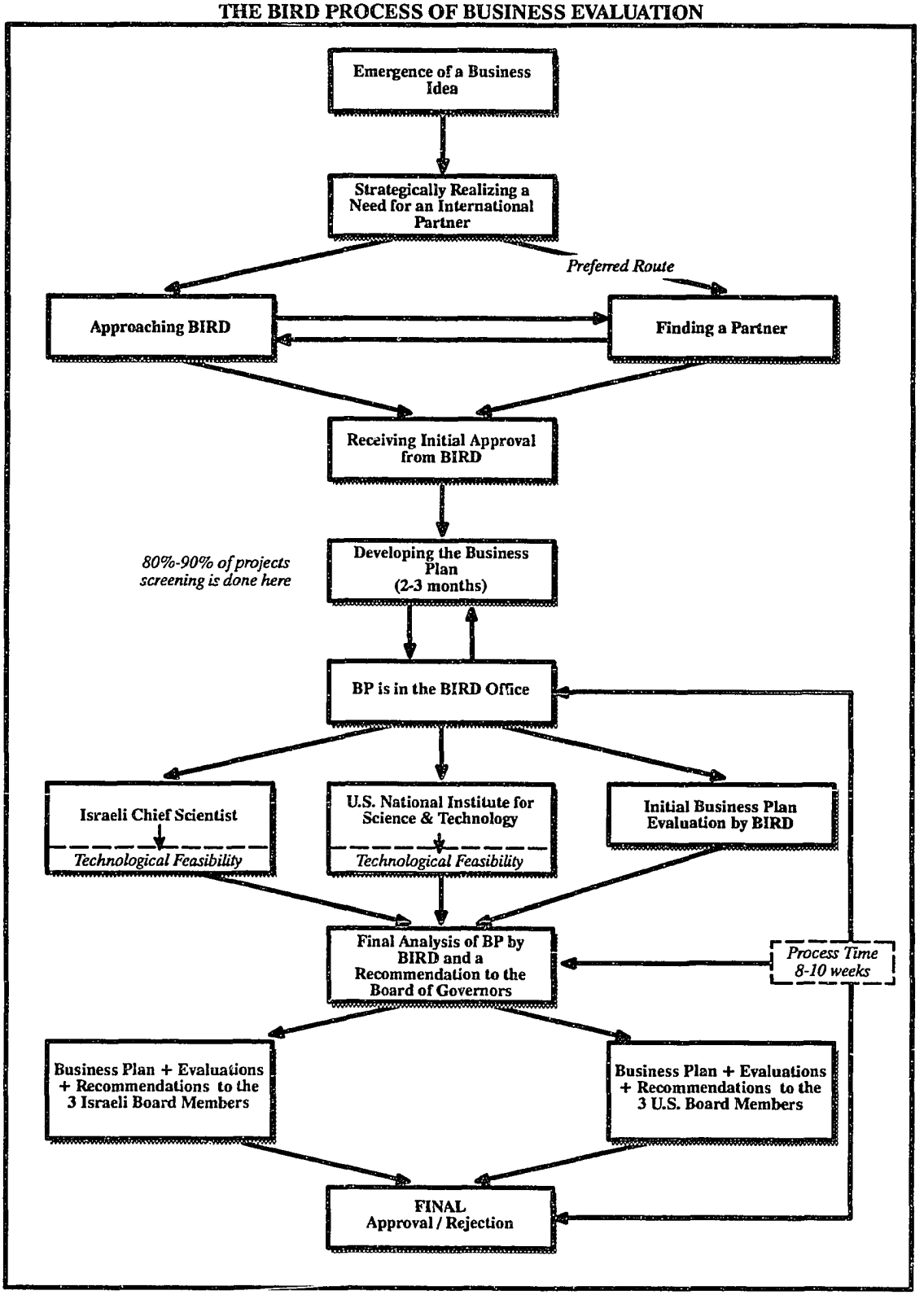
Follow-Up of Projects

The BIRD Foundation does not complete its role when it decides which projects to sponsor. The foundation considers itself a full partner of the project. Companies are required to issue a progress report to the foundation on a semiannual basis. In addition, BIRD staff visit companies and review their technological development, internal accounting, and commercialization progress. The frequency and extent of BIRD's follow-up is sufficient to achieve these objectives, but not so excessive as to interfere with the project operations. In fact, companies seem to value the BIRD reviews. Often the foundation helps companies to overcome problems in the product life-cycle, or disagreements that arise in the partnership. Companies indicate that BIRD help in the commercialization phase is particularly useful (Exhibit 6.3). Israeli companies' suggestions for changes in the BIRD program are presented in Exhibit 6.4.

The follow-up process is an integral part of BIRD's operations. The follow-up conducted by BIRD has important consequences-- it forces companies to review their own progress on a regular basis and therefore to adjust their operations if necessary, and it encourages companies with sales to repay royalties as required in the BIRD agreement.

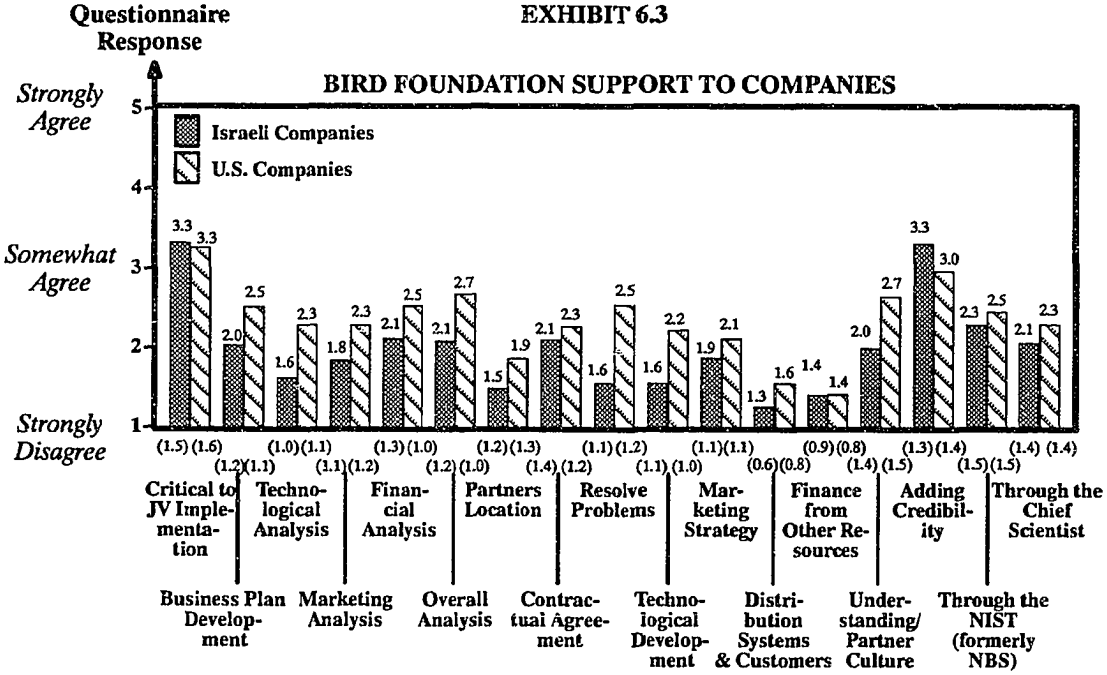
EXHIBIT 6.2

THE BIRD PROCESS OF BUSINESS EVALUATION



A vital part of the current review and selection process is evaluation by the National Institute of Standards and Technology (NIST, formerly NBS). The mission of the NIST is "providing accurate measurement." By supplying the foundations for measurement in industry, science and technology, NIST helps the nation to achieve higher productivity and increased competitiveness abroad.

EXHIBIT 6.3



Source: Dissertation survey

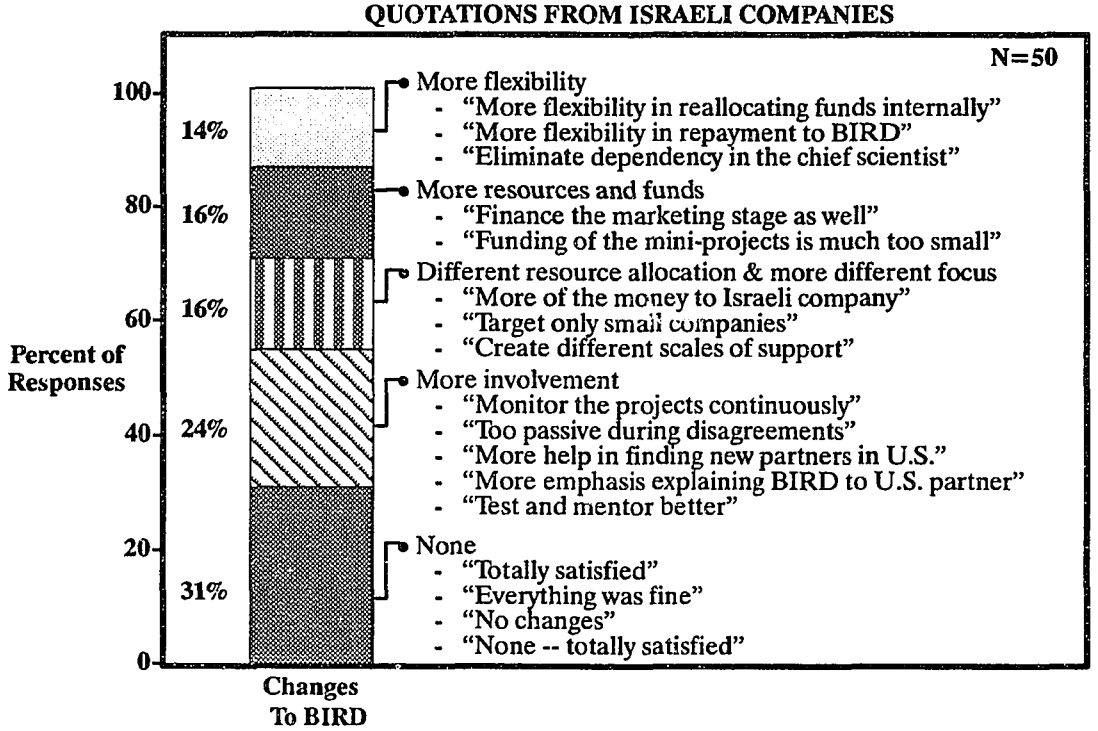
A nonregulatory agency of the United States Department of Commerce, NIST was established in 1901 specifically to aid manufacturing, commerce, government, and academia. For all areas of science and technology, NIST develops the standards, measurement techniques, reference data, test methods, and calibration services that help to ensure national and international measurement compatibility.

Operated on an annual budget of about $260 million (60% from Congress, 30% from government officials, 10% from private industry), NIST employs a highly skilled staff of 3000 at its headquarters in Gaithersburg, Maryland, and at its site in Boulder, Colorado.

NIST also controls some of the premier research and testing facilities throughout the United States.

EXHIBIT 6.4

SUGGESTED CHANGES TO BIRD QUOTATIONS FROM ISRAELI COMPANIES



Source: Dissertation survey

The NIST has an important role in the process of business plan evaluation for prospective BIRD joint ventures. The instructions given by the office of international affairs in the NIST direct reviewers to assess the technical aspects of the business plan: technological feasibility, the ability of key personnel, the anticipated duration of the plan, and finally, the reasonableness of the proposed budget. Dr. Mlavsky indicates that "the reviewers are asked to comment on whether the approach that is described is a valid one for achieving the goals and whether these goals are attainable. They are not invited to comment on the business plan as a commercial prospect." Dr. Jordan Baruch sees a broader role for the NIST in the evaluation process. He suggests that "the NIST is reviewing technological feasibility, competitive markets, and potential customers."

Dr. Ken Gordon is BIRD's contact official in the NIST. He receives the business plans from BIRD and distributes them to the NIST experts. Seldom are business plans sent for review outside of the NIST. In general, the time between BIRD's sending the business plan to the NIST and the return of the evaluation is about 30 days. The NIST reviewers keep track of there hours and the NIST is compensated for their contribution. Dr. Ernest Ambler, the Director of the NIST and one of BIRD's governors, and Dr. Gordon are not being paid for their time.

The NIST evaluation is detailed and professional, and it is generally very important for project approval or rejection. In some cases, NIST saved millions of dollars for both BIRD and potential joint venture companies by notifying them of a similar and competing project elsewhere, or by proving to them why their proposal was technologically not feasible.

The reputation of the NIST adds a great deal of credibility to the program. Some companies would not invest in projects without the approval of the NIST. In other cases, companies use the NIST approval as a tool for raising the necessary financing.

There is no interaction between the NIST and the IOCS for two reasons-- the prestige of each of the organizations, and the advantage of having two evaluations. Mr. Dan Halperin, previously a member of the Board of Governors, claims that "the knowledge base of the NIST is much deeper and broader than that of the IOCS. In addition, the IOCS is a political organization due to its affiliation with the Industrial and Commerce Ministry of the Israeli government. It is constantly under political pressure and can not function efficiently and objectively."

In summary, the NIST is an organization with a broad base of knowledge and experience. It has experts in all technological fields and has access to some of the premier research and testing facilities in the world. It is a part of the U.S. government and it is closely affiliated with the world's largest markets. These factors make NIST invaluable to BIRD.

PREVIOUS RELATIONSHIPS BETWEEN THE BIRD FOUNDATION AND COMPANIES

Very few of the companies in the database used in this study were rejected for a BIRD Grant at any time before or after the project considered in this study. Specifically, in Israel, only six of the ninety-two companies have ever been rejected, while in the United States, only two out of forty-nine companies have been rejected. This fact, supported by interviews with BIRD Foundation staff and Israeli companies, suggests that companies or partners may apply formally (with the submission of a full business plan) for a BIRD grant only after they have been assured (by the Executive Director and Associate Director) of receiving such a grant. While it is true that the BIRD Foundation and especially Dr. Mlavsky and Mr. Grinberg conduct a highly professional screening of most of the projects before business plans are formally submitted to BIRD, and that such a process saves time for those companies in writing such a plan (especially if their chances of receiving a BIRD grant are low), the selection process raises several concerns. These concerns are discussed in more detail below.

E. A Comparison of BIRD and PACT

"The objective of the BIRD Foundation shall be to promote and support non-defense industrial research and development activities of mutual benefit to the United States and Israel."

- BIRD's Objective Statement

"PACT is designed to accelerate the pace and quality of technological innovation for products and production processes having application in industry, agriculture, health, energy and other areas beneficial to the development process in India."

- PACT's Objective Statement

The PACT model is the United States-India program for the advancement of commercial technology. The PACT model represents the first attempt to extend the BIRD model to another setting. Although the principles of PACT were based on the BIRD model, the specific character of Indian economy, politics, and culture dictated a different form. The ability to modify BIRD successfully in an alternative setting is strong evidence of the potential of this model as a mechanism for furthering economic development and free enterprise.

BIRD and PACT, while based on the same principles, differ in many ways. First, PACT is not financed through an endowment. Instead, financing occurs through a commitment of ten million dollars by the U.S. Agency for International Development (AID). Second, the target market for PACT is the vast local Indian market, while BIRD projects are targeted for the OECD markets. Third, PACT is managed by the Industrial Credit and Investment Corporation of India Limited (ICICI), which is larger and more established organizationally than the BIRD office. Because the ICICI's and PACT's objectives are not identical, conflicts could potentially limit the autonomy of the program management. Such problems do not arise in the case of BIRD, which is wholly autonomous. Although the independence of PACT may be weakened by ICICI involvement, the networking, capital, and experience provided by a large bank of this sort provides may yield advantages as well. Fourth, PACT projects are targeted more to the R&D phase, with emphasis on developing and transferring new technologies to the local Indian market, while BIRD projects are more commercially oriented.

F. The Israeli Office of the Chief Scientist and the BIRD Foundation

The Israel Office of the Chief Scientist (IOCS) is a government agency that operates under the Ministry of Industry and Commerce. The broad objectives of the agency are: to develop science-intensive industry in Israel and to expand the technological, scientific, and human resources infrastructure of Israel; to improve the balance of payments in the state by influencing the development of science-intensive products for export; and to facilitate the creation of new places of employment in science-based industry. In its stated agency objectives, the IOCS differs from the BIRD in two ways. First, it is not focused on the commercialization phase exclusively, but invests considerable resources in enhancing the basic scientific and technological infrastructure of the nation. Second, jobs creation is its stated goal. The difference in emphasis between IOCS and BIRD stems largely from BIRD's more private sector orientation.

The operational objectives of IOCS are, however, in many ways similar to those of BIRD -- to formulate policy for the encouragement of R&D, to develop the scientific and technological infrastructure of Israeli, to manage the process of international cooperation,

and to facilitate the creation of new sources of venture capital funds and other financial mechanisms to support the development of Israeli's technology-based industry.

The IOCS has been operating for nearly twenty years, and its budget has expanded from a sum of eleven million annually to over one-hundred million in 1990. To date, it has supported over three thousand R&D projects in more than six hundred Israeli firms. In its twelve years of existence, the BIRD Foundation has supported nearly three hundred projects in more than two hundred firms. As these figures indicate, the BIRD operates on a much smaller scale, by virtue of its exclusive focus on projects executed with a U.S. partner and, of course, its more modest budget.

The IOCS consists of three major operational units-- the Information Center and Administration Office Unit, the Technology/Economic Unit, and the Fund Administration Unit. The Information Center of the IOCS collects data on Israeli technology-based industries and companies to aid in agency policy making. The Technology/Economic Unit reviews and tests the overall feasibility of the projects of all sizes and in all industries. The Funds Administration's primary responsibility is to manage the funds administered to large, medium, small-scale, and start-up projects, as well as the binational funds (including the BIRD Foundation), and joint programs with Israeli universities. Finally, it is empowered to administer the royalties flowing from all of its activities. In relation to the tight organizational and management structure of BIRD, the IOCS is far more complex and multi-task-oriented in its daily operations.

The IOCS claims to evaluate projects on the basis of several criteria. First, to be considered for funding, projects must be innovative; innovation is regarded as an essential ingredient in the development of new technologies. Second, the firm must demonstrate competent management, production, and marketing capabilities, and must have a coherent marketing strategy for its new products. Third, preference is given by the IOCS to products with a high value-added, products that are likely to be competitive in international markets. Fourth, projects must introduce new technology or demonstrate the potential for the expansion of scientific manpower.

In practice however, the IOCS lacks the personnel and resources to review projects adequately according to the above criteria. Specifically, it does not assess the management, marketing, and financial capabilities of the applicant firm. Unlike BIRD, the IOCS is almost like an office for controlling the distribution of funds among existing Israeli high-technology firms. The professional screening mechanism of BIRD encourages excellence and successful commercialization in a way that the IOCS process does not.

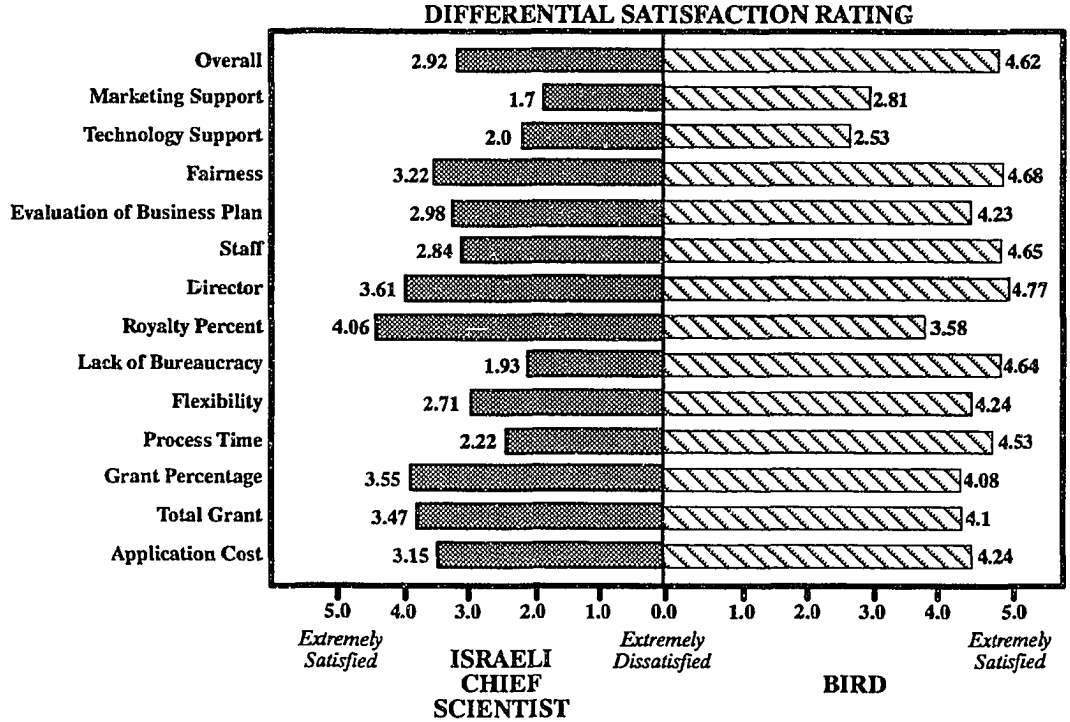
The differences in IOCS and BIRD model structure and management practice were confirmed by top managers in Israeli high-technology companies (Exhibits 6.5-6.10). Specifically, Israeli companies that had worked with both BIRD and IOCS were more satisfied working with the BIRD foundation in all of the categories examined.

