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AT A STRATEGIC DECISION POINT FOR HIGH GROWTH FIRMS

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INFLUENCE OF THE BOARD OF DIRECTORS
AT A STRATEGIC DECISION POINT FOR HIGH GROWTH FIRMS

By

Rebecca Ann Luce

A DISSERTATION

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# ABSTRACT

## INFLUENCE OF THE BOARD OF DIRECTORS
## AT A STRATEGIC DECISION POINT FOR HIGH GROWTH FIRMS

By

Rebecca A. Luce

The design of this dissertation attempted to address some of the criticisms of board composition research that have arisen due to the lack of findings of a practically meaningful relationship between board composition and firm performance. The five omissions noted in prior research of this nature that are tackled in this study are: (1) contextual factors do not receive sufficient attention in designing studies regarding board influence; (2) the failure to diversify the types of firms which are examined beyond the large corporation; (3) the inconsistency with which board composition variables have been operationalized; (4) the failure of many studies to tie the categorization of directors to the theoretical foundations being relied upon; and (5) the efforts of many researchers to link the composition of the board of directors to performance may fall short due to the distal nature of the connection.

In this study I examined the resource dependence role of the board of directors within the specific context of relatively small firms about to enter a period of high growth. I attempted to answer three primary research questions in this dissertation. The first was: How do the resources (in the form of knowledge and experiences) represented on the board of directors influence the response

of high growth firms to the internal organizational demands created by their steadily increasing size? The second was: How does the extent of the internal organizational changes implemented by firms during a period of high growth affect subsequent firm performance? And the final question was: How do the knowledge and experience resources represented on the board impact subsequent firm performance, both directly and indirectly, through the internal organizational changes made by firms during a period of high growth? I formulated six hypotheses to explore my three primary research questions, none of which received more than weak support.

This dissertation is dedicated to my parents,
Wayne and Patricia Luce.


They instilled in me a life long love of learning
and a belief that I could accomplish anything I set out to do.

## ACKNOWLEDGEMENTS

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# CHAPTER 1

## INTRODUCTION

Accompanying the dispersion of ownership that is characteristic of the modern corporate form is the rise of the board of directors as a corporate governance mechanism (Berle & Means, 1932). The existence of the board of directors is an acknowledgment that the owners of the firm are not in a position to assess for themselves whether or not their interests are being protected (Fama & Jensen, 1983). Both the managerialist perspective and agency theory take the general stance that when a firm's owners (principals) are not directly managing the business, they must entrust this activity to managers (agents), with the potential result that managers' self-interests will not coincide with those of the firm's owners (Berle & Means, 1932; Jensen & Meckling, 1976). The costs of monitoring the firm's managers, to ensure they are acting appropriately on behalf of the owners, reduces the value of the firm from its theoretical potential (Jensen & Meckling, 1976). The board of directors is a governance mechanism designed to minimize monitoring costs, and thus retain as much of the firm's value as possible for its shareholders (Fama & Jensen, 1983).

In their role as corporate watchdogs, boards of directors walk a fine line. They have a fiduciary responsibility to the firm's owners to protect their investment, yet they must generally accomplish this in a manner that does not usurp the responsibility of the firm's management, which is the running of the business (Lorsch & MacIver, 1989; Vance, 1983). Zahra and Pearce (1989) in their extensive review of the board of directors literature extant at that time,

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discuss the resource dependence perspective as it relates to the capabilities of boards of directors to perform their functions. According to Zahra and Pearce, the resource dependence approach "views boards as important boundary spanners that make timely information available to executives" and "extract resources for successful company operations" (1989: 297). In their resource dependence role, directors provide resources to the firm by virtue of their varying skills and abilities, as well as their linkages with the external environment (Pfeffer, 1972, 1973; Pfeffer & Salancik, 1978).

Zald (1969) points out that, in addition to board members serving as a means of reducing external uncertainty due to interdependency with other organizations, they also perform a valuable internal administrative role for the firm. In this role, directors who possess knowledge and experience that relate to the firm's business can influence the strategic decision making process (Zald 1969). According to Zald, this type of board resource can be knowledge that comes from "detailed familiarity with the specific organization or from general expertise..." (104:1969). To the degree that the resources represented by directors' knowledge and expertise match the needs of the firm, the board is better positioned assist the firm in attaining its goals (Pfeffer, 1972, 1973; Provan, 1980; Zald, 1967).

This dissertation examined the resource dependence role of the board of directors within the specific context of relatively small firms about to enter a period of high growth. I attempted to answer three primary research questions in this dissertation:

•How do the resources (in the form of knowledge and experiences) represented on the board of directors influence the response of high growth firms to the internal organizational demands created by their steadily increasing size?

•How does the extent of the internal organizational changes implemented by firms during a period of high growth affect subsequent firm performance?

•How do the knowledge and experience resources represented on the board impact subsequent firm performance, both directly and indirectly, through the internal organizational changes made by firms during a period of high growth?

To underscore the contributions of this study, I briefly review the relevant general findings thus far in research conducted on the influence of boards of directors, and to highlight some of the shortcomings that have been identified in the strategic management literature regarding board of directors research.

The theoretical models offered by the various perspectives on boards of directors all suggest that the nature of the directors serving on a firm's board, i.e. the composition of the board, is a critical factor in the ability of the board to fulfill their functions effectively (Zahra & Pearce, 1989). Literally hundreds of studies have investigated the relationship of board composition to various firm outcomes (cf. Dalton, Daily, Ellstrand, & Johnson, 1998; Johnson, Daily & Ellstrand, 1996; Zahra & Pearce, 1989). Studies of board composition adopt the presumption that boards made up of different types of directors will handle board functions differently due to the varying resources and perspectives they bring to their positions (Pfeffer, 1972, 1973).

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The litmus test of the efficacy with which a board executes its roles is ultimately firm performance. Perhaps due to the inherent difficulty in assessing the manner in which the board performs its functions, researchers have often sought to directly link board composition to firm performance, with mixed results (Zahra & Pearce, 1989; Johnson et al., 1996). Some researchers have found support for a relationship between the type of directors serving on a firm's board and firm performance (e.g. Barnhart, Marr, & Rosenstein, 1994; Baysinger & Butler, 1985; Cochran, Wood, & Jones, 1985; Pearce & Zahra, 1992; Schellenger, Wood, & Tashakori, 1989). Others, however, have failed to find such effects (e.g. Chaganti, Mahajan, & Sharma, 1985;Hermalin & Weisbach, 1991; Zahra & Stanton, 1988). In an effort to clarify the results of these apparently contradictory findings, Dalton et al. (1998) recently performed a meta-analysis of the effects of board composition on firm performance. Their analysis, which included fifty-four empirical studies and 159 different samples of firms, found a corrected mean correlation of .028 between board composition and firm performance, leading them to conclude that "board composition has virtually no effect on firm performance" (1998: 278).

The lack of a practically meaningful relationship between board composition and firm performance has attracted the attention of scholars interested in the board of directors as a governance mechanism. One of the primary criticisms of research being performed in this area is that contextual factors do not receive sufficient attention in designing studies regarding board influence (Zahra & Pearce, 1989). Governance scholars have pointed out that

boards' influences are often felt to the greatest degree when the firm faces a crisis of some sort calling for decisive action (Lorsch & MacIver, 1989; Mace, 1971; Zald, 1969), such as the dismissal of a current CEO (Vance, 1983), bankruptcy (Daily, 1995; Daily & Dalton, 1994), or takeover attempts (Ward, 1997). Zald emphasized that "it is during the handling of major phase problems, or strategic decision points, that board power is most likely to be asserted" (1969: 107). A failure to specify the context of the firms in a study may dilute the observed effects of the board of directors.

A second concern raised in reviews of the literature on board of directors is the failure to diversify the types of firms, which are examined. Most studies of the effects of boards of directors on firm outcomes have focused on large corporations, such as the Fortune 500 population (Zahra & Pearce, 1989). In the samples of the 54 studies included in Dalton et al.'s (1998) meta-analysis, eighty percent were large firms. Most board composition studies use a "convenience" sample of the firms for which data is most readily available, which tend to be larger corporations (Zahra & Pearce, 1989). However, the increased complexity of large, mature firms compared to smaller, younger firms may cloud the effects of the board of directors (Daily & Dalton, 1993; Dalton et al., 1998). Zald (1969) pointed out that when stock ownership is widely dispersed, (as it is apt to be in a large, public company), it is likely board power will be lessened. Correspondingly, the observed effect of the board's influence in such firms is likely to be diminished.