It should be noted that the IOCS is a government agency. As such, it operates under a unique set of constraints and obligations that inhibit its autonomy in managing its resources in the most efficient way. By contrast, the BIRD has the flexibility of a private foundation. This essential difference in the two organization's structures limits somewhat their direct comparison.

The inferior model structure and management practice of the IOCS was confirmed by the fact that Israeli companies were relatively less satisfied with IOCS in the following areas- bureaucracy, application and monitoring, time in project evaluation, flexibility in the use of the grant, professional evaluation of the business plan, marketing and technological support, fairness in grant distribution, overall satisfaction with the staff and the director of the agency, and overall satisfaction with the agency. Even though Israeli companies were returning less to the IOCS in project royalties, they were more satisfied with BIRD on average (Exhibits 6.5-6.7). Finally, the greater consistency of satisfaction with the BIRD foundation among companies (Exhibit 6.8) is further evidence of the uniformity of opinion among Israeli managers.

EXHIBIT 6.5

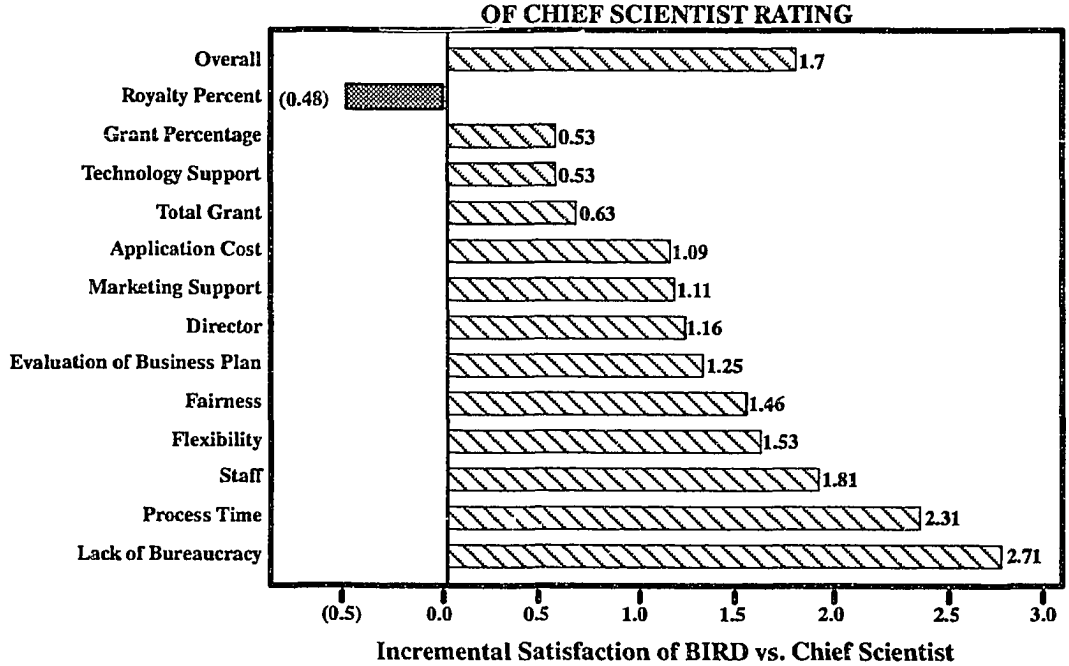
DIFFERENTIAL SATISFACTION RATING



Source: Dissertation survey

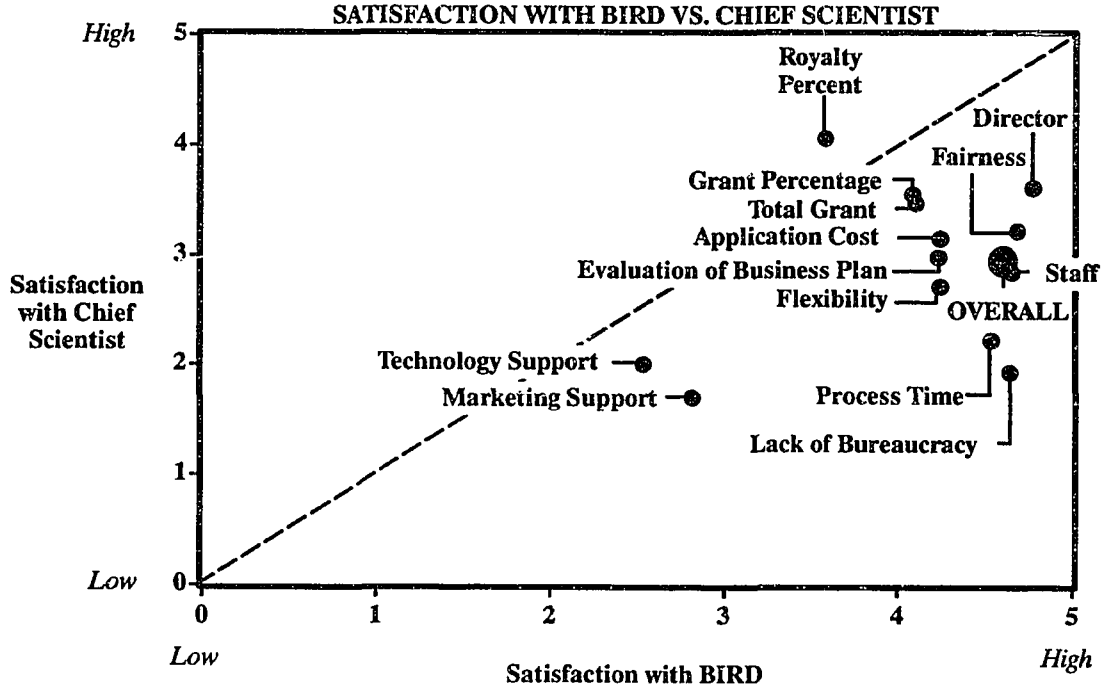
EXHIBIT 6.6

BIRD RATING MINUS ISRAELI OFFICE OF CHIEF SCIENTIST RATING



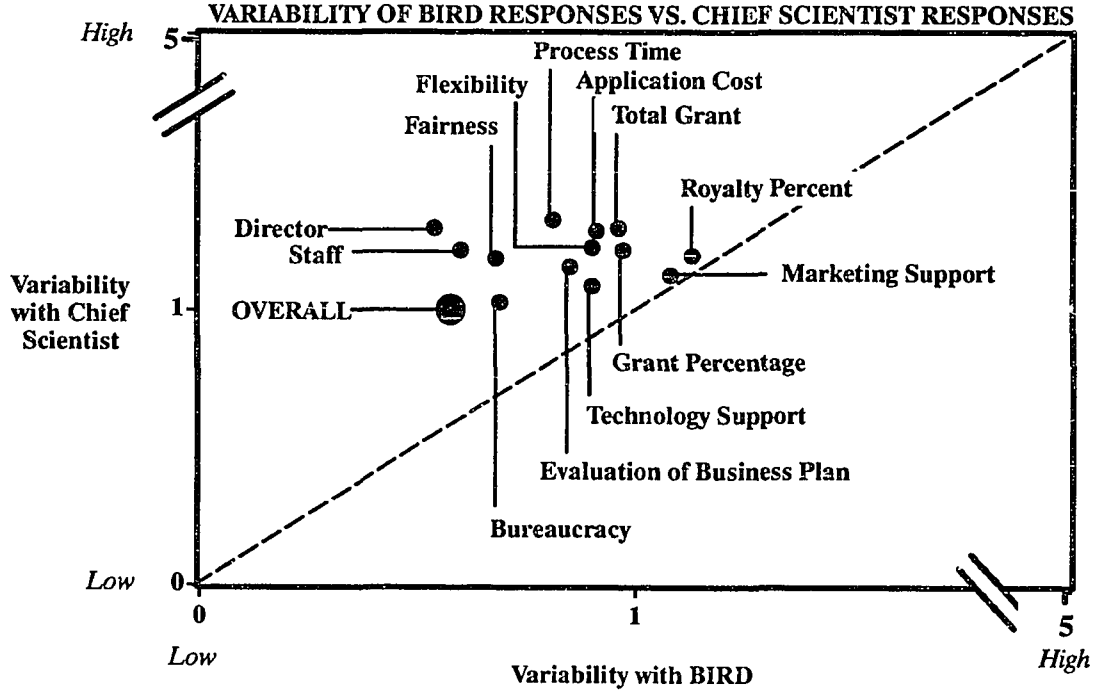
Source: Dissertation survey

EXHIBIT 6.7



Source: Dissertation survey

EXHIBIT 6.8



Source: Dissertation survey

EXHIBIT 6.9
BIRD CAN LEARN FROM CHIEF SCIENTIST
QUOTATIONS FROM ISRAELI COMPANIES

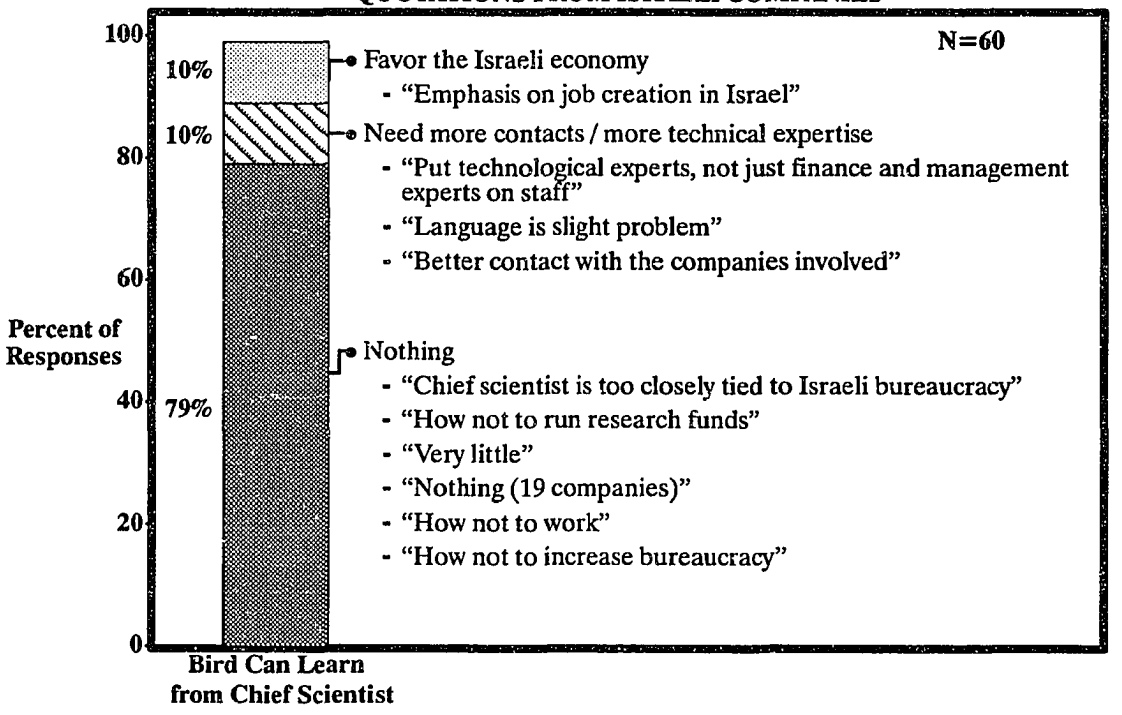
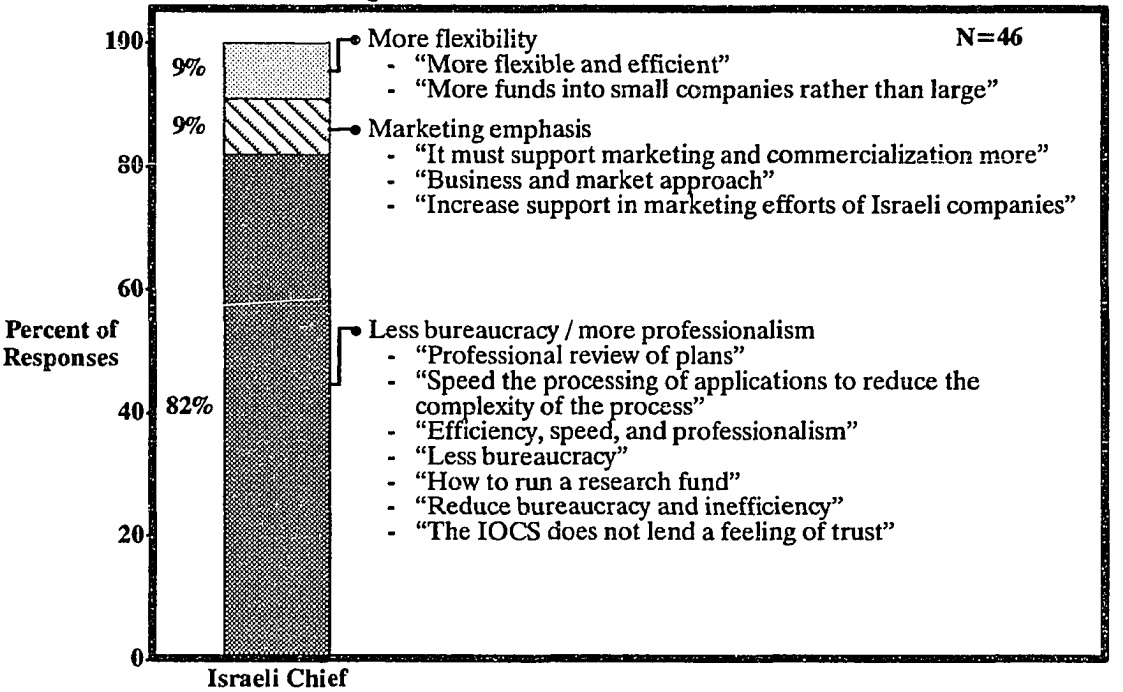


EXHIBIT 6.10
ISRAELI CHIEF SCIENTIST CAN LEARN FROM BIRD
QUOTATIONS FROM ISRAELI COMPANIES



Source: Dissertation survey

The companies surveyed for this study were asked to indicate what lessons the two agencies might learn from each other. Among the Israeli companies that responded to the question, seventy-nine percent said that BIRD has "nothing" to learn from IOCS (Exhibit 6.9). Among those companies that did offer suggestions, they noted that the BIRD should favor Israeli companies in grant distribution, and asked BIRD to be more involved in the technological aspects of projects. By contrast, one-hundred percent of Israeli companies who responded noted that the IOCS could learn from BIRD (Exhibit 6.10). Eighty-two percent of companies surveyed suggested IOCS to adopt the BIRD management system and be less bureaucratic. Other companies indicated that the IOCS could learn from BIRD how to better evaluate and support companies during the critical commercialization phase.

In summary, the survey indicates the superiority of BIRD to IOCS. The BIRD appears to be managed more professionally at all levels and has a superior overall structure.

G. BIRD Foundation Performance

BIRD Foundation Objectives

The stated objective of the foundation is to support joint, nondefense, industrial research and development of mutual benefit to the United States and Israel. In May, 1988, more specific definitions of the foundation's objectives were presented to the Board of Directors. They were:

- to attract new U.S. companies into projects with Israeli counterparts;
- to encourage United States and Israeli companies in the formation or expansion of manufacturing subsidiaries or affiliates in the other nation;
- to increase the export of high value-added products from Israel, from which United States companies could also benefit;
- to enhance the capabilities of the Israeli high technology industry, that they might develop products that are acceptable to both the United States and the world markets; and
- to enjoy the full funding resources of the foundation in the support of meritorious projects.

Although the emphasis of the agreement is on research and development, the actual funds are directed towards research, development, and commercialization of innovative

products and processes. This change is largely attributed to two people: Dr. Jordan Baruch, who was the Assistant Secretary of Commerce, for Productivity, Technology, and Innovation in the Department of Commerce at the time the agreement was signed, and Dr. Ed Mlavsky, the Executive Director of the BIRD Foundation. Both recognized that the success of the foundation depended on its more expanded mandate. First, they realized the needs of companies for monies during the commercialization stage-- too many good projects fail because of a lack of cash to complete commercialization. Second, they recognized the importance of linking the commercialization process to the research and development stage, and the difficulty faced by many Israeli companies in the past because too much emphasis was placed on the specifics of the product, rather than how those intricacies would best serve market needs. Third, both recognized that other funds for research and development were often available to the kinds of companies supported by the foundation, but that monetary support often ended before the commercialization stage. Thus, many companies could develop a good product but never get it to the market. The willingness to address and resolve these issues in the evolution of the BIRD Foundation is a fundamental reason for its success.

Assessment of BIRD Foundation Objectives

Objective: To attract new U.S. companies to Israel.

Since its inception in 1978, the BIRD Foundation has attracted over one-hundred thirty U.S. companies to Israel. Using data from 1979 to 1987, BIRD claims that, on average, fifty-eight percent of projects initiated involved new U.S. partner firms. The ability of BIRD to attract new U.S. firms to Israel despite the fact that its operations are primarily in Israel is testament to the foundation's achievement in this area. The survey results, however, point to some weaknesses on BIRD's part. Specifically, in only four of the 110 projects reviewed in this research, was the contact initiated by BIRD. Although the structure and management of the foundation has exceeded expectations in attracting U.S. companies, BIRD needs to better establish its networking mechanism.

Objective: *To encourage subsidiaries and affiliates of U.S. (Israeli) companies in the partner country.*

The total number of Israeli and U.S. subsidiaries or affiliates created as a direct consequence of BIRD projects was forty-four as of 1987, as reported by the foundation. Of one-hundred and fifty-six full and mini-scale projects, twenty-eight percent led to the creation of a new subsidiary or affiliate. Currently, twelve U.S. companies, following their BIRD projects, have established a fully owned subsidiary in Israel.

The foundation's evaluation procedures do not give priority to companies with common ownership over companies with no common ownership. The BIRD claims that projects between partners with common ownership are "significantly more likely to be successful." The empirical model used to evaluate the performance of IJVs in this research, however, shows that, if anything, IJV performance is negatively associated with common ownership in the BIRD data, once several important factors likely to influence IJV performance are taken into account (Exhibits 5.41-5.43). The BIRD may need to reassess its policy relating to companies and their already established subsidiaries.

Finally, the fact that BIRD is supporting joint projects between companies and their subsidiaries might, in fact, contradict their objective of attracting new U.S. companies to Israel.

Objective: *To increase exports from Israel.*

Of the two hundred and fifty seven projects funded by the BIRD Foundation, one hundred and fifteen led to sales. The BIRD Foundation claims that the total sales of the projects it supported exceeded one billion dollars since the first sale in 1981. In addition, the foundation claims that new BIRD products often lead to additional sales of related products. BIRD estimates that sales of related products have totalled an additional one billion dollars. It is of importance to note that some of these sales accrue from companies whose BIRD contribution is only a small fraction of their total investment in the project. A significant portion of these sales are Israeli exports.

The BIRD is concentrating too heavily on sales as an indicator of the foundation's performance. The fact that the foundation claims over one billion dollars of direct product sales, yet only eight and one-half million dollars of project royalties, suggests that a large proportion of these sales are not directly related to the BIRD investment. In some cases however, the ratio of royalties to sales may be an inappropriate gauge of the foundations performance. Because projects complete their obligations to the BIRD foundation in returning 150% of BIRD's investment, companies could legitimately claim significant project sales and return no royalties. In addition, this research shows that several of the companies that reported sales actually failed in the overall commercialization of their project and did not recoup their initial investment. This evidence suggests further that sales of projects are not a sufficient indicator of performance. Reported BIRD sales should better reflect the proportion of BIRD financing and should not be used as an exclusive measure of performance.

Objective: *To enhance the capabilities of the Israeli high-technology industry.*

This study shows that Israeli companies enhanced their overall business abilities. First, Israeli companies indicated that the BIRD foundation's request for a formal business plan was of great use to them in better developing and implementing their projects. Second, the presence of the U.S. partner exposed Israeli firms to more formal and sophisticated business practices, which they could then adopt and learn from. Third, thirty-three percent of Israeli companies in the research sample indicated that their BIRD exposure helped most in enhancing their marketing approach and capabilities. A majority of companies indicated that the BIRD experience improved their overall marketing ability. Fourth, thirty-five percent of Israeli and forty-five percent of U.S. surveyed companies claimed that the BIRD experience was most influential in teaching them how to manage their relationship with a foreign partner firm more successfully. All companies indicated that, by virtue of their experience with BIRD, they will be better able to manage any future relationship with a foreign partner.

Objective: *To employ the full funding resources of the Foundation in the support of meritorious projects.*

The fundamental principle of the foundation is to distribute BIRD resources in a manner that will maximize the achievements of each of the foundation's objectives. This research suggests that the foundation could devote more planning to better allocation of its resources.

H. Concerns

The analysis of the BIRD Foundation in this research highlights several areas of concern. Specifically, these concerns may be categorized according to the following issues:

- the measurements used to evaluate BIRD Foundation performance
- managerial structure
- the distribution of grants among projects
- depletion of the foundation's real endowment
- other administrative practices.

The Measurements Used to Evaluate BIRD Foundation Performance

The current performance measures used by the BIRD Foundation are vague and somewhat misleading. The foundation stresses project sales above other measures in evaluating the performance of the joint projects that it sponsors. In all its publications, including its ten-year evaluation report, the foundation points to total project sales and the percentage of companies initiating sales as the key measure of its success (Exhibits 6.11-6.13). The BIRD status report for 1990 indicates direct sales of one billion dollars from sponsored projects. In addition, it claims that 115 of the 223 projects supported through 1989 had initiated some sales.

There are two concerns regarding the emphasis BIRD places on sales. First, some of the sales reported accrue from companies whose BIRD contribution is only a small fraction of their total investment in the project. For example, sales of Luz Ltd. Israel, a very successful solar energy company, were in excess of 200 million as of 1990. In its sales accounting, BIRD records all of Luz's 200 million sales as BIRD related. BIRD's share of Luz's total investment is however between 5 and 10 percent.

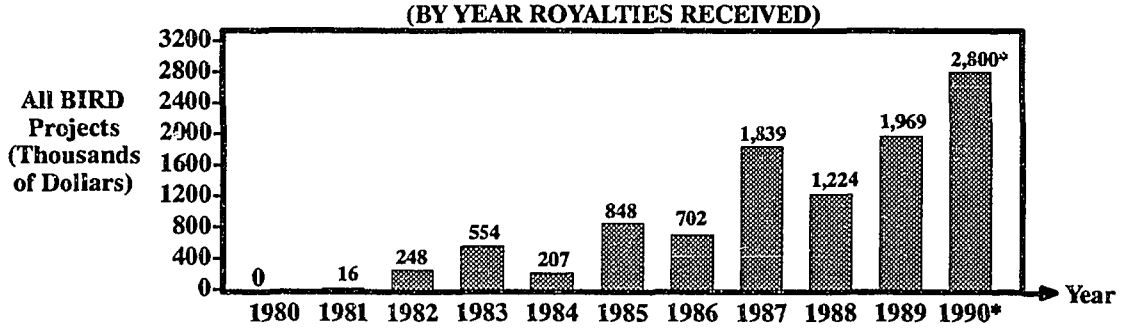
Second, companies who report sales are not necessarily successful. Consider the case of a project, initiated in 1985, that the foundation reported as having product sales in 1987.

It involved U.S. and Israeli companies in the electronics industry that had invested 3.2 million dollars in a joint project. The project was discontinued before it reached its intended conclusion. The companies did, however, sell between 20,000 and 30,000 dollars of by-products, returning approximately 10,000 dollars to the foundation. Under its current system of reporting, BIRD classified this project as a project with sales, strictly because of sales of by-products. Because BIRD does not indicate the source or amount of a company's sales, this practice of reporting confuses companies with sales as successful ventures. In this example, the project return on investment was less than 1%, the product never reached the commercialization phase, and the company itself indicated that the project had failed, but the venture could be miscategorized as successful according to sales.

Another issue concerns the discrepancy between project sales and royalties. Specifically, despite BIRD's success with sales, its royalties through 1990 were approximately 8.5 million dollars, only 12.5% of its 70 million dollar investment in projects Exhibits 6.11-6.12). Assuming an average lag of 3-5 years until substantial sales occur and the accrual of royalties begin, the proportion of royalties received is somewhat low.

EXHIBIT 6.11

ROYALTIES FROM BIRD PRODUCT SALES
(BY YEAR ROYALTIES RECEIVED)

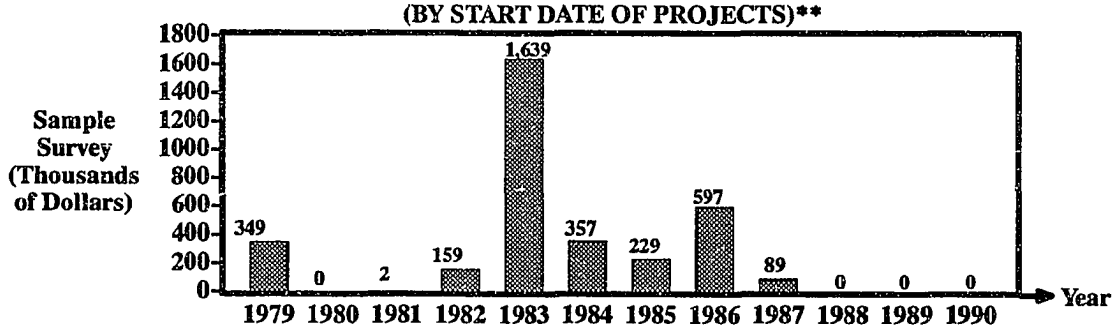


* 1990 Last Quarter estimated

Source: BIRD status report

EXHIBIT 6.12

ROYALTIES FROM SURVEY SAMPLE PROJECTS
(BY START DATE OF PROJECTS)**

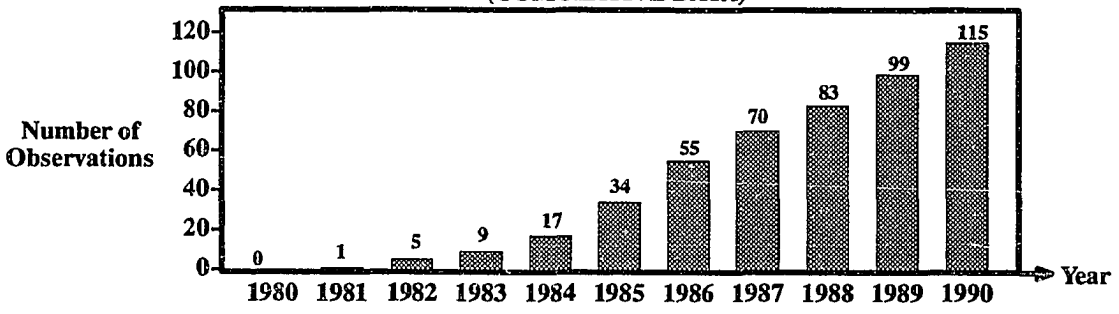


** Excluding royalties received in 1990

Source: Dissertation survey

EXHIBIT 6.13

NUMBER OF PROJECTS WITH SALES IN ALL BIRD POPULATION
(CUMULATIVE DATA)



Source: BIRD status report

There are two possible explanations for relatively low royalties to sales. First, the royalty repayment structure may not ensure the highest potential return on the very successful project (for example, higher than the 150% cap currently imposed by BIRD). Second, the BIRD royalty collection mechanism (while more efficient than that of the IOCS) may have some flaws.

MANAGERIAL STRUCTURE

The current managerial structure of the BIRD Foundation is extremely well regarded by U.S. and Israeli companies. Dr. Mlavsky and the BIRD staff are regarded as highly professional and innovative managers. However, there are several specific concerns about the foundation's future management.

First, by virtue of Dr. Mlavsky's excellence, too much managerial expertise may be concentrated in one individual. While this system works well for BIRD today, it poses risks for BIRD in the future. If Dr. Mlavsky were to leave the foundation it might lose much of its direction and momentum. The gap created by the director's departure might change what is now a coherent and consistent policy of IJV sponsorship to a bureaucratic and politically influenced process.

Second, the foundation has not yet achieved a level of recognizability and networking potential to ensure its continued success in the United States. According to several experts, there is not enough effort by BIRD aimed at convincing U.S. companies to look towards Israel for potential partners. The long-run success rate of BIRD could ultimately suffer if opportunities are missed to attract successful U.S. companies to Israel not because of the companies' lack of interest, but because of their ignorance about the BIRD and its functions.

Third, both U.S. and Israeli firms indicated that their greatest disappointment with the BIRD experience was with their partner (Exhibits 5.38-5.39). Consequently, their greatest lesson was the importance of successfully planning and managing future international partner relationships (Exhibits 5.40-5.41). In addition, problems with the partner's commitment proved to be the most important single deterrent to project success (Exhibits 5.42-5.44). The emphasis placed by companies on partner problems suggests a more active managerial role for the BIRD Foundation in this area.

The Distribution of Grants Among Projects

The BIRD Foundation considers several criteria to be important in its distribution of grants among projects. While several of the objective criteria used by BIRD in project selection-- like the size and experience of the potential partner-- are found to be positively associated with performance in this study, others are not. The foundation does not give any preference to companies based on either their form of ownership or their industry category. Based on the empirical results of this study, the form of ownership appears to influence IJV performance. Specifically, among Israeli companies, common ownership

was negatively correlated with IJV performance once industry, company size, and age were controlled for in the model. The study also suggests an important role for industry type as a predictor of IJV performance. The data point to higher success rates in the software industry, even after controlling for a variety of factors likely to affect performance.

A concern arises, therefore, that BIRD may be choosing to support relatively low value-added projects among common ownership form partnerships that not only fail to bring new companies to Israel, but also appear to be statistically somewhat less successful. In addition, BIRD may do better by sponsoring projects in industries where Israel is more internationally competitive.

DEPLETION OF THE BIRD FOUNDATION'S REAL ENDOWMENT

The BIRD Foundation was financed through an endowment of 110 million dollars. Thirty three million dollars of the initial endowment of 60 million dollars receives interest of 5.5%; the remaining 27 million dollars is indexed to the Israeli currency, and therefore its rate of return fluctuates. The additional 50 million dollars contributed in 1985 receives a fixed rate of 8.5%.

The value of its endowment today, in real terms adjusted for inflation, is 30% less than its real value in 1985. The shrinking endowment poses a concern not only because it represents real dollar losses, but also because over the same period of time the Israeli high-technology sector has nearly doubled in size. In May, 1988, for the first time in its history, BIRD was forced to reject several meritorious proposals because of lack of funds.

One problem with the endowment arises from the fact that a portion of it is linked to LIBOR. Specifically, the endowment is invested in a low-interest low-risk portfolio, a portion of which pays dividends to the foundation at LIBOR less 1/8% for handling. Because this rate fluctuates quite a bit, a portion of the BIRD endowment is affected. The first semiannual dividend, received on May 1, 1985, was at a rate of 11.36%, the second at 9.05%, the third at 8.07%, and the fourth at a little over 7 percent-- a series reflecting a reduction of 38% in the rate returned in just two years.

From 1985 to 1991, while the BIRD endowment lost about 30% of its real value, the IOCS budget increased over 80% in real terms. The relative disadvantage of BIRD in this regard is more troublesome given that Israeli companies indicated a preference for BIRD funding over IOCS funding (Exhibits 6.4-6.5).

OTHER ADMINISTRATIVE CONCERNS

In addition to the more substantive concerns raised above, there are additional administrative flaws to consider.

BIRD staff are subject to a 17% value-added tax by the Israeli government for all business conducted in the United States. This includes essential BIRD responsibilities in the United States such as visiting potential companies, evaluating companies already engaged in a BIRD ventures, and attending meetings of the Board of Governors. This discourages the foundation from conducting its operations effectively. It also reduces the monies available for project financing.

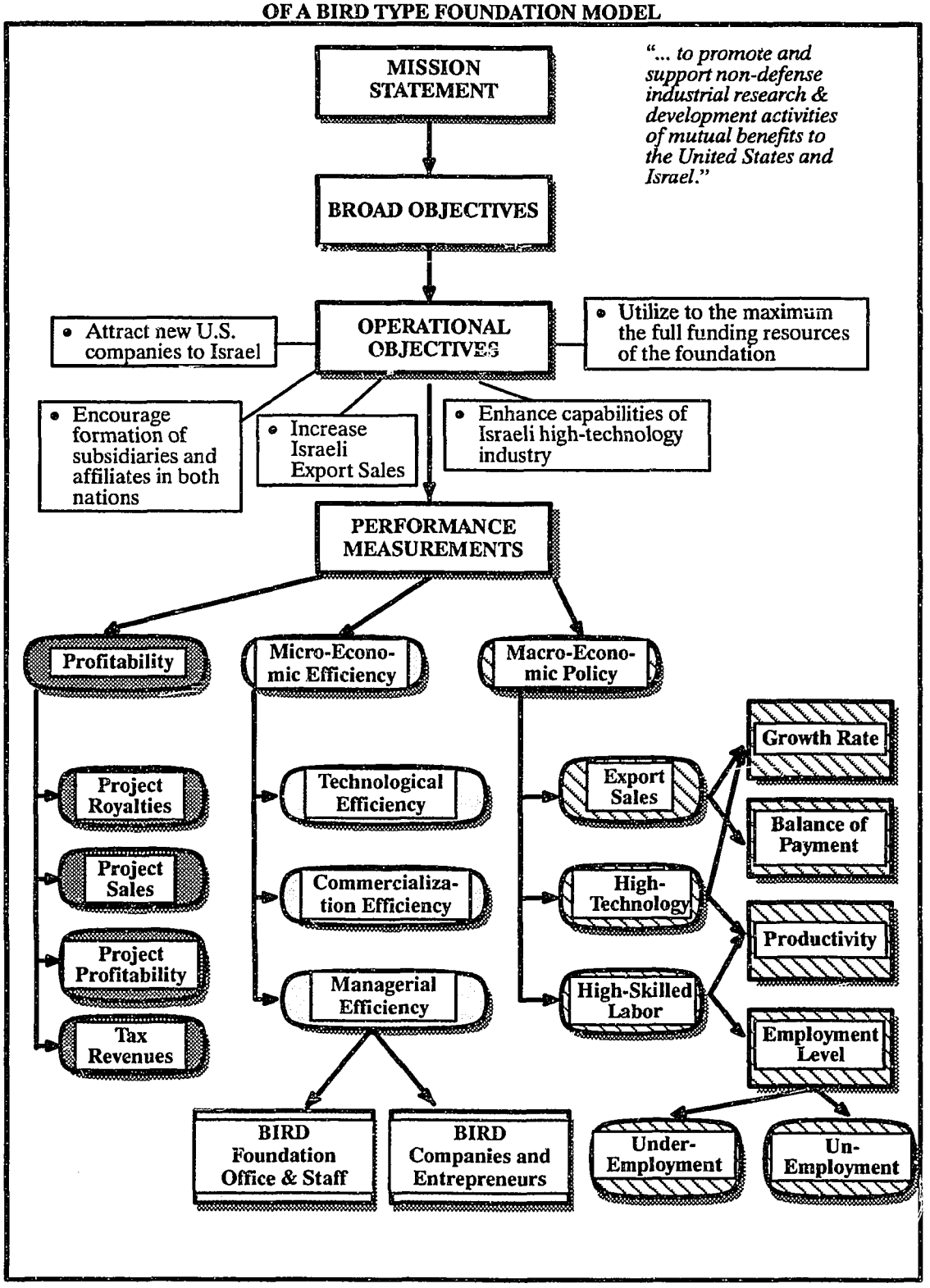
In the interviews conducted as a part of this research, a claim was made that some BIRD companies may have falsified records in order to increase the relative portion of BIRD's investment. Certain companies may be taking advantage of BIRD's trust in order to increase the investment cap from 50 to 80% of their R&D costs. In addition to overestimating R&D expenses, some companies are underreporting sales to avoid paying greater royalties to BIRD.

I. Implications and Recommendations

Despite the success of the BIRD program, there is room for improvement in several areas. In planning for the future and facing new economic trends worldwide, BIRD must attend to several issues that could severely compromise its future growth and success. These issues, detailed above, concern foundation structure, operations, and management.

EXHIBIT 6.14

SUGGESTED FRAMEWORK FOR THE MEASUREMENT OF THE PERFORMANCE OF A BIRD TYPE FOUNDATION MODEL



MEASUREMENTS USED TO EVALUATE BIRD FOUNDATION PERFORMANCE

Exhibit 6.14 offers a preferred model for evaluating the performance of the BIRD Foundation and similar types of models. The criteria used in the chart to evaluate performance are intended to provide a structure for evaluating the foundation's performance. It should be stressed that the relative emphasis placed on each of the performance criteria will most likely differ across countries, and within a given country across time. The point is that the performance measurements of an IJV foundation should extend beyond profitability and economic efficiency to their role in the macro-economic policy. Otherwise, IJV foundations could appear to be performing poorly when overall they are performing well.

Three criteria are central to evaluating performance, namely, profitability, micro-economic efficiency, and support for macro-economic growth and development.

PROFITABILITY

BIRD profitability is to be measured mainly through three quantitative measurements, namely project royalties, project sales, project profitability, and tax revenues received from projects. In regard to royalties, the Foundation should develop a new royalty plan with a goal of increasing the return of grant monies from successful ventures to the foundation. Specifically, companies should pay royalties ranging from 125% to 175% of BIRD's investment, with the percentages for individual companies determined by the risk, length, and anticipated profitability of the project. Payments should be indexed to the annual rate of inflation. High-risk, long-term, and high-profitability projects should pay the maximum royalty rate of 175% to the foundation. Lower risk, shorter term projects should pay discounted royalties on the order of 125 percent. The royalty repayment plan should exhibit sufficient flexibility of a sort that will not deter potential companies from seeking BIRD assistance. One such measure of flexibility would allow the yearly percentage of sales royalties to differ from project to project, ranging from 2% to 6% based on product life cycle and length of R&D. Companies whose product life cycle is relatively long but whose R&D is short (for example, software companies) would pay a smaller percentage of sales royalties relative to those with shorter product life cycles and longer R&D phase.

These recommendations for the restructuring of all royalties should correct the concerns raised above and ensure the highest potential return for BIRD projects.

In regard to project sales, findings of this study point to three recommendations. First, the foundation should consider companies as having sales only if they are sales of final products on a continuous basis, as opposed to by-products arising from discontinued projects. Second, BIRD should credit itself with project sales proportional to the size of its investment relative to the total dollars invested in the project. For example, if the BIRD grant represents 10% of the total investment in the project over time, and the project reports 50 million dollars of sales, then BIRD should credit itself with 5 million dollars of BIRD-related sales. Third, several categories of project sales should be developed in order to assess the status of the venture. These categories should reflect sales as a percentage of total dollars invested per project. One possibility would be to classify project sales in four categories: (i) projects with sales of 10% to 30% of total dollars invested; (ii) 30% to 50%; (iii) 50% to 100%, and; (iv) greater than 100%. Such a scheme would allow a differentiation of project performance by sales.

With regard to project profitability, the foundation should record project profitability in addition to project sales. This practice may encourage companies to emphasize more the profitability of projects in addition to the dollar sales.

Finally, the foundation should report its estimates of total tax revenues generated by BIRD projects and accruing to both U.S. and Israeli governments, in order to demonstrate the high return of government investment in the foundation. Dr. Mlavsky recently indicated that on average, every one dollar of sales in the United States generates municipal, state, and federal taxes in the sum of 19.5 cents. The comparable figure in Israel is 20 cents. Better publicizing these tax receipts might encourage government policy makers to initiate similar projects and increase the funding for existing foundations.

MICRO-ECONOMIC EFFICIENCY

There are three areas of micro-economic efficiency to consider in measuring the performance of the foundation -- *managerial ability, technological development, and commercialization status.*

The foundation should measure managerial efficiency along two dimensions, namely, its own management structure and organization and the management of the IJV by the companies involved. Internally, the foundation should ensure that its human resources and financial activities are directly related to its operational objectives. It must build the appropriate management mechanisms to ease the transition from one director to another. Each director must formalize procedures and policies in writing and train staff to assume key responsibilities within the organization. BIRD's current director is devoting considerable resources to training BIRD staff, delegating responsibilities, and transferring expertise and knowledge in policies and operational procedures to the foundation.

In response to concerns regarding BIRD recognition in the United States, the foundation should expand its activities to include more direct contact with U.S. companies. It should continue to utilize Israeli Economic Attache Offices and U.S.-Israeli Chambers of Commerce located throughout the United States, but should seek more direct means of managing their relationship with U.S. companies. Specifically, if and when the BIRD endowment grows, the foundation should consider operating and staffing an office in the United States.

The BIRD Foundation is helping Israeli companies in far more ways than just providing funds. BIRD is also educating Israeli firms in realigning their thinking towards marketing and special issues related to selling to OECD markets. It is assisting them in developing business plans, finding U.S. partners, and developing products from the research stage through the commercialization stage. Several U.S. and Israeli businessmen have also indicated that they have consulted Dr. Mlavsky for assistance in non-BIRD related projects. The foundation must continue to help companies find ways of better managing themselves.

Given that problems with partner commitment and trust were the most serious problems cited by both Israeli and U.S. companies, the foundation should devote more resources to planning and managing partner relationships. Specifically, the foundation could construct written guidelines and offer seminars on building sound partner relationships; it could also consult with companies regularly on these matters. In addition, the foundation should assist early in the venture to bridge potential differences between partners arising from divergent objectives, expectations, or culture. Finally, where problems lead to a dissolution of the partnership, the foundation should assist in resolving legal and other issues that might prevent a smooth exit from the partnership, and should aid firms in finding new partners to continue the project when desirable.

One of the foundations key activities is to support companies in partner selection. BIRD preferences are for U.S. companies that have 10 to 200 million dollars in sales; are public rather than private; are involved in developing, manufacturing, and marketing their products; have demonstrated long-term growth of between 15% and 30% annually; and are oriented towards the U.S. market and hence able to profit from the bridge that Israel can provide to Europe. Although these characteristics are found in most U.S. companies suitable for joint ventures with Israeli high-technology firms, they do not provide operational guidelines for Israeli companies in their search for the best U.S. partners. This study suggests that Israeli companies should assess the performance of the potential partner on the basis of its financial, marketing, managerial, technological, production, and invisible resources, with particular attention to the partner's characteristics and capabilities as outlined in Exhibit 6.15. Following such a well-defined set of guidelines in partner selection will help both the foundation and the companies to make a more informed partner choice.

EXHIBIT 6.15

GUIDELINES FOR PARTNER SELECTION

- Financial Resources
  - Financial means to invest in current operational needs
  - Financial means to invest in the commercialization phase of a successful technology innovation
  - Financial means to invest in the growth phase of a successful product commercialization
- Marketing Resources
  - General marketing know-how
  - Ability to successfully develop the right product for the right market
  - Knowledge of customer behavior, sales, customer information systems, and market research
  - Access to or control of distribution systems
  - Access to or control of customers
  - Access to supplier-related information and supply resources
- Managerial Resources
  - Ability to control a complex project
  - Basic management skills such as accounting, financial management, information systems, business strategy, and legal
- Technology
  - Technological know-how
  - Testing facilities
  - Technical abilities
- Production
  - Efficient existing production facilities
  - Production know-how
- Invisible Resources
  - Credibility
  - Reputation
  - Ability to capitalize on success.