Third, a considerable source of consternation among those reviewing board of director research findings thus far is the inconsistency with which board composition variables have been operationalized (Daily, Johnson, & Dalton, 1999; Dalton et al., 1998; Zahra & Pearce, 1989). As Daily et al. put it, "If researchers have seen one measure of board composition, they assuredly have not seen them all" (1999: 99). The often-used designation of "inside director" categorization has numerously been operationalized as "active employees of the firm," "active and former employees of the firm," and "active and former employees of the firm and relatives of management" (Daily et al., 1999). This lack of consistency has made it difficult to draw conclusions across studies regarding effects of board composition.

Exacerbating this problem is the failure of many studies to tie the categorization of directors to the theoretical foundations being relied upon (Daily et al., 1999). (For exceptions, see Baysinger & Butler, 1985; Baysinger & Zardkoohi, 1986 and Hillman, Cannella, & Paetzold, 2000). As examples, Daily et al. (1999) suggest that the "outside director" category (those who are unaffiliated with the firm) may be most relevant when the focus of the study is the resource dependence role of the firm, while the "independent/interdependent director" distinction (hinging on whether or not the director was appointed by the current CEO) may be more relevant to a study of the board's function as a monitoring mechanism. When the operationalization of board composition is not matched carefully to the theory of the study, reduced effect sizes are likely to result.

Additionally, the efforts of many researchers to link the composition of the board of directors to performance may fall short due to the distal nature of the connection (Zahra & Pearce, 1989). Many factors in an organization have the opportunity to intervene between action taken by the board and the ultimate performance of the firm. The management of the firm by its executives is but one major source of "noise" in drawing conclusions about board impact on performance. Most of the theoretical models of board of director influence contain "strategic outcomes" of the execution of board functions as intervening variables between board composition and firm performance, yet few researchers explicitly include them in their studies of boards of directors (Zahra & Pearce, 1989). A stronger relationship may be observed between boards of directors and firm outcomes that are more proximal to the performance of the board's functions, with the influence of the board on firm performance modeled primarily as an indirect effect felt through intermediate outcomes.

This dissertation attempts to address these criticisms of prior board research. The context for this study involves firms that are anticipating entrance into a period of high growth. Zald (1969) and Zahra and Pearce (1989), in their discussions of contexts when the board of directors may be particularly valuable to a firm, highlight the transition from one stage of the corporate life cycle to another. Although the existence of a specific sequence of stages in a corporate life cycle has been called into question by the results of empirical research (Miller & Friesen, 1984b), there is evidence that as firms move from an entrepreneurial stage of development into a period of rapid growth, demands are placed on its

internal organization that necessitate changes to support firm performance at a larger size (Chandler, 1962; Haire, 1959). This transition, if accomplished successfully, is customarily characterized by an increased prevalence of top managers with professional experience in a corporate setting and increased structural complexity of the firm organizationally (Blau & Schoenherr, 1971; Hambrick & Crozier, 1985; Penrose, 1959; Tashakori, 1980). The influence of the board of directors in the success of a firm's high growth transition, and the changes within the firm that accompany it, form a part of the specific context for this dissertation.

The firms being studied here differ from the typical "large firm" profile of the majority of past board of director research. The size of the firms making the transition from entrepreneurial to more professional will be considerably different in size from the large corporation commonly studied. To illustrate this divergence, we can compare firms about to undergo an initial public offering of their stock with the Fortune 500. Only twenty percent of the firms going public in 1988 that were included in a study by Welbourne and Andrews (1996) had over 700 employees, while the average number of people employed by a Fortune 500 firm in 1988 was 12,700 (Abelson & Jacob, 1989). As mentioned earlier, board researchers and scholars have suggested that less complex, smaller firms may provide an avenue for observation of greater board effects on firm outcomes than their large-firm counterparts (Daily & Dalton, 1993; Dalton et al., 1998; Zald, 1969).