In order to assess more systematically the *performance of projects*, the foundation should construct categories for project performance similar to those used in this study and based on measurements of the project's technological and commercial achievements. Specifically, this research suggests the adoption of a six-scale model with the categories below (a full description of the suggested model is found in Chapter V, section A):

- Category 0: Insufficient information
- Category 1: Failed both technologically and commercially
- Category 2: Partly succeeded in technological and product development but failed commercially
- Category 3: Succeeded in technological and product development with limited initial sales but probably will fail commercially
- Category 4: Succeeded in technological and product development with successful sales and probably will succeed commercially
- Category 5: Succeeded technologically and commercially

Developing and applying a comprehensive model of this sort to evaluate the status of all BIRD projects may require additional administrative resources, but the cost will be more than balanced by the additional information and control over projects that such a system will provide. Even more notably, the use of this system will help improve future project management and thereby lead to greater success.

Finally, the foundation should continue its efforts to bridge technological developments and marketable projects. The fact that the BIRD Foundation has supported companies in translating technological innovations into successful products (Exhibit 3.3) is a key to its overall success. BIRD's concentration on the commercialization phase of the product life cycle is a unique and distinguishing feature of this model of an IJV foundation.

The Distribution of Grants Among Projects

BIRD should consider several recommendations concerning the distribution of grants.

First, given that industry is a dominant factor in project performance (Exhibits 5.42 and 5.44), the foundation should concentrate on several high-technology sectors where Israeli industries have demonstrated considerable success and have acquired an internationally competitive advantage. In particular, this study has shown a tendency for higher performance in the software industry (Exhibit 5.42), suggesting that BIRD should increase its proportional investment in this industry. BIRD's 1990 Status Report indicates a relative increase in its investment in the software industry. This policy should be adopted formally, and applied as well to other industries in which Israel has proven to be internationally competitive.

Second, the study indicates that projects between companies with common ownership may not have performed as well as projects between companies with no affiliation (Exhibit 5.42 and 5.44). In addition, one of BIRD's principal operational objectives is to attract new U.S. companies to Israel. Consequently, BIRD should consider reducing its relative share of investments in companies with common ownership. The study sample indicated that 35% of all projects were between companies with common ownership (Exhibit 5.25). BIRD should consider reducing and limiting its investments in projects between companies with common ownership to 20% to 25%, according to both relative dollars invested and the relative number of projects. The reduction should be applied chiefly to projects between Israeli firms and their marketing/distribution subsidiaries/affiliates in the United States. The reason is that the relative value added for companies of this sort that participate in a BIRD project (like Scitex, or Tadiran) is questionable. It is of some note that Dr. Ed Mlavsky indicated in May 1991 that BIRD no longer supports joint-ventures between Israeli firms and their U.S. marketing subsidiaries.

Third, BIRD could be more effective overall if it pursued a more flexible policy in supporting projects. Under current policy, the foundation shares a fixed percentage of 45% to 50% of the total investment up to the beta site phase in every project. Instead, BIRD should provide funding both according to specific characteristics of the project (for example industry, start-up versus established firm, small versus large firms, common-ownership versus no affiliation) according to the project phase and progress. In some cases, for example, BIRD could provide effective support by sharing 20% to 25% of the investment. In other cases, such as start-ups, it may be more reasonable for BIRD to assume a level of support of up to 70 percent. In addition, it is recommended that BIRD increase its investment in a particular project over time and according to the venture's progress. This change could spread risk by increasing the number of ventures, provide an incentive for companies to shorten the R&D time and to excel, and provide the management of BIRD with flexibility in distributing the grants.

Fourth, even when controlling for other factors, the study does not find any significant difference between mini- and full-scale projects. It is somewhat troubling that none of the

seventy-four full-scale projects that made up this study were extensions of ventures that had been initiated as mini-scale projects. BIRD should encourage the transition of mini to full-scale projects. This could increase the overall success rate of BIRD projects by compelling companies to plan for the long term and be deterring them from investing in a mini-scale project that has a relative low probability of success.

Fifth, given that the Israeli economy does not encourage free enterprise, the private sector, and small entrepreneurial firms, and that the private sector is nonetheless important to the development and growth of high technology firms, BIRD should devote greater resources to small businesses and start-up firms.

Other Administrative Practices

Several additional miscellaneous suggestions are made. First, the various recommendations put forward in this study may require additional financial and non-financial resources. BIRD should not divert monies currently earmarked for grants to companies as a means of providing the additional funding. Instead, BIRD should finance management changes and research through additional external funds from the government and research institutions, and should better utilize the highly qualified human resources in Israeli and U.S. universities.

Another issue concerns the timing of the foundations' Board of Directors meetings. The foundation's Board of Directors meets biannually to approve the executive decisions to grant monies to partnerships. Several company executives indicated their desire to shorten the approval time process and suggested that the foundation's Board of Directors meet three rather than two times a year.

An additional recommendation concerns the BIRD's grant distribution process. Specifically, there is a sense among company participants that BIRD's management often reaches a decision on the projects proposed to them before companies have developed a full-scale business plan. The BIRD Foundation Board of Directors may be more of a "rubber stamp" than the real decision-making body. This process of informally approving projects should be changed, and the Board of Directors should have more involvement in

the screening mechanism. If the final project selection were to occur only after companies submitted a formal business plan, companies would be encouraged to compete more aggressively for BIRD grants. The BIRD Foundation is losing an opportunity to educate Israeli companies about the importance of having a comprehensive business plan, and to instruct companies how to write them. In addition, it is losing an opportunity to promote constructive competition among Israeli companies within a specific industry. Companies could gain the experience of writing a formal business plan and, in this way, better control the initiation and operation of joint projects.

The BIRD project selection process raises concerns of a somewhat different sort. Such a process may expose the BIRD Foundation staff to pressure and possible manipulation from Israeli companies in the future. Finally, a relatively informal process of selection relies on the expertise of a single individual. A strong director with Dr. Mlavsky's capabilities may be able to work effectively in the current system, but his successor may not.

Macro-Economic Policy

The impact of the BIRD Foundation on the macroeconomy is the final area to evaluate in assessing the overall performance of the foundation. Specifically, the BIRD Foundation can affect the Israeli economy through its influence on export sales, the growth of the high-technology sector, and the contribution it makes to producing highly skilled labor and increasing its representation in the Israeli workforce.

By enhancing export sales, the foundation can increase the rate of real output growth in the Israeli economy, thereby stimulating overall product demand. In addition, export sales growth will help the Israeli balance of payments. Balance of payments improvements will help to keep real interest rates down and will help to check the rate of price increases.

By promoting the high-technology sector, the foundation helps to increase the overall rate of productivity growth in the Israeli economy, thereby permitting labor markets to support higher nominal wage growth without additional strains on employer's cost. Given

a fixed rate of nominal wage growth, enhanced productivity growth can allow for more jobs at the same overall cost to employers.

Finally, the addition of large numbers of highly skilled workers in the Israeli economy enhances labor productivity, creates new job opportunities, and alleviates the strain of underemployment in the highly skilled sector.

Depletion of the Foundation's Endowment

Several steps should be taken to increase the monies available for the foundation.

First, the Israeli and the U.S. governments must increase the foundation's endowment. In lieu of a onetime increase which may be politically unfeasible, the foundation could request a gradual phase-in of the increase over several years.

Second, at 100 million dollars, the current IOCS budget is ten times the operating budget of the BIRD Foundation. Israeli companies, according to the results of this research, value the BIRD Foundation significantly more than they value the IOCS. In addition, because both offices share somewhat similar objectives, and because Israeli industry need to be more export-oriented, the IOCS might transfer 3% to 5% of its budget to BIRD's endowment annually over a 5 to 10 year period. The amount of the IOCS-BIRD transfer would be matched with a contribution of equal size by the U.S. government over the same period. A 3% transfer over a 5-year period would imply an increase in the endowment of about 28 percent-- an amount that will bring the endowment roughly to its 1985 value in real terms.

Third, the link between BIRD's endowment and LIBOR is placing an unnecessary constraint on the rate of growth and the predictability of BIRD's primary income. BIRD's mission would be better served by greater flexibility in the management and composition of its endowment portfolio.

Fourth, BIRD should consider selling "BIRD Bonds" in the United States and Israeli fixed-income markets. "BIRD Bonds" may prove attractive to investors who wish to demonstrate their commitment to the state of Israel, especially if the bonds will serve to aid both the United States and Israel. Although BIRD is not yet prepared for such

activity, it should consider this possibility in the future, as would a private company that was preparing to go public.

Summary

In sum, this study provides the BIRD Foundation with several recommendations for improving its overall performance in the areas of profitability, microeconomic efficiency, and macroeconomic functions. Although several of the suggestions may be relatively easy to implement in the short term, others require additional resources, research, and planning.

CHAPTER VII: CONCLUSIONS

The major conclusions of this research can be categorized according to their effect on the decisions of companies-- the micro level-- and on policy issues-- the macro level.

A. Implications and Recommendations: Micro-Level

Design and Management of International Joint-Ventures

Companies should have clear objectives, performance measurements, and market definition in designing an IJV. Objectives and performance measures should be sufficiently flexible to fit the firm's strategy in both the short and long run, because strategies may change. Each of the partners in an IJV should play an active role in defining the relevant market because of the importance of market definition during all stages of the product life cycle. Partners not involved in this function may be unable to adapt appropriately and in a timely way to changes that occur in their market environment.

Factors influencing the performance of International Joint-Ventures

This dissertation presents several conclusions regarding the performance of IJVs.

Building commitment in the partnership contributes significantly to the project's likelihood of success, even after controlling for the type of industry, form of ownership, age, size, and goals of the companies. For this reason, companies should choose partners carefully and build good relations with the partner firm on an ongoing basis. Those companies that used the existence of a previous relationship as a criterion in partner selection generally met with poor results. Firms should devote more resources to choosing the right partner, building commitment, and better managing the partner relationship.

Larger Israeli companies, with greater numbers of employees and revenues, performed somewhat better in IJVs than did their smaller counterparts, even after controlling for the age and ownership-form of the firm. The statistical significance of this effect is not independent of industry, suggesting that larger firms are found in industries in which projects are relatively successful. The superior performance of projects in larger firms may be a function of the greater physical and human resources with which they are endowed, or of their location in sectors in which Israel has a relative competitive advantage.

IJVs were less likely to succeed when technological development was a dominant motive in forming the partnership. The IJV was also less likely to succeed when companies indicated that creating new jobs was an important objective. IJV success depends most critically on the commercialization of innovations, and companies should emphasize commercialization in the objectives, design, and operation of the IJV through all phases of the project life cycle.

Finally, this research suggests that common ownership may lead to less successful Israeli-U.S. partnerships, even after controlling for industry, size, age, and goals of the project.

International Joint-Ventures between Developed and Less Developed Countries

IJVs between DCs and LDCs should be complementary in nature. DC firms can provide LDCs and NICs with better access to markets, marketing know-how, management expertise, financial capital, and other resources that may be scarce in LDCs and NICs. The LDC and NIC firms can provide the DC firm with entry into their market, access to low-cost R&D, and technological innovation. The advantages of IJVs that are complementary in nature are confirmed by the success of BIRD-sponsored projects between U.S. and Israeli companies.

This research shows that DC and NIC firms have somewhat different objectives and standards of performance for the IJV. Companies in DCs have somewhat higher expectations for the IJV and define success more in terms of profit, return on investment, or other financial benefits. By contrast, companies in LDCs are often more content with the successful development of the product and some new product sales.

B. Implications and Recommendations: Macro-Level

BIRD Foundation Objectives and Performance

This dissertation documents the success of the BIRD Foundation in achieving its objectives-- attracting new U.S. companies to Israel, encouraging U.S. and Israeli firms to expand operations in the partner country, increasing high-value-added exports, and enhancing the capabilities of the Israeli high-technology industry.

The foundation achieves its objectives in numerous ways. It provides assistance to Israeli firms in developing business plans and finding suitable partners. It conducts an ongoing review of projects that forces companies to assess their own progress on a regular basis and to adjust operations if necessary, and encourages companies with sales to repay royalties. The BIRD Foundation concentrates its resources on the phase between technological innovation and product commercialization. This is a unique feature of the foundation and it contributes to the foundation's success in transferring technological innovation to successful products.

The BIRD Foundation has a unique relationship with key U.S. and Israeli governmental agencies. Specifically, although it relies on the Israeli Chief Scientist Office and the U.S. National Institute of Standards and Technology for detailed technological feasibility studies of potential joint projects, it has autonomy in its operations and is not constrained by governmental bureaucracy.

This research shows that Israeli companies participating in a BIRD project enhanced their overall business ability. First, the requirement that the companies submit a business plan help them to develop and implement their projects more successfully. Second, the U.S. partner exposed Israeli firms to more sophisticated business practices. Third, BIRD exposure enhanced the firm's marketing ability. Fourth, the BIRD experience improved the partner firms' abilities to manage the current relationship and any future relationship with a foreign partner.

Despite its success, the foundation would benefit by adapting its structure, operations, and management according to the following recommendations:

- developing a more comprehensive framework for measuring its own performance based on profitability (measured by project royalties, sales, profitability, and tax revenues), microeconomic efficiency (technological, commercial, and managerial), and macroeconomic policy effectiveness (by enhancing export sales, the high-technology sector, and the skills of the workforce: Exhibit 6.14);

- providing better guidance to companies in their partner selection (the guidance would take the form of recommendations urging, among other things, that

companies seek information on the financial, marketing, managerial, technological, production, and invisible resources of the potential partner);

- constructing categories for evaluating project performance similar to those suggested in this dissertation;
- assisting companies at an early phase in the project life cycle to bridge differences with the partner arising from divergent objectives, expectations, and/or culture;
- promoting high-technology IJVs in sectors where Israeli industries have demonstrated relative competitive advantage;
- emphasizing the funding of IJVs between companies with no common ownership;
- devoting greater resources to small businesses and start-ups;
- widening the range of investment in projects from the current spread of 45% to 50% of total project costs to 25% to 70%, and adjusting its share over time according to the progress of the project;
- defining project sales on a final product basis and crediting BIRD-related sales proportional to their investment.

C. International Joint-Venture Foundations as a Strategy for Economic Development and Entrepreneurship

This research suggests that a BIRD-type model can be applied successfully in other settings. Promoting foundations like the BIRD would increase economic, cultural, and technological cooperation among nations to the benefit of the economies involved in the new alliance. By facilitating the transfer of resources between countries, a foundation of this sort promotes learning at the firm, industry, and national levels.

BIRD-type foundation support is complementary to direct foreign aid; in some cases, it represents a more suitable form of assistance. The majority of direct foreign aid goes to the government and government-supported infrastructure and perpetuates the inefficient distribution of resources. BIRD-type foundation support is directed primarily to the private sector, thereby avoiding local government inefficiencies. It creates mechanisms for

organizational learning and a transfer of knowledge that last well beyond the dissolution of the IJV. In addition, by encouraging IJVs between companies and entrepreneurs, BIRD-type foundations facilitate interpersonal relations that help in overcoming cultural and political barriers.

IJV foundations can help NICs by providing financial support, conducting technical and marketing evaluations of new products and ventures, encouraging the use of market-driven research and development, networking, helping companies to locate suitable partner firms, and instructing companies to develop comprehensive business plans. An IJV foundation can affect the economy through its influence on export sales, the growth of the high-technology sector, and the contribution it makes to producing highly skilled labor.

A critical factor in the success of BIRD type foundations is the endowment. An endowment ensures that the foundation will be financially stable over the long term for several reasons-- it protects the foundation from governmental intervention, it encourages long term planning, it permits management to support companies in planning and operations, and it ensures that committed funding is received by companies in a timely way.

Promoting Entrepreneurship and Small Business Development

Foundations similar to BIRD can help nations overcome barriers to entrepreneurship and small business development. Specifically, by providing technical assistance as well as financial support, foundations of this sort provide entrepreneurs with a viable concept and transfer to them market, management, and business knowledge. In addition, such foundations can provide entrepreneurs with legal assistance and capital to support their initiatives. In directing resources from the public to the private sector, BIRD-type foundations promote product market competition. Entrepreneurship and small business development are of critical importance to the growth and productivity of an economy-- it add new products, services, skills, and jobs, and provide a competitive spur to existing companies.

D. Limitations of the Research

This dissertation provides direct information about the BIRD Foundation and Israeli and U.S. high-technology firms participating in IJVs. Although most of the results are generalizable to foundations of a similar type, and to IJVs between DCs, NICs, or LDCs, some are not. Indeed, a country's unique social, cultural, and political norms influence its adaptability and performance in the IJV. It is conceivable that specific factors important to the performance of either the BIRD Foundation or U.S.-Israeli IJVs will have different effects in other settings.

Several unique features the U.S-Israeli relationship limit the applicability of these findings to other settings. First, the Jewish community in the United States attaches a great deal of importance to Israel. Many Jewish people are eager to do business with Israel and to support its economic infrastructure. Second, there is a strong strategic alliance between Israel and the United States that provides political stability between the two countries and encourages companies to engage in joint business activities. Third, although Israel is not a developed country, it has a fairly sophisticated human capital infrastructure and a large base of highly skilled workers. Fourth, Israeli firms are known for their technological innovation and relatively low-cost research and development. Finally, Israeli citizens have a good command of the English language and are more western in their culture than are the citizens of other developing countries, or newly industrialized.

E. Recommendations for Future Research

Extension of the Empirical Study

The analysis of BIRD Foundation-supported IJVs between Israeli and U.S. companies conducted in this dissertation suggests several areas for future research. An investigations of IJVs between Israeli and U.S. companies not supported by the BIRD foundation.

In addition to the 110 BIRD Foundation-supported IJVs between Israeli and U.S. firms studied in this research, a comprehensive analysis of non-BIRD-supported IJVs may be warranted. An analysis of this sort would permit a direct comparison of BIRD-and

non-BIRD-supported IJVs that could highlight additional features unique to the foundation. In addition, the new data might further clarify those characteristics of companies that attract foundation-type support. Finally, it would add to our knowledge the specific needs of companies seeking IJVs.

A Comparison of BIRD to Venture Capital Firms

Venture capital firms use their expertise and experience to invest in companies with high-growth potential and to help companies better manage themselves so as to realize this potential. In theory, the investment decisions of a venture capital firm should be similar to those of a foundation like BIRD, and comparing the two should yield potentially important insights into the strengths and weaknesses of the foundation's selection and management process.

A comparison of BIRD to the program for the advancement of commercial technology (PACT)

A detailed analysis of the PACT program-- a BIRD-type IJV between India and the United States-- should be conducted. In addition, a comparative analysis of the BIRD Foundation and the PACT program is suggested. This would provide information about BIRD-type foundations and their impact when applied to different types of partnerships-- in this case, between a developed and a less developed country.

A Study of Economic Support Mechanisms Used by Other Organizations

One key objective of this study was to evaluate the BIRD model as a mechanism for supporting economic development and growth. The BIRD Foundation should be compared to organizations whose stated goals are similar to its own in this regard. A partial list of organizations might include U.S. AID, the World Bank, the International Monetary Fund, and the PACT. Given the diversity of these organizations in terms of scale and mandate, several key factors should be highlighted in the comparison:

- binational versus multinational cooperation within a project
- financial resources devoted to the project
- detailed objectives of the project
- degree of agency or foundation control of the project
- performance of recipients of agency or foundation support
- staffing requirements such as location, budget, and size
- legal status of the project
- relative roles of the United States and other governments in the project
- criteria for targeting recipients of support
- methods of intervention used by the agency or foundation
- nonfinancial support offered by the agency or foundation.

Comparing the various organizations according to the above criteria would yield potentially useful information about the advantages and disadvantages of different organizational designs in the promotion of LDCs, entrepreneurship, and small business development. It would help BIRD and similar foundations to identify the most effective design strategy in promoting IJVs.

APPENDIX A.1

Confidential Survey

Israeli Companies

The Israel-U.S. Binational Industrial Research & Development Foundation: A Case Study in the Promotion of International Partnerships

Conducted by:
Lior E. Yahalomi
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This survey will be the basis of Lior Yahalomi's doctoral dissertation in Managerial Science and Applied Economics at The Wharton School of The University of Pennsylvania

Directions:

The intent of this survey is to gather your views and impressions of the Binational Industrial Research & Development Foundation (BIRD) program. Please check only one response for each question unless otherwise indicated. Your comments are encouraged (in English or Hebrew) in the places indicated or at the end of the questionnaire. This questionnaire should be completed if your company was directly involved in the BIRD project, by the Chief Executive, Chief R&D, Chief Financial, or Bird Project Manager.

The information will be used in aggregate and individual firms will not be identified in the project reporting.. The information will not be transferred to BIRD or to any one else. Completed questionnaires should be returned to the Wharton School in the enclosed self-addressed envelope. The final report summarizing the conclusions of this survey will be sent to you upon request at its completion. Please, feel free to contact us with any questions you may have.

Thank you very much for your cooperation and time!

Israeli Companies

PART I: INFORMATION REGARDING THE INTERNATIONAL PARTNERSHIP

INSTRUCTIONS:
This section is intended for one partnership only. If your company entered more than one project with BIRD, please complete a separate Part I for each project.