This dissertation focuses on the administrative aspect of the resource dependence role of the board of directors, i.e. furnishing advice and counsel to the CEO based on expertise directors bring to their positions. In an effort to ensure that the operationalization of board composition variables reflected this resource provision aspect of the board, I use the categorization of directors developed by Hillman et al. (2000). In their study, Hillman et al. reviewed the resource dependence literature and arrived at designations for directors based on the resources they brought to the board. The taxonomy they developed for directors was based on directors' experiences, expertise, and knowledge and their occupational attributes. By using classifications of directors directly tied to the specific role of the board I examine in this dissertation, and building on the use of the categorization system established as predictive by Hillman et al. (2000), I expect to increase the likelihood I would find evidence of the influence of board resources on firm outcomes in my dissertation.

Lastly, my dissertation design addresses the issue of proximity of the influence of the board of directors by examining the relationship between board composition and an outcome intervening between actions of the board of directors and firm performance, the transition to the growth stage of organizational development. I present a mediation model showing how I expect the expertise resources represented by directors to affect the firm's high growth transition, which in turn I predict will affect firm performance. I include a direct effect of the composition of the board of directors on firm in the model based on the results of prior studies, but I anticipate that the primary impact of board

resources on performance will be indirect, through the internal organizational infrastructure associated with high growth.

This dissertation employs a longitudinal research design in order to adequately assess the influence of the board of directors on changes that may (or may not) occur within the firm over time as it grows. I collected the data for this dissertation from archival sources over the period of four years, beginning with the measurement of board composition along with other "starting point" variables. For four years following the starting point date, data were collected on the degree to which a firm has implemented internal organizational changes associated with a high growth transition. Finally, subsequent firm performance was assessed four years after the starting point, allowing time for the effects of the internal organizational changes on performance to be observed. Figure 1.1 presents my general research model outlining the relationships between the primary variables in this study.

The balance of this dissertation is organized as follows: in Chapter II I review the primary literature underlying this dissertation, present the full model of effects I examine in this dissertation, along with my hypotheses regarding the relationships between the constructs. In Chapter III I describe the research methodology I used to collect my data and to empirically test my hypotheses. Chapter IV presents the results of my analyses and Chapter V contains my discussion of the results as well as directions for future research.
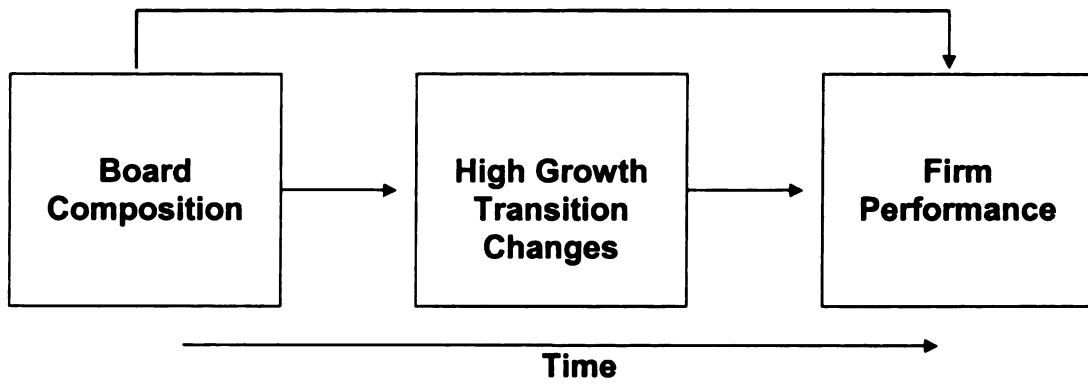
**Figure 1.1 General Theoretical Model**

# CHAPTER II

## LITERATURE REVIEW, THEORY, AND HYPOTHESES

To provide a foundation for the investigation I describe in this dissertation, I will next review the relevant research streams associated with the questions I posed. The primary areas of research related to this study are the resource dependence role of the board of directors and organizational structure literatures. I will proceed first by reviewing the research documenting the resource dependence role of the board, and then focus more narrowly on research regarding the board of directors' resource dependence role in smaller firms as well as in those experiencing a period of crisis or transition. Next, I will present the research related to organizational structure and, more specifically, firms' transitions in response to a period of high growth.