Please note that BIRD "Project" or "Partnership" refers to your joint-project supported by BIRD.

Please approximate when an exact answer to a question is not available. Your rough estimate is of more value to us than an incomplete answer.

Please Indicate:
____ **Full-Scale Project**
____ **Mini-Scale Project**(up to $150K)

BIRD Project General Information

1. Your company's name (Israel) _____
2. Partner's name (U.S) _____
3. Partner's primary business activity _____
4. Title of BIRD project _____
5. Primary activity of partnership _____
6. Date BIRD project initiated _____

	1st Year(a)	2nd(b)	3rd(c)
7. Your company equivalent number of full time employees working for this particular BIRD project.	_____	_____	_____
8. Partner equivalent number of full time employees working for the BIRD project.	_____	_____	_____
9. Other (external) people working for this particular project.	_____	_____	_____

10. Did BIRD ever rejected your company's request for a grant? __ Yes __ No

10a. If Yes: Year requested ____ Reason for rejection _____

11. Total dollars invested in this particular project funded by BIRD? $_____

12. Actual percentage contribution (100% total) Israeli partner_____% U.S. partner_____% BIRD _____%

13. Accumulated sales of BIRD product $_____ From(date) _____ To _____
(If sold as part of a system, please isolate and approximate only the BIRD part)

13.a. Accumulated sales of the system/s of which BIRD product is a part $_____

14. Total projected sales of BIRD product (including sales to date) $_____

15. Accumulated profits from BIRD products. $_____

16. Please indicate any common ownership between your company and your partner's company:
___ a. No common ownership.
___ Yes common ownership. Please indicate here.....b.___ Israeli company is a subsidiary of U.S. partner.
c.___ U.S. partner is a subsidiary of Israeli company.
d.___ Other. Please explain: _____

17. Who initiated the contact between you and your partner:
___ a. Israeli Company ___ c. BIRD
___ b. U.S. Company ___ d. Other_____

18. Which company made the following initial non-cash contributions to the partnership:

	Israeli Partner(1)	U.S. Partner(2)	Both(3)
a. The Entrepreneurial Idea	____	____	____
b. Innovation of Technology	____	____	____
c. Marketing	____	____	____
d. Business Plan Preparation	____	____	____
e. Other _____	____	____	____

19. WHAT INFLUENCE did each of the following factors have on your firm's decision to develop and commercialize a product with a U.S. company partner:
(Please answer even if there exists common ownership between the companies involved in the partnership.)

Rate the extent of influence of each factor from 1 (No influence) to 5 (Large Influence).	No Influence		Some Influence		Large Influence
a. Having access to financial sources from partner.	1	2	3	4	5
b. Sharing risk of the project.	1	2	3	4	5
c. Obtaining technological know-how.	1	2	3	4	5
d. Accessing new channels of distribution/customers.	1	2	3	4	5
e. Attaining/Increasing cost efficiency through joint production or joint R&D.	1	2	3	4	5
f. Saving time in R&D phase by pooling resources with partner.	1	2	3	4	5
g. Availability of financial support from BIRD.	1	2	3	4	5
h. Availability of non-financial support from BIRD.	1	2	3	4	5

Please specify and rate important factors not mentioned above.

i. _____	1	2	3	4	5
j. _____	1	2	3	4	5

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

20. Please indicate who performs the following functions for the partnership:

	Israeli Company Solely (1)	Israeli Company Mainly (2)	Shared (3)	U.S Company Mainly (4)	U.S. Company Solely (5)	Not Relevant (6)
a. Market definition	____	____	____	____	____	____
b. Product definition	____	____	____	____	____	____
c. Product specification	____	____	____	____	____	____
d. R & D	____	____	____	____	____	____
e. Marketing	____	____	____	____	____	____
f. Distribution/Sales	____	____	____	____	____	____
g. Manufacturing	____	____	____	____	____	____
h. Other _____	____	____	____	____	____	____

21. How IMPORTANT were the following factors in SELECTING your partner:
(If there exists common ownership between the companies, please answer as if you were/are looking for a partner in the U.S.)

	Not at All Important		Somewhat Important		Extremely Important	Not Relevant
a. Technological know-how of partner.	1	2	3	4	5	0
b. Marketing know-how of partner.	1	2	3	4	5	0
c. Channels of distribution of partner.	1	2	3	4	5	0
d. Access to customers through partner.	1	2	3	4	5	0
e. Willingness and ability of partner to finance the project.	1	2	3	4	5	0
f. Managerial expertise of partner.	1	2	3	4	5	0
g. Firm size of partner.	1	2	3	4	5	0
h. Willingness of partner to participate equally in the project decision making process.	1	2	3	4	5	0
i. Previous relationship with an individual in partner firm.	1	2	3	4	5	0
j. Previous relationship with partner firm in general.	1	2	3	4	5	0
k. Similarity of business practices and philosophies with partner.	1	2	3	4	5	0
l. Owner/manager of U.S. partner firm being Jewish.	1	2	3	4	5	0
Please specify and rate any factors not mentioned above.						
m. _____	1	2	3	4	5	0
n. _____	1	2	3	4	5	0

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

In questions 22 to 25, please indicate your company preference in selecting a partner in the U.S.

22. __ a. Privately Owned __ b. Publicly Owned __ c. No preference

---

23. __ a. Managed by founders __ b. Managed not by founders __ c. No preference

---

24. __ a. Export oriented __ b. Oriented towards the U.S. market __ c. No preference

---

25. __ a. Sales up to $1M __ b. $1M-$10M __.e. No preference
__ c. $10M-$100M __ d. >$100M

26. Specify the seriousness of any DISAGREEMENTS that occurred or PROBLEMS that arose with your partner over the following issues.

Then, answer whether they were resolved or not.

	Never	Not Serious				Very Serious	Resolved Yes	Resolved No
a. Contractual responsibilities.	0	1	2	3	4	5	__	__
b. Capital expenditures.	0	1	2	3	4	5	__	__
c. Product development.	0	1	2	3	4	5	__	__
d. Marketing strategy.	0	1	2	3	4	5	__	__
e. Management control.	0	1	2	3	4	5	__	__
f. Production planning.	0	1	2	3	4	5	__	__
g. Pricing.	0	1	2	3	4	5	__	__
h. Personal communication problems.	0	1	2	3	4	5	__	__
i. Cultural problems (conflict of values, moral codes, habits, language, other).	0	1	2	3	4	5	__	__
j. Deterioration of trust.	0	1	2	3	4	5	__	__
k. Lack of autonomy/independence in the project.	0	1	2	3	4	5	__	__
l. Ability of partner firm to deliver agreed upon share.	0	1	2	3	4	5	__	__
m. Overall commitment of partner to the project.	0	1	2	3	4	5	__	__
n. Competitive conflicts between your firm and the partner.	0	1	2	3	4	5	__	__
o. Misuse of know-how developed in the project by partner.	0	1	2	3	4	5	__	__

Please specify and rate important factors not mentioned above.

p. _____	1	2	3	4	5	__	__
q. _____	1	2	3	4	5	__	__

27. Rate the IMPORTANCE of each GOAL in your decision to embark on (start) this project.

	Not at All Important		Somewhat Important		Extremely Important	Not Relevant
a. Growth in company sales.	1	2	3	4	5	0
b. Growth of company export sales.	1	2	3	4	5	0
c. Return on investment/profit.	1	2	3	4	5	0
d. Growth of market share.	1	2	3	4	5	0
e. Access to new/foreign markets.	1	2	3	4	5	0
f. Technological innovation.	1	2	3	4	5	0
g. Job creation.	1	2	3	4	5	0
h. Production efficiency.	1	2	3	4	5	0
i. Acquisition of management expertise.	1	2	3	4	5	0
j. Increasing available capital.	1	2	3	4	5	0

Please specify and rate important factors not mentioned above.

k. _____	1	2	3	4	5	
l. _____	1	2	3	4	5	

28. Please indicate your SATISFACTION with listed factors in your particular project funded by BIRD (performance of project relative to initial goals):

	Not at All Satisfied		Somewhat Satisfied		Extremely Satisfied	Not Relevant
a. Completion/Advancement of product development.	1	2	3	4	5	0
b. Having sales of the product.	1	2	3	4	5	0
c. Growth in company sales.	1	2	3	4	5	0
d. Growth of company export sales.	1	2	3	4	5	0
e. Return on investment/profit.	1	2	3	4	5	0
f. Growth of market share.	1	2	3	4	5	0
g. Access to new/foreign markets.	1	2	3	4	5	0
h. Technological innovation.	1	2	3	4	5	0
i. Job creation.	1	2	3	4	5	0
j. Production efficiency.	1	2	3	4	5	0
k. Acquisition of management expertise.	1	2	3	4	5	0
l. Increasing available capital.	1	2	3	4	5	0

Please specify and rate important factors not mentioned above.

m. _____	1	2	3	4	5	
n. _____	1	2	3	4	5	

29. **As a result of your experience with this particular partnership, HOW LIKELY are the following:**

	Less Likely		No Effect		More Likely	Not Relevant
a. Additional partnership with same partner not supported by BIRD.	1	2	3	4	5	0
b. Additional partnership with same partner supported by BIRD.	1	2	3	4	5	0
c. Alternative type of business partnership with same partner.	1	2	3	4	5	0
d. U.S. firm establishing a subsidiary in Israel.	1	2	3	4	5	0
e. Israeli firm establishing a subsidiary in the U.S.	1	2	3	4	5	0
f. Mini-Project (up to $150K) with a new partner supported by BIRD.	1	2	3	4	5	0
g. Full-Project with a new partner supported by BIRD.	1	2	3	4	5	0
h. **(for Mini-Scale Projects only)** This particular Mini-Scale Project will lead to a Full-Scale Project.	1	2	3	4	5	0
i. Other _____	1	2	3	4	5	

30. What has been the single greatest achievement of this partnership/project?

_____

_____

31. What has been the single greatest disappointment of this partnership/project?

_____

_____

32. What did you learn most from the experience of this partnership/project?

_____

_____

33. How long did the R&D phase last (or do you anticipate it lasting if not completed) in this project? _____ (months).

34. What is the job-title of the person in your company with primary responsibility for the project? _____

35. Please indicate the status of the partnership/project:

___ a. Partnership is in effect with initial agreement substantially unchanged.

___ b. Partnership is in effect with new terms since formation.

___ c. Partnership no longer exists.

___ Project(venture) was acquired by: __ d. Our company
__ e. Partner company
__ f. Third company

___ g. Other _____.

PART II: INFORMATION REGARDING THE BIRD-FOUNDATION

(Please refer to your experience with BIRD in general)

1. The BIRD-Foundation helped the partnership in the following ways :

	Strongly Disagree		Somewhat Agree		Strongly Agree	Not Relevant
a. Without the the BIRD grant my firm would not have implemented the project.	1	2	3	4	5	0
b. In developing the business plan.	1	2	3	4	5	0
c. In analysis of technological feasibility.	1	2	3	4	5	0
d. In analysis of marketing feasibility.	1	2	3	4	5	0
e. In analysis of financial feasibility.	1	2	3	4	5	0
f. In analysis of overall feasibility.	1	2	3	4	5	0
g. In locating a partner for the project in the U.S.	1	2	3	4	5	0
h. In helping formulate conditions of agreement between the companies.	1	2	3	4	5	0
i. In helping to resolve problems that arise during execution of the project.	1	2	3	4	5	0
j. In comments regarding technological development of the product/process.	1	2	3	4	5	0
k. In comments regarding marketing strategy of the product/process.	1	2	3	4	5	0
l. In locating new distribution systems (or customers) for the product/process.	1	2	3	4	5	0
m. In obtaining financial support from resources other than BIRD.	1	2	3	4	5	0
n. In understanding the business culture in the U.S.	1	2	3	4	5	0
o. By adding credibility to the project.	1	2	3	4	5	0
p. Through U.S. Governmental support and added credibility, especially through the National Institute of Science and Technology (former National Bureau of Standards).	1	2	3	4	5	0
q. Through Israeli Governmental support and added credibility, especially through the Israeli Office of the Chief Scientist.	1	2	3	4	5	0

Please specify and rate additional factors not mentioned above.

r. _____	1	2	3	4	5
_____					

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

2. How did you hear of BIRD:

___ a. BIRD publications & press. ___ d. Business Associates.
___ b. Israeli Government Authorities. ___ e. Don't know/Don't remember.
___ c. U.S. Government Authorities. ___ f. Other _____.

3. Please indicate your SATISFACTON on the following as a result of working with BIRD:

	Extremely Dissatisfied		Somewhat Satisfied		Extremely Satisfied	Not Relevant
a. Application cost (Business Plan preparation & other).	1	2	3	4	5	0
b. Total available grant.	1	2	3	4	5	0
c. Grant percentage as part of the project.	1	2	3	4	5	0
d. Approval/rejection process time.	1	2	3	4	5	0
e. Flexibility in use of grant.	1	2	3	4	5	0
f. Level of bureaucracy.	1	2	3	4	5	0
g. Percentage of sales royalties.	1	2	3	4	5	0
h. Dr. Ed Mlavsky, the Executive Director.	1	2	3	4	5	0
i. Foundation Staff.	1	2	3	4	5	0
j. Professional evaluation of business plan.	1	2	3	4	5	0
k. Fairness in project selection.	1	2	3	4	5	0
l. Technological support.	1	2	3	4	5	0
m. Marketing support.	1	2	3	4	5	0
n. BIRD performance overall.	1	2	3	4	5	0
Please specify and rate any additional factors not mentioned above.						
o. _____	1	2	3	4	5	
p. _____	1	2	3	4	5	

3.a. Please indicate your (dis)agreement with the following statements:

	Strongly Disagree		Somewhat Agree		Strongly Agree	Not Relevant
a. Without the BIRD grant my firm would not have implemented the project.	1	2	3	4	5	0
b. Without the BIRD grant my firm would have implemented the project but not with a U.S firm partner.	1	2	3	4	5	0
c. If BIRD had provided more money we would have higher success in this particular project.	1	2	3	4	5	0
d. Without the BIRD grant we would not be implementing now any business with the U.S.	1	2	3	4	5	0
e. **(for Full-Scale Projects only)** The Full-Scale project was a lead from a Mini-Scale Project with BIRD.	1	<----------		---------->	5	0

4. If you personally could make one change in (or make one suggestion to) BIRD policies or procedures, what would it be?

_____

_____

_____

5. **Please indicate your SATISFACTON with the following factors as a result of working with the Israeli Office of Chief Scientist (IOCS):**
(Please answer only if your company or you had direct experience working with the IOCS).

	Extremely Dissatisfied		Somewhat Satisfied		Extremely Satisfied	Not Relevant
a. Application cost (Business Plan Preparation & other).	1	2	3	4	5	0
b. Total available grant.	1	2	3	4	5	0
c. Grant percentage as part of project.	1	2	3	4	5	0
d. Approval/rejection process time.	1	2	3	4	5	0
e. Flexibility in use of grant.	1	2	3	4	5	0
f. Level of bureaucracy.	1	2	3	4	5	0
g. Percentage of sales royalties.	1	2	3	4	5	0
h. Mr. Yigal Erlich, the Chief Scientist.	1	2	3	4	5	0
i. IOCS Staff.	1	2	3	4	5	0
j. Professional evaluation of business plan.	1	2	3	4	5	0
k. Fairness in project selection.	1	2	3	4	5	0
l. Technological support.	1	2	3	4	5	0
m. Marketing support.	1	2	3	4	5	0
n. IOCS performance overall.	1	2	3	4	5	0
Please specify and rate any additional factors not mentioned above.						
o. _____	1	2	3	4	5	
p. _____	1	2	3	4	5	

6. Based on your experience, what could the BIRD-Foundation learn most from the (IOCS) ?

_____

_____

7. Based on your experience, what could the IOCS learn most from BIRD?

_____

_____

8. Please summarize below your experience working with the BIRD Foundation.

Thank you for completing part I & II. Please comment on your experience with international partnerships/joint-ventures, the BIRD Foundation, R&D and Commercialization arrangements, or other below. If necessary, attach additional pages.

PART III: COMPANY GENERAL INFORMATION

1. Company name _____

2. Year company founded _____

3. Primary (major) business activity of company _____

4. Current number of employees by type of job:

a. R&D/Engineering/Design	_____
b. Management	_____
c. Administration	_____
d. Marketing/Sales	_____
e. Production/Maintenance	_____
f. Finance/Accounting	_____
g. Other _____	_____
h. Total	_____

Company Financial Information

	1989(estimated) (a)	1988 (b)	1987 (c)
5. Company total revenues (consolidated):	$_____	$_____	$_____
6. Company net earnings/loss (consolidated):	$_____	$_____	$_____
7. Company retained earnings:	$_____	$_____	$_____

(I would appreciate you sending me your current Annual Report)

8. Approximately what percentage of your company's 1988 consolidated sales revenues came from sales of BIRD project (check one only).

	≤10% (1)	10-25% (2)	25-50% (3)	≥50% (4)	Not Relevant (5)
a. Domestic	___	___	___	___	___
b. Export	___	___	___	___	___

9. How many partnerships did your company enter since ever:

a. Domestic	____
b. International with BIRD	____
c. International without BIRD	____

THANK YOU FOR TAKING THE TIME TO COMPLETE THE QUESTIONNAIRE!

You can be sure that your answers will be treated with the strictest confidence.
Please indicate if you would like to receive a summary of the report ___ Yes ___ No
(you may staple your business card).

Name _____

Company _____

Title _____

Address _____

_____

Telephone Number _____

Please return the questionnaire to:

Lior Yahalomi
Entrepreneurial Center
The Wharton School
3733 Spruce Street
Philadelphia, PA 19104
TEL: (215) 898-4856
FAX: (215) 898-1299

APPENDIX A.2

Confidential Survey

U.S. Companies

The Israel-U.S. Binational Industrial Research & Development Foundation: A Case Study in the Promotion of International Partnerships

Conducted by:
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This survey will be the basis of Lior Yahalomi's doctoral dissertation in Managerial Science and Applied Economics at The Wharton School of The University of Pennsylvania

Directions:

The intent of this survey is to gather your views and impressions of the Binational Industrial Research & Development Foundation (BIRD) program. Please check only one response for each question unless otherwise indicated. Your comments are encouraged in the places indicated or at the end of the questionnaire. This questionnaire should be completed if your company was directly involved in the BIRD project, by the Chief Executive, Chief R&D, Chief Financial, or Bird Project Manager.

The information will be used in aggregate and individual firms will not be identified in the project reporting. The information will not be transferred to BIRD or to any one else. Completed questionnaires should be returned to The Wharton School in the enclosed self-addressed envelope. The final report summarizing the conclusions of this survey will be sent to you upon request at its completion. Please, feel free to contact us with any questions you may have.

Thank you very much for your cooperation and time!

U.S. Companies

PART I: INFORMATION REGARDING THE INTERNATIONAL PARTNERSHIP

INSTRUCTIONS:
This section is intended for one partnership only. If your company entered more than one project with BIRD, please complete a separate Part I for each project.

Please approximate when an exact answer to a question is not available. Your rough estimate is of more value to us than an incomplete answer.

Please Indicate:
___ **Full-Scale Project**
___ **Mini-Scale Project** (up to $150k

BIRD Project General Information

1. Your company's name _____
2. Partner's name _____
3. Partner's primary business activity _____
4. Title of BIRD project _____
5. Primary activity of partnership _____
6. Date BIRD project initiated _____

	1st Year	2nd	3rd
7. Israeli company equivalent number of full time employees working for this particular BIRD project.	_____	_____	_____
8. U.S. company equivalent number of full time employees working for the BIRD project.	_____	_____	_____
9. Other (external) people working for this particular project.	_____	_____	_____

10. Did BIRD ever rejected your company's request for a grant? __ Yes __ No

If Yes: Year requested ____ Reason for rejection _____

11. Total dollars invested in this particular project funded by BIRD? $_____
12. Actual percentage contribution (100% total) Israeli partner_____% U.S. partner_____% BIRD _____%
13. Accumulated sales of BIRD product $_____ From(date) _____ To _____
(If sold as part of a system, please isolate and approximate only the BIRD part)
13.a. Accumulated sales of the system/s of which BIRD product is a part $_____
14. Total projected sales of BIRD product (including sales to date) $_____
15. Accumulated profits from BIRD products. $_____
16. Please indicate any common ownership between your company and your partner's company:
___ a. No common ownership.
___ Yes common ownership. Please indicate here.....b.___ Israeli company is a subsidiary of U.S. partner.
c.___ U.S. partner is a subsidiary of Israeli company.
d.___ Other. Please explain: _____
17. Who initiated the contact between you and your partner:
___ a. Israeli Company ___ c. BIRD Foundation
___ b. U.S. Company ___ d. Other_____
18. Which company made the following initial non-cash contributions to the partnership:

	Israeli Partner(1)	U.S. Partner(2)	Both(3)
a. The Entrepreneurial Idea	____	____	____
b. Innovation of Technology	____	____	____
c. Marketing	____	____	____
d. Business Plan Preparation	____	____	____
e. Other _____	____	____	____

19. WHAT INFLUENCE did each of the following factors have on your firm's decision to develop and commercialize a product with an Israeli company partner:
(Please answer even if there exists common ownership between the companies involved in the partnership.)