### Resource Dependence Role of the Board of Directors

The capacity of boards of directors to be valuable resources to the chief executive of their firms is one of the primary ways by which boards serve the interests of the shareholders they are entrusted to protect (Mace, 1971; Pfeffer & Salancik, 1978; Zahra & Pearce, 1989). All organizations face uncertainty, with prosperity and survival contingent on their ability to identify and cope with the factors that contribute to that uncertainty (Pfeffer & Salancik, 1978; Selznick, 1949; Thompson, 1967). Having a board of directors that provides needed resources is one manner in which firms can reduce uncertainty and be in a better position to compete successfully (Pfeffer & Salancik, 1978). Selznick (1949) originated the concept that organizations will be more successful if they garner

the support of key constituencies in their environments by soliciting their involvement in organizational activities, which he called "cooptation." Pfeffer and Salancik describe the rationale behind the perspective that outside directors are likely to coopt resources for use by the firms they serve as follows: "When an organization appoints an individual to a board, it expects the individual will come to support the organization, will concern himself with its problems, will favorably present it to others, and will try to aid it" (1978: 163). Zald takes the position that "to the degree that board members control or represent salient external 'resources' they are more powerful than if they do not control such resources" (1969: 100), thus giving them more latitude in executing their governance responsibilities. Since the primary purpose of the board of directors is to insure the maximization of shareholder wealth (Fama & Jensen, 1983; Mace, 1971; Vance, 1983), its ability to assist the firm's management by supplying valuable resources is directly related to serving the interests of the board's constituency.

Ferry (1999) reports that the representation of outside directors, (those who are not part of the firm's management), on corporate boards has steadily increased since 1973. Today, the typical board in the United States is comprised predominantly of outside directors, with such directors holding nine of the eleven average number of board seats. This change in board composition may have been spurred primarily by the focus on board reform over the past two decades, due to powerful institutional investors' perceptions that boards dominated by insiders were too passive in the execution of their discipline responsibilities (Rechner, 1989; Ward, 1997). However, the result of increased outside director

representation is boards that offer more resources than ever before to a firm's management. Since outside directors bring to their responsibilities a variety of experiences and knowledge on general business matters, as well as technical expertise, the "outside board" presents considerable potential for contributions to the running of the business (Fama & Jensen, 1983; Zahra & Stanton, 1988).

Board researchers have identified the resource dependence role of the board, its capacity to supplement a firm's resource base, as one of its key functions (Johnson, et al., 1996; Mace, 1971; Zahra & Pearce, 1989). Boards of directors are potentially in a position to accomplish their resource dependence role in two ways (Hillman et al., 2000; Pfeffer, 1973; Provan, 1980; Zald, 1969). First, directors may provide linkages to the external environment that facilitate the ability of the firm to procure the resources it seeks (Pfeffer, 1972, 1973). For example, a director from the financial sector may have connections within the banking industry that would make it easier for a firm to obtain needed financing (Pfeffer, 1972). By virtue of their contacts with other organizations within the firm's domain, outside directors may be in a position to enhance the competitive position of the firms they represent by making it possible to secure resources that would otherwise be difficult to procure (Charan, 1998; Pfeffer & Salancik, 1978; Thompson, 1967). When boards control access to crucial inputs, they reduce environmental uncertainty, and increase their influence within the organization (Zald, 1969).

The second manner in which outside directors can fulfill their resource dependence role is in an administrative capacity, by furnishing advice and

counsel that derives from directors' professional experiences and expertise (Pfeffer, 1972,1973; Provan, 1980; Zald, 1969). When outside directors join a firm's board with either executive or technical expertise, they supplement the knowledge and experience of the firm's top management and thereby provide an additional resource base upon which the firm can draw for decision making (Pfeffer, 1973; Pfeffer & Salancik, 1978; Provan, 1980; Zahra & Pearce, 1989). The ability of outside directors to supplement internal firm resources may assist them in preventing business problems before they arise, a high priority of large institutional investors and governance advisors (Byrne, Grover, & Melcher, 1997). Research supports the existence and importance of both the advice and counsel and external resource cooptation aspects of the board's resource dependence role, as I demonstrate in the following discussion.

As advisors, outside directors serve the interests of the firm's shareholders by providing counsel to CEOs and other top managers that supplements their existing business knowledge (Mace, 1971; Zahra & Stanton, 1988). According to Mace's interviews of corporate CEOs, the role of directors as sounding boards is an integral part of their function: "The inputs of outside directors were valued by top management, who had generally regarded the board members as 'additional windows to the outside world'" (1971: 39-40). The mental capacity of the top management team can be expanded by drawing upon board expertise, resulting in a "collective wisdom" that is more valuable to the firm than either the board or management functioning independently (Charan, 1998).

Using their professional expertise, outside board members can influence a CEO's decisions by "watching and counseling", without directly interceding in the management of the business (Lorsch & MacIver, 1989), a tactic that should only be employed when the firm's management is clearly performing in a substandard manner (Walsh & Seward, 1990). "Directors spend much more time advising the CEO, a task that, while not as dramatic as replacing him, enables them to play what many consider to be their key normal duty" (Lorsch & MacIver, 1989: 64). Mace (1971) found that chief executives often regarded outside directors as their peers in the business environment, and actively solicited their guidance in making critical business decisions. Hermalin and Weisbach's (1988) findings suggest that new CEOs may appoint outside directors as a means of securing needed advice and counsel.

While outside directors who currently or in the past served as executives themselves may provide general business management experience and perspective (Fama & Jensen, 1983), a firm may also the benefit from the expertise of those who come from more specialized professions, such as finance, law, or marketing (Mace, 1971; Pfeffer, 1972; Zald, 1969). These "specialist" directors are in a position to offer advice based on their technical knowledge and, therefore, to make contributions to decisions in areas in which managerial expertise is sparse (Baysinger & Butler, 1985; Baysinger & Zardkoohi, 1986; Hillman et al., 2000; Vance, 1983).

Two streams of research investigate the implications of the resource dependence perspective for the composition of the board of directors. One

stream examines the effects of contingencies facing the firm on the composition of the board, while the other looks at the effects of board composition on firm outcomes (Boyd, 1990). I first discuss the results of empirical studies that identify firms' contextual demands and assess to what degree their needs influence the composition of their boards of directors.

**Firm strategic contingency-board composition link.** While the evidence of the advice and counsel role of the board is largely descriptive, based on interviews or experiences of researchers (Johnson et al., 1996), there is considerable empirical research support for the position that the composition of the board varies depending on the resource needs of the firm. These studies start with the assumption that if directors are indeed a factor in providing needed resources for the benefit of the firms on whose boards they sit, then the backgrounds of the directors chosen by a particular firm should reflect its resource needs as well as the potential of the board to fulfill its functions (Pearce & Zahra, 1992). Therefore, various aspects of board composition serve as the dependent variables in this type of study, with compositional factors acting as proxies for the resources directors bring to the firm (Pfeffer, 1972, 1973).

Pfeffer (1972), in his landmark study of the resource dependence perspective, examined the relationship between common contingencies facing corporations, such as capital requirements or degree of regulation, and the composition of the firm's board of directors. He found support for his hypothesized linkages in a sample of eighty large corporations across a variety of industries. For instance, firms having needs to acquire financial capital (i.e.

those with higher debt to equity ratios), were more likely to have outside directors from financial institutions. Pfeffer (1973) obtained similar results in his research with a sample of hospitals, where the composition of the board of directors was related to the environmental demands placed on the hospitals and the functions administrators expected their boards to perform. Hospitals that were more reliant on the environment for fund-raising were more likely to look to their directors for linkages to the external environment than hospitals that had other sources of funding available to them. In addition, there was some evidence that the board function of providing external linkages was related to the composition of the board.

Baysinger and Zardkoohi (1986) classified directors into four categories, based primarily on their likelihood of contributing to decision control within a firm. They hypothesized that regulated firms (utilities) were less in need of directors capable of performing decision control functions than unregulated firms, due to the governmental restrictions on their operations. Baysinger and Zardkoohi's (1986) findings were consistent with the resource dependence perspective since the composition of boards differed between the two groups of firms based on their variation in resource requirements. Hermalin and Weisbach (1988) provide additional evidence supporting the resource dependence view. They found that an impending CEO succession was related to changes in the types of directors departing or being added to the board. Hermalin and Weisbach's (1988) results suggested that, as a CEO neared retirement, more insiders were added to the board, presumably to give potential successors additional exposure to other

directors who would be making the final CEO selection decision, and to give the candidates experience with the directorship function. They also found that a change in the firm's product strategy or poor performance led to changes in board composition.