Rate the extent of influence of each factor from 1 (No influence) to 5 (Large Influence).	No Influence		Some Influence		Large Influence
a. Having access to financial sources from the partner.	1	2	3	4	5
b. Sharing risk of the project.	1	2	3	4	5
c. Obtaining technological know-how.	1	2	3	4	5
d. Accessing new channels of distribution/customers.	1	2	3	4	5
e. Attaining/Increasing cost efficiency through joint production or joint R&D.	1	2	3	4	5
f. Saving time in R&D phase by pooling resources with partner.	1	2	3	4	5
g. Availability of financial support from BIRD.	1	2	3	4	5
h. Availability of non-financial support from BIRD.	1	2	3	4	5
Please specify and rate important factors not mentioned above.					
i. _____	1	2	3	4	5
j. _____	1	2	3	4	5

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

19.a. The BIRD project is our company's first business with Israel: ___ Yes ___ No
If not, describe in short your previous business experience in Israel.

_____

_____

_____

_____

20. Please indicate who performs the following functions for the partnership:

	Israeli Company Solely (1)	Israeli Company Mainly (2)	Shared (3)	U.S Company Mainly (4)	U.S. Company Solely (5)	Not Relevant (6)
a. Market definition	____	____	____	____	____	____
b. Product definition	____	____	____	____	____	____
c. Product specification	____	____	____	____	____	____
d. R & D	____	____	____	____	____	____
e. Marketing	____	____	____	____	____	____
f. Distribution/Sales	____	____	____	____	____	____
g. Manufacturing	____	____	____	____	____	____
h. Other _____	____	____	____	____	____	____

21. How IMPORTANT were the following factors in SELECTING your partner:
(If there exists common ownership between the companies, please answer as if you were/are looking for a partner in Israel)

	Not at All Important		Somewhat Important		Extremely Important	Not Relevant
a. Technological know-how of partner.	1	2	3	4	5	0
b. Marketing know-how of partner.	1	2	3	4	5	0
c. Channels of distribution of partner.	1	2	3	4	5	0
d. Access to customers through partner.	1	2	3	4	5	0
e. Willingness and ability of partner to finance the project.	1	2	3	4	5	0
f. Managerial expertise of partner.	1	2	3	4	5	0
g. Firm size of partner.	1	2	3	4	5	0
h. Willingness of partner to participate equally in the project decision making process.	1	2	3	4	5	0
i. Previous relationship with an individual in partner firm.	1	2	3	4	5	0
j. Previous relationship with partner firm in general.	1	2	3	4	5	0
k. Similarity of business practices and philosophies with partner.	1	2	3	4	5	0
l. Partner company being an Israeli firm.	1	2	3	4	5	0
Please specify and rate important factors not mentioned above.						
m. _____	1	2	3	4	5	0
n. _____	1	2	3	4	5	0

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

In questions 22 to 25, please indicate your company preference in selecting a partner in Israel.

22. __ a. Government/Histadrut (Union) Owned __ b. Privately Owned __ c. Publicly Owned __ d. No preference

23. __ a. Managed by founders __ b. Managed not by founders __ c. No preference

24. __ a. Oriented towards the European market __ b. Oriented towards the U.S. market __ c. No preference

25. __ a. Sales up to $1M __ b. $1M-$10M __ c. $10M-$100M __ d. >$100M __.e. No preference

26. Specify the Seriousness of any DISAGREEMENTS that occurred or PROBLEMS that arose with your partner over the following issues.

Then, please answer whether they were resolved or not.

	Never	Not Serious				Very Serious	Resolved Yes	Resolved No
a. Contractual responsibilities.	0	1	2	3	4	5	__	__
b. Capital expenditures.	0	1	2	3	4	5	__	__
c. Product development.	0	1	2	3	4	5	__	__
d. Marketing strategy.	0	1	2	3	4	5	__	__
e. Management control.	0	1	2	3	4	5	__	__
f. Production planning.	0	1	2	3	4	5	__	__
g. Pricing.	0	1	2	3	4	5	__	__
h. Personal communication problems.	0	1	2	3	4	5	__	__
i. Cultural problems (conflict of values, moral codes, habits, language, other).	0	1	2	3	4	5	__	__
j. Deterioration of trust.	0	1	2	3	4	5	__	__
k. Lack of autonomy/independence in the venture/project.	0	1	2	3	4	5	__	__
l. Ability of partner firm to deliver agreed upon share.	0	1	2	3	4	5	__	__
m. Overall commitment of partner to the venture/project.	0	1	2	3	4	5	__	__
n. Competitive conflicts between your firm and the partner.	0	1	2	3	4	5	__	__
o. Misuse of know-how developed in the venture by the partner.	0	1	2	3	4	5	__	__

Please specify and rate important factors not mentioned above.

p. _____	1	2	3	4	5	__	__
q. _____	1	2	3	4	5	__	__

27. Rate the IMPORTANCE of each GOAL in your decision to embark on this project.

	Not at All Important		Somewhat Important		Extremely Important	Not Relevant
a. Tax/Duty-free access to the European Market through the Israeli company.	1	2	3	4	5	0
b. Access to the Israeli market.	1	2	3	4	5	0
c. Access to technological innovation.	1	2	3	4	5	0
d. Relatively low-cost R&D.	1	2	3	4	5	0
e. Availability of funding from BIRD.	1	2	3	4	5	0
f. Growth in company sales.	1	2	3	4	5	0
g. Growth of company export sales.	1	2	3	4	5	0
h. Growth of market share.	1	2	3	4	5	0
i. Creation of jobs in the U.S.	1	2	3	4	5	0
j. Production efficiency.	1	2	3	4	5	0
k. Acquisition of management expertise.	1	2	3	4	5	0
l. Increasing available capital.	1	2	3	4	5	0
Please specify and rate important factors not mentioned above.						
m. _____	1	2	3	4	5	

28. Indicate your SATISFACTION with listed factors in your particular project funded by BIRD (performance of project relative to initial goals):

	Not at All Satisfied		Somewhat Satisfied		Extremely Satisfied	Not Relevant
a. Tax/Duty-free access to the European Market through the Israeli company.	1	2	3	4	5	0
b. Access to the Israeli market.	1	2	3	4	5	0
c. Access to technological innovations.	1	2	3	4	5	0
d. Availability of funding from BIRD.	1	2	3	4	5	0
e. Completion/Advancement of product development.	1	2	3	4	5	0
f. Having sales of the product.	1	2	3	4	5	0
g. Growth in company sales.	1	2	3	4	5	0
h. Growth of company export sales.	1	2	3	4	5	0
i. Return on investment/profit.	1	2	3	4	5	0
j. Growth of market share.	1	2	3	4	5	0
k. Creation of jobs in the U.S.	1	2	3	4	5	0
l. Production efficiency.	1	2	3	4	5	0
m. Acquisition of management expertise.	1	2	3	4	5	0
n. Increasing available capital.	1	2	3	4	5	0
Please specify and rate important factors not mentioned above.						
o. _____	1	2	3	4	5	

29. As a result of your experience with this particular partnership, HOW LIKELY are the following:

	Less Likely			More Likely		Not Relevant
a. Additional partnership with same partner not supported by BIRD.	1	2	3	4	5	0
b. Additional partnership with same partner supported by BIRD.	1	2	3	4	5	0
c. Alternative type of business partnership with same partner.	1	2	3	4	5	0
d. U.S. firm establishing a subsidiary in Israel.	1	2	3	4	5	0
e. Israeli firm establishing a subsidiary in the U.S.	1	2	3	4	5	0
f. Mini-Project (up to $150K) with a new partner supported by BIRD.	1	2	3	4	5	0
g. Full-Project with a new partner supported by BIRD.	1	2	3	4	5	0
h. **(for Mini-Scale Projects only)** This particular Mini-Scale Project will lead to a Full-Scale Project.	1	2	3	4	5	0
i. Other _____	1	2	3	4	5	

30. What has been the single greatest achievement of this partnership/project?

_____

_____

31. What has been the single greatest disappointment of this partnership/project?

_____

_____

32. What did you learn most from the experience of this partnership/project?

_____

_____

33. How long did the R&D phase last (or do you anticipate it lasting if not completed) in this project? _____ (months).

34. What is the job-title of the person in your company with primary responsibility for this project? _____

35. Please indicate the status of the partnership/project:

___ a. Partnership is in effect with initial agreement substantially unchanged.

___ b. Partnership is in effect with new terms since formation.

___ c. Partnership no longer exists.

___ Project(venture) was acquired by: __ d. Israeli partner
__ e. U.S. partner
__ f. Third company

___ g. Other _____.

PART II: INFORMATION REGARDING THE BIRD-FOUNDATION

(Please refer to your experience with BIRD in general)

1. How did you hear of BIRD:

___ a. BIRD publications & press.
___ b. Israeli Government Authorities.
___ c. U.S. Government Authorities.
___ d. Business Associates.
___ e. Don't know/Don't remember.
___ f. Other _____.

2. The BIRD-Foundation helped the partnership in the following ways :

	Strongly Disagree		Somewhat Agree		Strongly Agree	Not Relevant
a. In developing the business plan.	1	2	3	4	5	0
b. In analysis of technological feasibility.	1	2	3	4	5	0
c. In analysis of marketing feasibility.	1	2	3	4	5	0
d. In analysis of financial feasibility.	1	2	3	4	5	0
e. In analysis of overall feasibility.	1	2	3	4	5	0
f. In locating a partner for the project in Israel.	1	2	3	4	5	0
g. In helping formulate conditions of agreement between the companies.	1	2	3	4	5	0
h. In helping to resolve problems that arise during execution of the project.	1	2	3	4	5	0
i. In comments regarding technological development of the product/process.	1	2	3	4	5	0
j. In comments regarding marketing strategy of the product/process.	1	2	3	4	5	0
k. In locating new distribution systems or customers for the product/process.	1	2	3	4	5	0
l. In obtaining financial support from resources other than BIRD.	1	2	3	4	5	0
m. In understanding the business culture in Israel.	1	2	3	4	5	0
n. By adding credibility to the project.	1	2	3	4	5	0
o. Through U.S. Governmental support and added credibility, especially through the National Institute of Science and Technology (former National Bureau of Standards).	1	2	3	4	5	0
p. Through Israeli Governmental support and added credibility, especially through the Israeli Office of the Chief Scientist.	1	2	3	4	5	0

Please specify and rate additional factors not mentioned above.

q. _____	1	2	3	4	5

List the THREE MOST IMPORTANT factors from those cited above

Most important _____. Second _____. Third _____.

3. Please indicate your (dis)agreement with the following statements:

	Strongly Disagree		Somewhat Agree		Strongly Agree	Not Relevant
a. Without the BIRD grant my firm would not have implemented the project.	1	2	3	4	5	0
b. Without the BIRD grant my firm would have implemented the project but not with an Israeli firm partner.	1	2	3	4	5	0
c. If BIRD had provided more money we would have higher success in this particular project.	1	2	3	4	5	0
d. Without the BIRD grant we would not be implementing now any business with Israel.	1	2	3	4	5	0
e. **(for Full-Scale Projects only)** The Full-Scale project was a lead from a Mini-Scale Project with BIRD.	1	<----------		---------->	5	0

4. Please indicate your SATISFACTON on the following as a result of working with BIRD:

	Extremely Dissatisfied		Somewhat Satisfied		Extremely Satisfied	Not Relevant
a. Application cost (Business Plan Preparation & other).	1	2	3	4	5	0
b. Total available grant.	1	2	3	4	5	0
c. Grant percentage as part of the project.	1	2	3	4	5	0
d. Approval/rejection process time.	1	2	3	4	5	0
e. Flexibility in use of grant.	1	2	3	4	5	0
f. Level of bureaucracy.	1	2	3	4	5	0
g. Percentage of sales royalties.	1	2	3	4	5	0
h. Dr. Ed Mlavsky, the Executive Director	1	2	3	4	5	0
i. Foundation Staff.	1	2	3	4	5	0
j. Professional evaluation of business plan.	1	2	3	4	5	0
k. Fairness in project selection.	1	2	3	4	5	0
l. Technological support.	1	2	3	4	5	0
m. Marketing support.	1	2	3	4	5	0
n. The BIRD performance overall.	1	2	3	4	5	0

Please specify and rate any additional factors not mentioned above.

o. _____	1	2	3	4	5
p. _____	1	2	3	4	5

5. If you personally could make one change in (or make one suggestion to) BIRD policies or procedures, what would it be?

6. Please summarize here your experience working with the BIRD Foundation.

Thank you for completing part I & II. Please write below any comments regarding your experience with international partnerships/joint-ventures, the BIRD Foundation, R&D and Commercialization arrangements, or other.

PART III: U.S. COMPANY GENERAL INFORMATION

1. Company name _____

2. Year company founded _____

3. Primary (major) business activity of company _____

4. Current number of employees by type of job:

a. R&D/Engineering/Design	_____
b. Management	_____
c. Administration	_____
d. Marketing/Sales	_____
e. Production/Maintenance	_____
f. Finance/Accounting	_____
g. Other _____	_____
h. Total	_____

Company Financial Information

	1989 (estimated) (a)	1988 (b)	1987 (c)
5. Company total revenues (consolidated):	$_____	$_____	$_____
6. Company net earnings/loss (consolidated):	$_____	$_____	$_____
7. Company retained earnings:	$_____	$_____	$_____

(I would appreciate you sending me your current Annual Report)

8. Approximately what percentage of your company's 1988 consolidated sales revenues came from sales of BIRD project (check one only).

	≤10% (1)	10-25% (2)	25-50% (3)	≥50% (4)	Relevant (5)
a. Domestic	___	___	___	___	___
b. Export	___	___	___	___	___

9. How many partnerships did your company enter since ever:

a. Domestic	____
b. International with BIRD	____
c. International without BIRD	____

THANK YOU FOR TAKING THE TIME TO COMPLETE THE QUESTIONNAIRE!

You can be sure that your answers will be treated with the strictest confidence.
Please indicate if you would like to receive a summary of the report ___ Yes ___ No
(you may staple your business card).

Name _____

Company _____

Title _____

Address _____

_____

Telephone Number _____

Please return the questionnaire to:

Lior Yahalomi
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The Wharton School
3733 Spruce Street
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TEL: (215) 898-4856
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APPENDIX B.1

ISRAELI COMPANIES THAT PARTICIPATED IN BIRD SURVEY

YR.	ISRAELI COMPANY	U.S PARTNER	PARTNERSHIP TITLE	PARTNERSHIP ACTIVITY
1. Electronic Equipment & Instrumentation				
1984	Zoran Microelectronics	Zoran Corp (CA)	VLSI FFT (Chip Set Imaging)	Compression of image processing
1984	Simtech Ltd. (Tadiran's sub.)	Perceptronics Inc.	Video Mapping Sys.	Develop Civilian Video Mapping Sys.
1984	Tabor Electronics Ltd.	Keithly Instruments	Programmable Function Generator	Programmable Function Generator
1984	Middle East Electronics	Metrometer Inc.	Electronic Taximeters	Elec. Taximeters for Credit Card use
1985	Cimatron Ltd.	Cromemco Inc.	CADS/CAM Solid Model	CADS/CAM Sys Based on Solid Model
1986	Elmo Engineering Ltd	Galil Motion Control	Motion Controller	Motion controllers for elec. motors
1986	Eldar Electronics	Watsco Inc. (Miami Fl)	Thermostats	Electronic Room Thermostats
1986	Time & Frequency Ltd.	Frequency Electronics Inc.	Civil Rubidium Standard	Trans Military Product for Civilian use.
1987	Scitex Corp. Ltd.	Contex (bought by Xsivision)	2-D/3-D Packaging Design Sys.	2-D/3-D Packaging Design Sys.
1987	Elron Quick Projects	VLSI Technology Inc.	Laser Programmable Gate Array	High Den Lasr Programmable Gate Array
1988	OR-X Ltd.	Tektronix Inc.	Advanced Signal Source	Advanced Signal Source
1988	North Hills Israel Ltd.	North Hills Electronics	Switch Power Supply	Development of High Power
1988	Orbot Instruments Ltd.	Orbot Inc.	Reticle Inspection System	Devel. and Mktg of Reticle Inspection Sys
1989	RADA Ltd.	Tasco Inc.	VIS Series Development	Computers, Test Equipment
1989	Daisy/Cadnetix Israel Ltd.	Daisy/Cadnetix Inc.	CAM Manufacturing Work Stations	CAM Manufacturing Work Stations
1989	DSP Group Ltd.	DSP Group Inc.	DSP Based T.A.D.	Devel. & Mktg of Telephone Answ Mach
1989	Aerobit Industries Ltd.	I.E.C. Intl. Environmental Corp.	Fan Coil Controller	Fan Coil Controller
2. Software Packages and Systems				
1983	I.B.S. Ltd.	Martin Marietta Data Sys.	Ramis	Development of Software Ramis II
1984	Degem Systems Ltd.	Technovate	EB-2000	EB-2000 Computerized Teaching Sys.
1984	Central Software & Auto.	Grumman Data System Corp.	MCSA Sys.	Equipt. Maintenance Software Sys.
1984	TSS-Semech	On-line Software Int.	Interest PL/1	Devel of Interest PL/1 for IBM Comp.
1985	Edunatics Ltd.	Prentice Hall Software Inc.	Science Curriculum Educational Prog.	Middle School Science Computer Programs
1986	Policy Mgmt Sys Israel Ltd.	Policy Mgmt Sys Corp.	Insurance Claims Admin Sys.	Micro-Examiner Claims Adjudicat'n Sys.
1986	TICI Software Syst.	International Software Corp.	DCL-64 Software	Emulator for VAX
1986	A & S Software Engineering	Cybra Corp.	Sesame IBM Access	Security Software

YR.	ISRAELI COMPANY	U.S PARTNER	PARTNERSHIP TITLE	PARTNERSHIP ACTIVITY
1987	Manof Sys. Ltd.	Logica-Data Architects	MBS--Message Banking Sys.	Software Devel for Wholesale Banking
1987	Central Software Auto.	Software Center Inc. (CSA sub)	Healthcare Sys.	Integrated Info Sys forHealthcare Products
1987	Advanced Technology LTD	Advanced Tech International	Super Case	Computer Aided Software Eng. Tech.
1987	Adtech LTD	Data Translation Inc	Digital Signal Processing Board	Digital Signal Processing Board
1987	Product Computers Ltd.	Software Developers Co. Inc.	Final test	Testing of Software
1988	Ready Sys. Ltd.	Ready Sys. Corporation	Deve. of Card Tools	Real Time Optg Sys and Tools for Software
1988	Decision Systems Israel	Inter ACT Corp.	Simulation Environment	Simulation Environment
1988	Digitronics Ltd. (Digelec sub)	Digelec	PROM Programmer	PROM Programmer
1988	Hashmira Security Ltd.	American Magnetics Corp.	EACS--Control Sftware	Development of Control Software
1988	Relational Techn. Sys.	MITI-Mgmt Info Tech. Inc.	RPT to C	To Develop the product, Market & Support
1989	Laser Ind. Ltd.	Sharplan Laser(Laser sub)&Luxar	Surgical Laser	Head & Pwr Supply for 100 W Surgical Laser
1989	Simtech Ltd.	Perceptronics	CDI Mapping	CDI Laser Mapping
1989	G.T. Graphic Technology Ltd.	Graphic Science Corp.	Seismic Data System	Seismic Data Scanning & Reconstruct'n Devel
1989	Allegro Intelligent Sys., Ltd.	Westinghouse Elect. Corp.	FAX Response	FAX & Voice Tech. for Automating
1989	Conthal	NCR Inc.	qad-ARC21 Dord to NCR VRX/E 9800	Software Dev.
1989	Algorithmic Research Ltd.	Packet/PC Inc.	Crypto/74	Support Secure Comm. & Specific Environ
1989	TICI Software Sys. Ltd.	Encore Computer Systems Inc	Object Code Optimizer	Software Development
1989	Uni Power UPC Ltd.	Lachman Ass., Inc	Open Sys. Emulator	OS2/Unix Emulator(replaces DOS with OS2)
3. Medical Products & Equipment				
1981	Atlas Research Ltd.	Farral Instruments Inc.	Healing Monitors	Healing Monitors/Monitor Impedance Prod.
1982	Gelman Science Tech. Ltd.	Gelman Science Tech. Inc	New Microporous Membrane Tech.	Technology to Produce Microporous Materials
1985	Micro-Bit Sys. Ltd.	Data Scope Corp. (NJ)	Advanced Defibrilator Sys.	Advanced Defibrilator Sys (for heart attack)
1985	Mennen Medical Ltd.	Mennen Medical Inc.	ICU A Workstation/Control Terminal	ICU A Workstation/Control Terminal
1986	I.D.L Ltd.(Purchased by Eldan)	Syva Ca	Screening Tests	Tests for Gastrointestinal Infectious Diseases
1986	Bio-Logic Sys. Ltd.	Bio-Logic Corp.	Computerized EMG Systems	Computerized EMG Systems
1986	Gelman Sciences Tech. Ltd.	Energy Science Inc.	Micro Porous Membranes	Elec. Beam Equi. for Micro Porous Membrane
1986	Midrasole Orthotic Israel	Orthofeet Orthotic Inc.	Orthotics	Marketing Orthotics
1987	Spegas Industries	Mine Safety Appliances	Capnograph	Development of Medical Components
1987	L.E.Optronics(Isracan Tec.)	CAS Medical Science Inc.	Blood Pressure Measurement Sys.	Continuous Non-Invasive Sys.

YR.	ISRAELI COMPANY	U.S PARTNER	PARTNERSHIP TITLE	PARTNERSHIP ACTIVITY
1987	Migada Ltd	Migada Inc.	Lab-Site	
1988	Frantz Tech Israel Ltd.	Frantz Medical Development	NAGA Nutritional Supplement	Devel. & Mftg Instru for Nutrition Assessm't
1988	Savyon Diagnostics Ltd.	ICN Medical Inc.	Multiple Photogen Detection Sys.	System for Sexually Transmitted Diseases
1988	Telrad Telecom&Electronic Ind	Telrad Telecomm. Inc.	Small Business System	Telecomm. Systems For Small Businesses
1988	M Systems	Magna Computers (Zendex Corp)	PC/AT Mutibus Board	Comp(H+ S) Dev. for PC as a Wang Workstat'n
4. Communications Equipment				
1984	RAD Computers Ltd.	ADC Telecommunications Inc.	Data Over Voice DOV	Deve. of Data Over Voice Modem
1986	ECI Telecom LTD.	ECI Telecom Inc.	DTX 240	R&D & Marketing of DTX 240
1986	Efrat Future Technologies Ltd.	Converse Technology Inc.	Teleserve-- Voice & FAX Mainframe	Voice Management Systems
1986	Phasecom (Israel) Ltd.	General Instruments Corp. (N.Y)	Switch Modem	Switch Modem
1986	Lannet Data Comm. Ltd.	Chipcom Corp.	AUI Compatible Fibre Optic Eternet	Dev. Fiber Optic Based Local Area Network
1987	RAD Network Devices Ltd.	DPI Digital Pathway Inc.	SWAN- Security Wide Area Network	SWAN for Ethernet
1988	United Medical Systems Ltd.	United Medical Systems Inc. (CA)	Antisperm Antibodies Diagnostic Ki.	Infertility Diagnostic Systems
1989	Bio Dar Ltd.	Schin (SPI Microtech Inc.)	Sustain Release	Devel of Oral Sustained-Release Formulations
1990	Lognet Systems	CHI Corp.	Speed File Transfer	Speed File Transfer
5. Agrotechnology				
1979	Motorola Israel Ltd.	Motorola Inc.	Computerized Irrigation System	Computerized Irrigation
1981	Aquaculture Produc. Tec. Inc	General Mills Rest. Group Inc.	Freshwater Prawn	Devel proc for freshwater shrimp prod.
1982	Tedea Ltd.	Celesco Tr.Pr. Inc.	Digital Transducer	Digital Output Load and Pressure Transducer
1983	Hazera Seeds (1939) Ltd	Long Shelf Life Co.	Long Shelf Life Tomato	Research & Breeding of US Tomato
1983	Motorola Israel Ltd.	Motorola Inc.	Computerized Irrigation System	Computerized Irrigation
1985	Luxandurg Chemicals Ltd.	FMC Corp.	Novel Herbisides	Devel of New Herbicides (destroy plants)
1985	Koor Foods Ltd.	Alcide Corp.	Food Processing	Food Processing
1987	Makteshim Chemicals Work	FMC Corp.	Biolog Control Agent	Trichodoma Biomedical Fungiside Development
6. Machinery & Equipment				
1981	Ricor Ltd	Veeco Instruments INC.	VM Cryogenic Pump System	ICryopump: VM type thermodynamic cycle.
1983	Robomatix Ltd.	Unimation Inc. (Westinghouse)	Robot	Pick, Place and Palletizing Robot

Y.R.	ISRAELI COMPANY	U.S PARTNER	PARTNERSHIP TITLE	PARTNERSHIP ACTIVITY
1983	TMB Fertilizer Pumps Ltd.	Hays Equipment Inc.	High Capacity Fertilizer Inject. Pump	Devel. & Sales of 300 gal/hr Fert. Inj. Pump
1984	TMB Fertilizer Pumps	Plant Food Systems Inc	Low Capacity Fertilizer Injection	Devel. & Sales of Low Capacity Fertil. Pump
1985	Sivan Dev. and Implement. Ltd.	21st Century Robotics Inc.	Mobile Robot	Development and Sales of Small Mobile Robots
1986	M.L.I. Lasers Ltd.	Utilazer Inc	Industrial CO2 Laser	Development of a 5KW Compact Laser
1986	Numalog Ltd. (Subs. of Numar)	Numar Inc.	NMR Oil Lodging	Deve. & Mftg of NMR Tech. for Oil Drilling
1987	Dimex Ltd.	Simbol Technologies Inc.	Laser Check II/ Verification Systems	Laser Check Verification Systems
1987	Istec Ind.&Tech. Ltd	Wynn's Climate Sys. Inc.	Ejector Cycle Cap Air Conditioner	AC uses Waste Ene: no pressure on the Car
1988	Galai Labs Ltd.	Brinkmann Instruments Inc.	Online Particle Characterization	Online Measurement of Particles
1989	Gilat Comm. Systems Ltd.	GTE Spacenet Inc.	USAT	R&D Ultra Small Aperture Terminal
7. Semiconductor Devices & Equipment				
1982	Vishay Israel Ltd.	Vishay Intertechnology Inc	Photoclusion	Photoclusion (tm) - A New Product Devel
1982	Macdermid Israel Ltd.	Macdermid Inc	Novel Photoresists	Optical Electron Beam & X-Ray Exposure
1985	Kulick & Soffa Ltd.	Kulick & Soffa Ind. Inc.	Dicing Center System	Automatic Wafer Dicing System
1986	KLA Instruments Ltd.	KLA Instruments Inc.	Advanced Wafer Inspection	Machine for Measurement of Line Width
1989	Advanced Semic. Tech. Ltd.	Displaytek Corp.	CONCORD Chip	Digital Convergence Correction Chip
1989	Maintek Ltd	SMC, Standard Microsystems Co.	MDC 4000	Storage Peripheral VCSI Components devel
1989	Kulicke and Soffa Israel, Ltd.	Kulick & Soffa Inc.	Image Processing Sys. for Dibonder	Image Processing Sys. for Dibonder
8. Miscellaneous				
1986	M.A.T.Energy Engineering Ltd.	Maximum Technology, Inc.	Reflectors&Parabolic Louvers	Energy efficient flourescent fixtures
1988	Plastopil Hazorea	Plastigone Tech.	Photodegradable Rolyethylene Films	Photodegradable Rolyethylene Films
1989	Rokar International Ltd.	Tracor Aerospace Inc.	GPS Navigation System	GPS Navigation System
1989	Luz Ind. Israel Ltd.	Luz Dev. & Finance Corp.	Front Surface Mirrors	Front Surface Mirrors For Solar Energy Sys.

APPENDIX B.2

U.S COMPANIES PARTICIPATED IN BIRD SURVEY

YR	U.S COMPANY	ISRAELI PARTNER	PROJECT TITLE	PARTNERSHIP ACTIVITY
1. Electronic Equipment & Instrumentation				
1984	Perceptronics, INC	SimTech Ltd.	Video Mapping Sys.	Development of Civilian Video Mapping Sys.
1984	Keithly Instruments	Tabor Electronics Ltd.	Programmable Function Generator	Programmable Function Generator
1986	Watsco Inc. (Miami Fl)	Eldar Elctronics	Thermostats	Electronic Room Thermostats
1988	Tektronix Inc.	OR-X Ltd.	Advanced Signal Source	Advanced Signal Source
1989	I.E.C. Intl. Environm. Corp.	Aerobit Industries Ltd.	Fan Coil Controller	Fan Coil Controller
2. Software Packages & Systems				
1984	Technovate (From 87 I.T.E)	Degem Systems Ltd.	EB-2000	EB-2000 Computerized Teaching Sys.
1985	Prentice Hall Soft. Inc.	Edunatics Ltd.	Science Curriculum Educational Prog.	Middle School Science Computer Programs
1985	Just For You	L.K.P Ltd	Music Generator	Computer Video Music Generator
1986	Policy Mgmt Sys Corp.	Policy Mgmt Sys Israel Ltd.	Insurance Claims Administrative Sys.	Micro-Examiner Claims Adudication Sys.
1986	Just For You	L.K.P. Ltd.	Computer Greeting	Computer Greeting Cards
1986	Cybra Corp.	A & S Software Engineering	Sesame IBM Access	Control of Access to Software- Security Software
1987	Logica-Data Architects	Manof Sys. Ltd.	MBS--Message Banking Sys.	Software Development for Wholesale Banking
1987	Syllogy Corporation	I.B.S. Ltd.	Develop C-Sort	Development of C-Sort
1987	Data Translation Inc	Adtech LTD	Digital Signal Processing Board	Digital Signal Processing Board
1987	Software Developers Comp. Inc	Product Computers Ltd.	Final test	Testing of Software
1988	BBN Sys. & Tech. Corp.	Logal Corp.	STEP-MACINTOSH	STEP-MACINTOSH
1989	Sharplan Laser Inc (Sub/Laser)	Laser Ind. Ltd.	Surgical Laser	Head & Power Supply for 100 W Surgical Laser
1989	Lachman Ass. Inc.	Uni Power UPC Ltd.	Open Sys. Emulator	OS2/Unix Emulator
3. Medical Products & Equipment				
1986	Accurate	Eldan Bio-Tech. Ltd.	Blood Platelet Kit	Reagent and Assay Kit for Blood Platelet
1986	Syva Ca	I.D.L Ltd.(Purchased by Eldan)	Screening Tests	Screening Tests for GI Infectious Diseases
1986	Energy Science Inc.	Gelman Sciences Tech. Ltd.	Micro Porous Membranes	Elec. Beam Equi. for Micro Porous Membrane
1987	Mine Safety Appliances	Spegas Industries	Capnograph	Development of Medical Components

YR	U.S COMPANY	ISRAELI PARTNER	PROJECT TITLE	PARTNERSHIP ACTIVITY
1987	Lemmon Company	Teva Ltd.	Generic Drugs for US	Drugs for the U.S Pharmaceutical Market
1987	CAS Medical Science Inc.	L.E.Optronics(Isracan Tech. Ltd.)	Blood Pressure Measurement Sys.	Continuous Non-Invasive Blood Pressure Sys.
1987	Migada Inc.	Migada Ltd	Lab-Site	
1988	Frantz Medical Development	Frantz Tech Israel Ltd.	NAGA Nutritional Supplement	Instrument for Nutrition Assessment
1988	ICN Medical Inc.	Savyon Diagnostics Ltd.	Multiple Photogen Detection Sys.	Sexualy Transmitted Diseases system
1988	Telrad Telecomm. Inc.	Telrad Ind. Ltd.	Small Business System	Telecomm. Systems For Small Businesses
1988	Magna Computers(Zendex)	M Systems	PC/AT Mutibus Board	Comp(H+ S) for PC as Wang Workstation
4. Communications Equipment				
1986	General Instrum. Corp.	Phasecom (Israel) Ltd.	Switch Modem	Switch Modem
1986	Chipcom Corp.	Lannet Data Comm. Ltd.	AUI Compatible Fibre Optic Eternet	Local Area Network Compatible
1987	DPI Digital Pathway Inc.	RAD Network Devices Ltd.	SWAN- Security Wide Area Network	SWAN- Security Wide Area Network for Ethernet
1987	Pulsecom Harvey Div./Hubbell	Tadiran Ltd.	LIU-X Common Unit	LIU-X Common Unit
1988	RAD Data Comm. Inc.	RAD Data Comm.Ltd.	CSU/DSU for DDS	CSU/DSU for DDS with Secondary Channel
1989	ElectroCom Automation Inc	Kolnet Systems Ltd.	INFOCOM	Voice/Data Comm. Sys.-Code Name "INFOCOM"
1989	Avatar Corporation	Gambit Computer Com. Ltd	Coaxplitter	GAM-30125 High Performance Coaxplitter
5. Agrotechnology				
1982	Celesco Tr.Pr. Inc.	Tedea Ltd.	Digital Transducer	Digital Output Load and Pressure Transducer
1983	Long Shelf Life Corp.	Hazera Seeds (1939) Ltd	Long Shelf Life Tomato	Research & Breeding of US Tomato
1987	FMC Corp.	Makteshim Chemicals Work	Biolog Control Agent	Trichodoma Biomedical Fungiside Development
1989	PALS Division, Inc.(#2)	Rotem Ltd.	Poultry House II	Rotem Second Generation Computerized Control
6. Machinery & Equipment				
1984	Plant Food Sys. Inc (Fl)	TMB Fertilizer Pumps	Low Capacity Fertilizer Injection	Devel. & Sales of Low Capacity Fertilizer Pump
1986	Numar Inc.	Numalog Ltd. (Subs. of Numar)	NMR Oil Lodging	Deve. & Mftg of NMR Tech. for Oil Drilling
1987	Wynn's Climate Sys. Inc.	Istec Ind. &Tech.(Glil Adv.Tech.)	Ejector Cycle Cap Air Conditioner	Efficient Car Air Conditioner
1988	Brinkmann Instruments Inc.	Galai Labs Ltd.	Online Particle Characterization	Online Measurement of Particles
1989	GTE Spacenet Inc.	Gilat Comm. Systems Ltd.	USAT	R&D Ultra Small Aperture Terminal
1989	Coherent Components Inc.	Holo-Or Ltd.	CO2 Laser Lenses	Lenses for Material Processing Lasers

YR	U.S COMPANY	ISRAELI PARTNER	PROJECT TITLE	PARTNERSHIP ACTIVITY
7. Semiconductor Devices and Equipment				
1986	KLA Instruments Inc.	KLA Instruments Ltd.	Advanced Wafer Inspection	Measurement of Line Width
1989	Displaytek Corp.	Advanced Semic. Tech. Ltd.	CONCORD Chip	Digital Convergence Correction Chip
8. Miscellaneous				
1988	Plastigone Tech.	Plastopil Hazorea	Photodegradable Rolyethylene Films	Photodegradable Rolyethylene Films
1989	Luz Dev. & Finance Corp.	Luz Ind. Israel Ltd.	Front Surface Mirrors	Front Surface Mirrors For Solar Energy Sys.

APPENDIX C

LIST OF INSTITUTIONS, GOVERNMENT BODIES, AND INDIVIDUALS INTERVIEWED IN ISRAEL AND THE UNITED STATES

ISRAEL

- The Ministry of Commerce and Industry, Government of Israel
- Bank of Israel
- The BIRD Foundation--Tel-Aviv Israel
- The Israeli Office of The Chief Scientist
- The Export Institute--Israel
- Investment Authority--Istrael
- Israeli Operation Independence--Tel-Aviv and New-York
- Israeli Economic Attache in North America--New York
- MATIMOP: Israeli Center for Industrial R&D--Tel-Aviv
- JIM: Jerusalem Institute of Management, Tel-Aviv
- The Israeli Institute for Advanced Studies, Jerusalem
- The Recanati Business School, Tel-Aviv University
- R&D Institute, Tel-Aviv University
- The Invstment Bank of Discont, Tel-Aviv and New-York
- Investment Corporation, Bank Hapoalim, Tel-Aviv

UNITED STATES

- AIPAC: American Israeli Public Affair Committee
- United States Embassy in Israel, Counselor for Economic Affairs and Scientific & Technological Attache, Tel-Aviv
- NIST: National Institue of Science and Technology, (Formerly NBS)
- The State Department, U.S. Government
- The Wharton Business School, University of Pennsylvania, Philadelphia
- MIT: Massachuset Institute of Technology, Cambridge
- The Office of Productivity, Technology, and Innovation, U.S. Department of Commerce, Washington D.C.
- PACT: The Indian- U.S.A Program for the Advancement of Commercial Technology
- BATTLE Columbus Division of the Battle Memorial Institute, OHIO

APPENDIX D

DESCRIPTION OF VARIABLES IN DATA-BASES

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
PART I		
Information of Partnership		
COMCODE	COMCODE	Company's code.
ISQ	USQ	Partner's name
UFULMIN	FULMIN	Full/Mini-scale project.
UINDCLAS	INCLAS	Industry classification.
UFAILSUC	FAILSUC	Fail/Success DEPENDENT variable.
USTM6	STM6	Month of project start.
USTY6	STY6	Year of project start.
UISEM17A	ISEM17A	Israeli partner's employees assigned to project in 1st year.
UISEM27B	ISEM27B	Israeli partner's employees assigned to project in 2nd year.
UISEM37C	ISEM37C	Israeli partner's employees assigned to project in 3rd year.
UUSEM18A	USEM18A	U.S company's employees assigned to project in 1st year.
UUSEM28B	USEM28B	U.S company's employees assigned to project in 2nd year.
UUSEM38C	USEM38C	U.S company's employees assigned to project in 3rd year.
UEXEM19A	EXEM19A	Other people to work in project in 1st year.
UEXEM29B	EXEM29B	Other people to work in project in 2nd year.
UEXEM39C	EXEM39C	Other people to work in project in 3rd year.
UREJ10A	REJ10A	Grant rejected by BIRD in past (YES/NO).
UTOTIN11	TOTINV11	Total $ invested in project.
UPERI12A	PERIS12A	% contributed by Israeli partner.
UPERU12B	PERUS12B	% contributed by U.S partner.
UPERB12C	PERBD12C	% contributed by BIRD.
UBDGRANT	BDGRANT	BIRD grant ($ indexed).
UROYALTY	ROYALTY	Total royalties received by BIRD.
USALBD	SALBD	Accumulated historical sales reported by BIRD.
USALAC13	SALAC13	Accumulated historical sales reported by company.
USALBC10	SALBC10	Companies with no sales of product but reported sales by BIRD.
USALPJ14	SALPJ14	Total (historical+projected) sales from project.
UPROF15	PROFIT15	Accumulated profits from project.
UOWN16	OWN16	Type of ownership between partners.
UCONT17	CONT17	Contact initiator.
Partner Initial Contribution to the IJV		
UENT18A	ENT18A	Entrepreneurial Idea
UTEC18B	TEC18B	Innovation of Technology
UMKT18C	MKT18C	Marketing
UBP18D	BP18D	Business Plan Preparation

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
Reasons to Pursue JV Strategy with a U.S company		
UACF19A	ACF19A	Financial resources
URIS19B	RIS19B	Risk sharing
UTEC19C	TEC19C	Technology know-how
UDIS19D	DIS19D	Access to distribution/customers
UEFF19E	EFF19E	Economies of scale
UTIM19F	TIM19F	Time saving of R&D
UBDOL19G	BDOL19G	Financial support from BIRD
UNBOL19H	NBDOL19H	Non-financial support from BIRD
UBIS19AA		Previous Experience Working with Israel
Function Performed by Partner		
UMKTD20A	MKTDF20A	Market Definition
UPROD20B	PRODF20B	Product Definition
UPROS20C	PROSP20C	Product Specification
URD20D	RD20D	R&D
UMKTG20E	MKTG20E	Marketing
UDISL20F	DISSL20F	Distribution/sales
UMNFG20G	MNFG20G	Manufacturing
Partner Selection Criteria		
UTECH21A	TECH21A	Partner's Technology
UMKTG21B	MKTG21B	Partner's Marketing
UDISS21C	DISS21C	Partner's Distribution
UCUS21D	CUST21D	Access to Customers
UPARD21E	PARD21E	Partner's Financing
UMGNT21F	MGNT21F	Partner's Managerial Expertise
USIZ21G	SIZE21G	Partner's Company Size
UDM21H	DM21H	Partner's Participation in Decision Making
UINDC21I	INDC21I	Previous Relationship with an Individual in Partner's Firm
UCOMC21J	COMC21J	Previous Relationship with Partner in General
UPHIL21K	PHIL21K	Similar Philosophy
UJEW21L	JEW21L	Partner's company is owned or managed by Jew / is in Israel
Additional Selection Preferences		
UPRVT22	PRVT22	Private/public/Histadrut Ownership
UFNDRS23	FNDRS23	Founders as Managers
UEXPT24	EXPT24	Market Orientation
USLSZ25	SLSZ25	Sales Volume

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
Seriousness of Disagreements/Problems with Partner		
UCON26A	CON26A	Contractual Responsibilities
UDOL26B	DOL26B	Capital Expenditures
UPRD26C	PRD26C	Product Development
UMKT26D	MKT26D	Marketing Strategy
UMGT26E	MGT26E	Management Control
UPRP26F	PRP26F	Production Planning
UPRI26G	PRI26G	Pricing
UPER26H	PER26H	Personal Communication
UCLT26I	CLT26I	Cultural Problems
UTST26J	TST26J	Trust Deterioration
UAUT26K	AUT26K	Lack of Independence/Autonomy
UDEL26L	DEL26L	Ability of Partner to Deliver
UCMT26M	CMT26M	Overall Commitment of Partner
UCMP26N	CMP26N	Competitive Conflicts between the Partners
UMSU26O	MSU26O	Misuse of Know-how Developed in Project
Resolved Problems (Yes/No)		
URCON26A	RCON26A	Contractual responsibilities
URDOL26B	RDOL26B	Capital expenditures
URPRD26C	RPRD26C	Product development
URMKT26D	RMKT26D	Marketing strategy
URMGT26E	RMGT26E	Management control
URPRP26F	RPRP26F	Production planning
URPRI26G	RPRI26G	Pricing
URPER26H	RPER26H	Personal communication
URCLT26I	RCLT26I	Cultural problems
URTST26J	RTST26J	Trust deterioration
URAUT26K	RAUT26K	Lack of independence/autonomy
URDEL26L	RDEL26L	Ability of partner to deliver
URCMT26M	RCMT26M	Overall commitment of partner
URCMP26N	RCMT26N	Competitive conflicts between the partners
URMSU26O	RMSU26O	Misuse of know-how developed in project