Several firm contextual factors were linked to board size and to the representation of outside directors on the board in a longitudinal study of large firms conducted by Pearce and Zahra (1992) in their test of Pfeffer's (1972, 1973) strategic contingency view. For example, Pearce and Zahra (1992) had expected that when environmental uncertainty facing a firm increases, a large board and more outside directors will be observed. They supported this contention by pointing out that firms facing uncertainty (1) will attempt to coopt external constituencies to reduce uncertainty by including them on the board, (2) will recognize the benefits of a variety of director skills and capabilities, and (3) will seek to increase linkages with valuable resources in the environment. According to the resource dependence perspective, these three objectives would be more likely to be met with a larger board and greater outsider representation. As they had hypothesized, Pearce and Zahra (1992) found that increased environmental uncertainty in a firm's domain, diversification strategy, higher leverage structure, and past performance were all related to board size and the level of representation of outside directors.

Further indications of the connection between resource needs and board composition was provided by Hillman et al. (2000) who hypothesized that the uncertainty presented by deregulation of the airlines industry would dictate

strategic changes and, therefore, lead airline companies to alter the composition of their boards of directors accordingly. For instance, Hillman et al. (2000) predicted that outside directors with executive expertise would be more likely to appear on airline firms' boards when a vacancy occurred following deregulation, due to their capability to advise the firm on strategic direction. Supporting their hypotheses, they found that the need for firms to change their corporate strategies led to predicted alterations in the type of directors selected to serve on airline companies' boards.

Although not all of these studies linking board composition to firms' resource contingencies investigate whether or not directors actually make the contributions expected of them based on the resources they bring to the firm, their results are indicative of a link between firm resource needs and directors' abilities to meet those needs. The second stream of resource dependence research tackles the issue of how board resources, as reflected in board composition, are related to firm-level outcomes. These studies provide evidence that the composition of the board of directors affects the nature of their contributions to their firms.

**Board composition-firm outcome link.** The first set of studies I review within this second stream looks at firm outcomes that are intermediate between board influence and firm performance. Zald (1967) and Provan (1980), in research regarding the effect of board composition on the level of fund-raising by nonprofit organizations, found that the presence of directors who were influential in the community was positively related to the amounts of contributions and fund

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allocations the agencies received. In a study examining the cooptation of financial resources by a firm through the composition of its board of directors, Stearns and Mizruchi (1993) found that the type and amounts of funds a firm borrowed was positively associated with the nature of the financial institutions its directors represented. As Stearns and Mizruchi point out, "The financial institution can use its position on the firm's board to seek out potential business, and the firm can use the board appointment to coopt the financial institution into providing funds should the firm require them" (1993: 614). Boeker and Goodstein (1993) investigated the role of board composition on the selection of a new CEO. Their hypothesis that the choice of a CEO from outside the firm would be less likely when insiders dominated the board, since an outside successor would portend greater disruption than someone with whom they were already familiar, was supported.

A few studies specifically examine the relationship between board composition and strategic outcomes. Zahra and Stanton (1992), in an exploratory study of the relationship of board composition to strategic decisions, discovered that the size of a firm's board of directors was positively associated with increased research and development expenditures, and negatively related to divestments, while the ratio of outside directors was positively related to divestment frequency. Contrary to their expectations, Hill and Snell (1988) and Baysinger, Kosnik, and Turk (1991) found that inside director representation on the board was positively related to research and development spending by the firm. Both sets of researchers had expected to find that management directors

would be more risk-averse than outside directors, and therefore less likely to be associated with high-risk investments, such as R & D. Hill and Snell (1988) were also surprised to find that increased representation of outsiders was associated with greater levels of diversification. They had expected to find that outside directors would represent the shareholder view that there are more effective means of minimizing risk than firm diversification strategy. Although their hypotheses were not supported, Hill and Snell observed that "The results certainly indicate that board composition matters. Thus, they contradict the arguments of those who see the board as little more than a 'rubber stamp'" (1988: 588). In their discussion, Hill and Snell (1988) rely on a firm needs-board resources argument to explain their findings: inside directors may provide avenues for needed integration of functions within a firm when it is spending more on innovation, while more outside directors of the board may bring needed breadth of expertise to the firm that is diversifying. Since the design of their study was cross-sectional, it is difficult to assess the degree to which the board composition of Hill and Snell's (1988) firms was a reflection of its resource needs in managing strategies already decided upon, or whether the composition of the board influenced the strategic decisions that were made.