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
Project (LIV) Goals (importance)		
	GSAL27A	Company's sales growth
	GEXP27B	Company's export sales growth
	ROI27C	ROI
	GMS27D	Market share increase
	FOR27E	Access to new/foreign market
	TEC27F	Technological innovation
	JOB27G	Job creation in Israel
	EFF27H	Production efficiency
	MGTE27I	Acquisition of management expertise
	DOLC27J	Increasing available capital
UTAXI27A		Tax/duty free access to Europe
UACCI27B		Access to the Israeli market
UTEC27C		Technological innovation
URD27D		Low cost R&D
UBD27E		Funding from BIRD
UGSAL27F		Company's sales growth
UGEXP27G		Company's export sales growth
UGMS27H		Market share increase
UJOB27I		Job creation in U.S
UEFF27J		Production efficiency
UMGTE27K		Acquisition of management expertise
UDOLC27L		Increasing available capital

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
Performance Satisfaction		
	PRD28A	Product development completion/advancement
	SAL28B	Having sales of product
	GSAL28C	Company's sales growth
	GEXP28D	Company's export sales growth
	ROI28E	ROI
	GMS28F	Market share increase
	FOR28G	Access to new/foreign market
	TEC28H	Technological innovation
	JOB28I	Job creation in Israel
	EFF28J	Production efficiency
	MGTE28K	Acquisition of management expertise
	DOLC28L	Increasing available capital
UTAX28A		Tax/duty free access to Europe
UACC28B		Access to the Israeli Market
UTEC28C		Technological innovation
UBD28D		Funding from BIRD
UPRD28E		Product Development Completion/Advancement
USAL28F		Having Sales of Product
UGSAL28G		Company's Sales Growth
UGEXP28H		Company's Export Sales Growth
UROI28I		ROI
UGMS28J		Market share increase
UJOB28K		Job Creation in U.S
UEFF28L		Production Efficiency
UMGTE28M		Acquisition of Management Expertise
UDOLC28N		Increasing Available Capital
Future Expectations		
USNB29A	SNB29A	Additional partnership with same partner - no support by BIRD
USB29B	SB29B	Additional partnership with same partner - supported by BIRD
UALT29C	ALT29C	Alternative partnership with same partner
USUBI29D	SUBI29D	U.S partner to establish a subsidiary in ISRAEL
USUBU29E	SUBU29E	Israeli partner to establish a subsidiary in U.S
UMIN29F	MIN29F	Mini project with new partner - supported by BIRD
UFUL29G	FUL29G	Full project with new partner - supported by BIRD
UMF29H	MF29H	(For mini projects) project leads to a full project
ULRD33	LRD33	R&D phase duration
USTAT35	STAT35	Current status of partnership/project

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
PART II - Information Regarding BIRD		
Help from BIRD		
	BDIM1A	Get to Implementation
	BUSP1B	Develop business plan
	ATEC1C	Technological feasibility analysis
	ANM1D	Marketing feasibility analysis
	AFIN1E	Financial feasibility analysis
	ADV1F	Overall feasibility analysis
	PART1G	Locate U.S partner for project
	COND1H	Agreement conditions formulation
	PROB1I	Resolve problems during project
	TEC1J	Technological development - comments
	MKT1K	Marketing strategy - comments
	DIS1L	Locate distribution channels
	FINS1M	Obtain financial support other than BIRD
	CULT1N	Understand U.S business culture
	CRED1O	Add credibility
	USG1P	U.S governmental support
	ISG1Q	Israeli governmental support
HOW2	HOW2	How did you hear of BIRD
UBUSP2A		Develop business plan
UTEC2B		Technological feasibility analysis
UM2C		Marketing feasibility analysis
UFIN2D		Financial feasibility analysis
UDV2E		Overall feasibility analysis
UPART2F		Locate Israeli partner for project
UCOND2G		Agreement conditions formulation
UPROB2H		Resolve problems during project
UTEC2I		Technological development - comments
UMKT2J		Marketing strategy - comments
UDIS2K		Locate distribution channels
UFINS2L		Obtain financial support other than BIRD
UCULT2M		Understand U.S business culture
UCRED2N		Add credibility
UUSG2O		U.S governmental support
UISG2P		Israeli governmental support

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
Satisfaction Working with BIRD		
UALPC4A	APCST3A	Application Cost
YGRNT4B	GRNT3B	Total Grant
UPRNT4C	PGRNT3C	Grant % of Total Project Cost
UTIME4D	TIME3D	Approval/Rejection Process Time
UFLEX4E	FLEX3E	Flexibility in use of Grant
UBUR4F	BUR3F	Level of Bureaucracy
UPROY4G	PROY3G	% of Sales Royalties
UBPEV4J	DIR3H	Ed Mlavsky
UFAIR4K	STFF3I	Foundation Staff
UTEC4L	BPEV3J	Business Plan Evaluation
UMKT4M	FAIR3K	Fair Project Selection Criteria
UDIR4H	TEC3L	Technological Support
USTF4I	MKT3M	Marketing Support
UOVER4N	OVER3N	BIRD Performance Overall
Agreements/Disagreements Statements		
UOUT3A	OUT3AA	Get to implementation phase without BIRD
UNUSP3B	NUSP3AB	Without BIRD - implementation not with a U.S partner
UBD3C	BD3AC	More successful if additional money from BIRD
UNUSB3D	NUSB3AD	Without BIRD - no business in U.S
UMTOF3E	MTOF3AE	Full scale project led by a mini scale project
Satisfaction with the Israeli Chief Scientist		
	APCT5A	Application Cost
	GRNT5B	Total Grant
	PGRNT5C	Grant % of Total Project Cost
	TIME5D	Approval/Rejection Process Time
	FLEX5E	Flexibility in Use of Grant
	BUR5F	Level of Bureaucracy
	PROY5G	% of Sales Royalties
	CHIEF5H	Chief Scientist (Yigal Erlich)
	CSSTF5I	IOCS Staff
	PBEV5J	Business Plan Evaluation
	FAIR5K	Fair Project Selection Criteria
	TEC5L	Technological Support
	MKT5M	Marketing Support
	OICS5N	IOCS Performance Overall

U.S. VARIABLE	ISRAELI VARIABLE	DESCRIPTION
PART III -		
Company General Information		
UYEAR2	YEAR2	Year comany founded
Current Number of Employees in		
UERD4A	EMPRD4A	R&D/Engineering
UEMC4B	EMPMG4B	Management
UEAD4C	EMPAD4C	Administration
UEMK4D	EMPMK4D	Marketing/Sales
UEPR4E	EMPPR4E	Production/Maintenance
UEF14F	EMPFI4F	Finance/Accounting
UEOTH4G	EMPOT4G	Other
UETOT4H	EMPTOT4H	Total employees
UREV895A	REV895A	1989 revenues
UREV885B	REV885B	1988 revenues
UREV875C	REV875C	1987 revenues
UREVGRO	RECGRO	Revenue Growth
UER896A	ERN896A	1989 net earnings
UER886B	ERN886B	1988 net earnings
UER876C	ERN876C	1987 net earnings
UDOMS8A	PDOM8A	Domestic sales from BIRD project as % of company's total domestic sales
UEXS8B	PEXP8B	Export sales from BIRD project as % of company's total export sales
UJVD9A	PRTD9A	# of domestic partnerships
UJVB9B	PRTIB9B	# of international partnerships - with BIRD
UJVNB9C	PRTIND9C	# of international partnerships - without BIRD

APPENDIX E: STATISTICAL ANALYSIS

APPENDIX E.1
SUCCESS DETERMINANTS OF IJVs
POOLED DATA/ALL VARIABLES

VARIABLE NAME	VARIABLE	(1)	(2)
BDOL19G	Financial support from BIRD as an IJV strategy	.219* (1.301)	.167 (1.074)
DIS19D	Access to distribution/customers as an IJV strategy	-.111 (-.774)	.005 (.035)
RIS19B	Risk sharing as an IJV strategy	.007 (.038)	-.154 (-.921)
TEC19C	Access to technology as an IJV strategy	0.292* (-1.832)	-.239+ (-1.542)
TIM19F	R&D time savings as an IJV strategy	.111 (.677)	.222 (1.169)
ACF19A	Access to finance from partner company as an IJV strategy	-.148 (-.914)	-.102 (-.648)
INDC21I	Previous relationship with an individual leading to partner selection	-.139 (-1.015)	.284* (-2.125)
DOL26B	Problems with capital expenditures in the IJV	.224+ (1.285)	.313* (1.889)
MGT26E	Problems with management in the IJV	-.021 (-.113)	-.173 (-.962)
CLT26I	Problems related to culture in the IJV	-.012 (-.079)	(.039) (.269)
TST26J	Problems with trust in the IJV	-.128 (-.865)	.017 (.120)
AUT26K	Problems with autonomy in the IJV	-.001 (-.003)	-.105 (-.462)
CMT26M	Problems with commitment in the IJV	-.297+ (-1.394)	-.417*** (-3.122)
JOB27G	Jobs creation as an IJV goal	-.227 (-1.209)	.-161 (-.901)
LRD33	R&D phase duration	-.008 (-.464)	.001 (.036)
OWN16DUM	Common-ownership dummy variable	.198 (.397)	-.421 (-.817)
INDDUM	Industry dummy variable	No	Yes
R2		.007	.210
N		58	58

*** Denotes significance at greater than the .01 level
** Denotes significance at greater than the .05 level
* Denotes significance at greater than the .10 level
+ Denotes significance at greater than the .20 level

Note: Coefficient estimates appear with T-statistics in parenthesis

APPENDIX E.2

RESULTS OF STEPWISE REGRESSION
SUCCESS DETERMINANTS OF IJV OWNERSHIP IN POOLED DATA

NO INDUSTRY CONTROLS (COLUMN 1)

	VARIABLE ENTERED	PARTIAL R2	MODEL R2
Step 1	CMT26M	.108	.108
Step 2	JOB27G	.034	.142
Step 3	TEC19C	.032	.175

WITH INDUSTRY CONTROLS (COLUMN 2)

	VARIABLE ENTERED	PARTIAL R2	MODEL R2
Step 1	CMT26M	.108	.108
Step 2	IND3	.058	.167
Step 3	IND6	.077	.243
Step 4	JOB27G	.021	.295
Step 5	TEC19C	.021	.315

NO INDUSTRY CONTROLS (COLUMN 3)

	VARIABLE ENTERED	PARTIAL R2	MODEL R2
Step 1	CMT26M	.144	.144
Step 2	JOB27G	..030	.175
Step 3	TEC19C	.036	.211

WITH INDUSTRY CONTROLS (COLUMN 4)

	VARIABLE ENTERED	PARTIAL R2	MODEL R2
Step 1	CMT26M	.144	.144
Step 2	IND6	.052	.196
Step 3	IND3	.055	.251
Step 4	TEC19C	.020	.271
Step 5	JOB27G	.015	.286
Step 6	IND7	.022	.307

APPENDIX E.3

SUCCESS DETERMINANTS OF IJVs
ISRAELI DATA/ALL VARIABLES

VARIABLE NAME	(1)	(2)	(3)
LN(EMPT4H)		.499*	.357
		(1.785)	(.853)
JVEXP9A		.029	-.030
		(.306)	(-.322)
YEAR2		.084**	.088
		(2.279)	(1.098)
OWN16DUM	-.213	-.867	-1.316*
	(-.382)	(-1.105)	(-1.841)
BDOL19G	.054	-.221	.097
	(.269)	(-.903)	(.550)
DIS19D	.050	-.335	-.002
	(.243)	(-.946)	(-.006)
RIS19B	.208	.084	-.231
	(1.044)	(.289)	(-.864)
TEC19C	-.052	-.185	-.155
	(-.291)	(-.849)	(-.748)
TIM19F	-.025	-.017	.244
	(-.141)	(-.077)	(.832)
ACF19G	-.313*	-.313	.045
	(-1.708)	(-.989)	(.132)
INDC21I	-.270*	-.471**	-.622***
	(-1.708)	(-2.259)	(-3.262)
DOL26B	.311+	.248	.316+
	(1.607)	(.973)	(1.498)
NGT26E	-.054	-.200	-.209
	(-.274)	(-.827)	(-.831)
CLT26I	-.033	-.068	-.091
	(-.191)	(-.328)	(-.538)
TST26J	-.079	.030	.203
	(-.471)	(.143)	(1.056)
AUT26K	-.104	.024	-.184
	(-.407)	(.069)	(-.581)
CMT26M	-.409***	(-.364)**	-.531***
	(3.115)	(-2.248)	(-3.726)
JOB27G	-.206	.031	.136
	(-1.171)	(.098)	(.540)
TEC27G	.170	.150	.256
	(.941)	(.614)	(1.134)
LRD33	-.021	.000	-.142+
	(-.955)	(.013)	(-1.468)
INDDUM	No	No	Yes
R^2	.071	.040	.549
N	42	37	37

*** Denotes significance at greater than the .01 level
** Denotes significance at greater than the .05 level
* Denotes significance at greater than the .10 level
+ Denotes significance at greater than the .20 level

Note: Coefficient estimates appear with T-statistics in parenthesis

APPENDIX E.4

RESULTS OF STEPRISE REGRESSION
SUCCESS DETERMINANTS OF IJV OWNERSHIP

NO INDUSTRY CONTROLS (COLUMN 1)

	VARIABLE ENTERED	SIGN	PARTIAL R2	MODEL R2
Step 1	CMT26M	-	.196	.196
Step 2	LNEMPT4H	+	.071	.267
Step 3	TST26S	-	.038	.304
Step 4	OWN16DUM	-	.044	.348

WITH INDUSTRY CONTROLS (COLUMN 2)

	VARIABLE ENTERED	SIGN	PARTIAL R2	MODEL R2
Step 1	CMT26M	-	.196	.108
Step 2	IND3	-	.123	.319
Step 3	TST26J	-	.049	.368
Step 4	INC21I	-	.051	.419
Step 5	IND5	-	.062	.481
Step 6	OWN16DUM	-	.029	.509
Step 7	IND4	+	.027	.536

NO INDUSTRY CONTROLS (COLUMN 3)

	VARIABLE ENTERED	SIGN	PARTIAL R2	MODEL R2
Step 1	CMT26M	-	.145	.145
Step 2	INDC21I	-	.069	.214
Step 3	LNEMPTY4H	+	.030	.243
Step 4	TST26S	-	.025	.269

WITH INDUSTRY CONTROLS (COLUMN 4)

	VARIABLE ENTERED	SIGN	PARTIAL R2	MODEL R2
Step 1	CMT26M	-	.145	.145
Step 2	IND3	-	.074	.219
Step 3	IND6	-	.077	.296
Step 4	IND21I	-	.044	.341
Step 5	IND4	+	.032	.373
Step 6	TST26S	-	.024	.396

APPENDIX E.5

LIST OF HIGHLY CORRELATED VARIABLES WITH CMT26M

ISRAELI DATA

VARIABLE	CORRELA-TION COEFFI-CIENT	P-VALUE	N (OBSER-VATIONS)
OWN16DUM	-.345	.0008	92
PRD28A	-.250	.0193	87
SAL28B	-.418	.0015	55
GEXE28D	-.499	.0003	48
ROI28E	.418	.0043	45
GMS28F	-.445	.0022	45
JOB28I	-.450	.0025	43
EFF28J	-.441	.0116	32
SNB29A	-.386	.0004	80
SB29B	-.490	.0001	85
NUSP3AB	.318	.0105	64
CON26A	.255	.0172	87
CMP26N	.1743	.1106	85
DEL26L	.5305	.0001	89
PER26H	.260	.0132	90
TST26J	.304	.0037	89
AUT26K	.228	.0352	87
CLT26I	.1746	.1037	88
MSU26O	.226	.038	85
BD3AC	-.202	.1069	65
ALT29C	-.224	.0556	74
OVER3N	-.178	.1003	86
BPEV3J	-.187	.1091	75
DOL26B	.1794	.0945	88
PRTD9A	-.193	.41	69

APPENDIX E.5 (CONT.)

LIST OF HIGHLY CORRELATED VARIABLES WITH CMT26M

POOLED DATA

VARIABLE	CORRELA-TION COEFFI-CIENT	P-VALUE	N (OBSER-VATIONS)
OWN16DUM	-.325	.0001	140
GSAL27A	.200	.0228	129
GEXP27B	.221	.0129	126
PRD28A	-.303	.0004	133
SAL28B	-.385	.003	83
GEXP28D	-.400	.008	87
ROI28E	-.352	.0021	74
GMS28F	-.390	.0009	70
JOB28I	-.420	.0007	62
EFF28J	-.497	.0003	48
SNB29A	-.395	.0001	124
SB229B	-.445	.0001	132
ALT29V	-.259	.0048	117
NVSP3A	.229	.0262	95
CON26A	.298	.0004	137
DOL26B	.266	.0016	138
PRD26C	.269	.0012	141
PER26H	.227	.0017	140
TST26J	.346	.0001	139
AUT26K	.171	.0408	137
DEL26C	.584	.0001	139
PROY3G	.163	.0906	109

APPENDIX E.6

LIST OF HIGHLY CORRELATED VARIABLES WITH OWN16DUM

ISRAELI DATA

VARIABLE	CORRELA-TION COEFFI-CIENT	P-VALUE	N (OBSER-VATIONS)
CON26A	-.384	.0002	87
TST26J	.263	.0128	89
LNEMPT4H	.314	.0026	90
TOTINV11	-.292	.0041	95
BDGRANT	-.302	.0029	95
SALAC13	-.257	.0304	71
PRT1B9B	-.300	.0056	84
GMS27D	-.224	.0370	87
EFF27H	-.247	.0290	78
NGTE27I	-.233	.0400	78
GMS28F	-.348	.0141	49
JOB28I	-.408	.0044	47
EFF28J	-.531	.0012	34
SB29B	.434	.0001	88
ALT29C	.394	.0004	76
SNB29A	.450	.0001	82
CRED10	.230	.0323	87
USGIP	.285	.0286	59
OUT3AA	-.231	.0240	95

APPENDIX E.6 (CONT.)

LIST OF HIGHLY CORRELATED VARIABLES WITH OWN16DUM

ISRAELI DATA

VARIABLE	CORRELA-TION COEFFI-CIENT	P-VALUE	N (OBSER-VATIONS)
CON26A	-.379	.0001	137
TST26J	-.261	.0021	137
DEL26L	-.216	.0112	137
CMT26M	-.325	.0001	140
TOTINV11	.283	.0005	146
BDGRANT	,285	.0005	145
SALAC13	.216	.0222	112
PRT1B9B	.277	.0025	117
YEAR2	.197	.0214	130
EFF27H	.185	.0471	116
MGTE27I	.277	.0029	113
PRD28A	.217	.0105	135
GMS28F	.243	.0372	74
JOB28I	.348	.0042	74
EFF28J	.456	.0010	49
MGTE28K	.322	.0177	54
SNB29B	.350	.0001	135
ALT29C	.339	.0001	120
SNB29A	.408	.0001	127
OUT3A4	-.227	.0094	130
NVSP3AB	-.254	.0120	97
BUR3F	.240	.0074	123
TEC3L	-.270	.0482	54

APPENDIX F: KOLMOGOROV-SMIRNOV TWO - SAMPLE TEST

VARIABLE	QUESTION	KOLMOGOROV-SMIRNOV STATISTIC (D-NORMALIZED)	ISRAEL	U.S.
ACF19A	19A	1.32	99	52
RIS19B	19B	0.78	99	52
TEC19C	19C	1.95	98	52
DIS19D	19D	4.03	98	52
EFF19E	19E	0.62	97	52
TIM19F	19F	1.77	98	52
BDOL19G	19G	0.74	98	52
NBDOL19H	19H	0.57	96	52
TECH21A	21A	2.48	87	49
MKTG21B	21B	4.19	91	49
DISS21C	21C	4.23	92	48
CUS21D	21D	4.34	90	48
PARD21E	21E	0.60	81	47
MGMT21F	21F	0.71	83	49
SIZ21G	21G	1.53	83	45
DM21H	21H	0.39	78	45
INDC221I	21I	0.28	76	42
COMC21J	21J	0.74	72	41
PHIL21K	21K	0.74	79	43
JEW21L	21L	1.96	61	42
CON26A	26A	0.99	93	52
DOL26B	26B	0.80	93	52
PRD26C	26C	0.74	94	52
MKT26D	26D	0.58	94	52
MGT26E	26E	0.34	92	52
PRP26F	26F	1.06	93	52
PRI26G	26G	0.26	94	52
PER26H	26H	0.64	94	52

APPENDIX F (CONT.)

VARIABLE	QUESTION	KOLMOGOROV-SMIRNOV STATISTIC (D-NORMALIZED)	ISRAEL	U.S.
CLT26I	26I	0.67	94	52
TST26J	26J	0.72	93	52
AUT26K	26K	0.64	92	50
DEL26L	26L	0.56	93	50
CMT26M	26M	0.44	94	50
CMP26N	26N	0.40	92	50
MSU26O	26O	0.25	86	46
GSAL27A	27A	2.37	94	49
GEXP27B	27B	3.49	95	42
GMS27D	27D	0.74	87	45
FOR27E	27E	3.67	97	39
TEC27F	27F	1.13	94	50
JOB27G	27G	1.06	87	45
EFF27H	27H	0.29	78	41
MGTE27I	27I	0.59	78	37
DOLC27J	27J	1.21	78	48
PRD28A	28A	1.09	93	50
SAL28B	28B	0.34	61	30
GSAL28C	28C	0.58	51	30
GEXP28D	28D	1.13	52	21
ROI28E	28E	0.37	49	31
GMS28F	28F	0.38	48	27
FOR28G	28G	0.18	64	12
TEC28H	28H	0.99	78	12
JOB28I	28I	1.00	47	21
EFF28J	28J	0.58	34	18
MGTE28K	28K	0.36	41	17
DOLC28L	28L	0.65	55	30

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