Judge and Zeithaml's (1992) study assessed the effect of board composition variables on the degree to which directors became involved in their firms' strategic decisions. They used both archival records and personal interviews with board members and CEOs in collecting their data. Again, results obtained for the influence of inside directors were counter to expectations.

Judge and Zeithaml (1992) had hypothesized that increased representation of inside directors would be associated with increased board involvement in strategic decisions, due to management directors' access to detailed internal information regarding the firm's business. In reflecting back on CEO interview comments to explain their counter-intuitive results, Judge and Zeithaml (1992) concluded that at least some CEOs may look to outside directors to make strategic contributions.

The second set of studies in this stream examines the relationship of bottom-line firm outcomes and board composition. As mentioned earlier, there are mixed results in the literature regarding board influences on firm performance. Five of the studies discussed earlier also examined the effects of board composition on some type of firm performance measure. Returning to Pfeffer's two studies, we find support for the proposition that the resource dependence role of the board has an impact on ultimate outcomes. In his 1972 study, Pfeffer assesses the effect of deviations from the "predicted" board composition based on the strategic contingencies facing firms, and finds that deviations are very significantly correlated with industry-adjusted performance measures (ratio of net income to sales and ratio of net income to shareholders' equity). Pfeffer (1973) uses several measures of organizational effectiveness for the hospitals in his study, and also finds correlational evidence of board composition associations with additions in facilities or programs, increases in the numbers of beds, and increases in budget size. In their study of the effects of strategic contingencies on board composition, Pearce and Zahra (1992) went on

to examine the relationship between board composition measures and future company performance. They found that both board size and outsider representation were related to multiple measures of firm performance, (ROA, ROE, and EPS), averaged over a three-year period

These three studies assessed both aspects of the resource dependence model described by Boyd: "First, composition of the board should be affected by environmental pressures and demands. Second, differences in board composition should affect a firm's performance" (1990: 419). All three of them found evidence for their hypotheses regarding the effects of firm strategic contingencies on board composition and the subsequent influence director resources on firm performance. Their results suggest, as the resource dependence perspective would predict, that when board resources are aligned with firm needs, the firm experiences positive outcomes.

Two additional studies that were discussed above regarding interim firm outcomes also investigated the effects of board resources on firm performance. Hill and Snell (1988) found that more outsiders on the board was positively related to industry-adjusted three-year average ROA, in spite of the fact that their predicted relationships between board composition and strategic outcome variables were not supported. Judge and Zeithaml (1992) whose study looked at the effects of board composition on the board's involvement in strategic decision making, used structural equation modeling to determine if indirect effects of composition measures (board size, insider representation) on financial performance could be observed. They found a marginally significant relationship

between board involvement and industry-adjusted ROA (averaged over a five year period).

A brief overview of six additional studies examining the relationship between board composition and firm performance are given, three of which find such a relationship, and three, which do not. Baysinger and Butler (1985) find that there is a lagged effect of changes in board composition on performance, with an increase in the proportion of directors having more independence contributing positively to later performance. Because of the longitudinal design of their study, Baysinger and Butler (1985) were able to establish that the effect of prior performance on board composition changes was less than the effect of composition on performance. Two studies used market measures of firm performance, designed to capture shareholder wealth as the dependent variable, given its centrality in corporate governance theory. Schellenger et al. (1989) and Rosenstein and Wyatt (1990) both found positive relationships between the representation of outside directors and shareholder annualized return on investment and share-price reactions, respectively.

As a counterbalance to the studies finding a board composition-firm performance relationship, Chaganti et al. (1985) found no difference in the proportion of outside directors when they compared the boards of twenty-one matched pairs of retailing firms, half of which had failed, and the other half which had not. In their exploratory study of the relationships between board composition and firm outcomes, Zahra and Stanton (1988) found either no relationship or a negative relationship between outside director ratio and multiple

measures of firm performance. Hermalin and Weisbach (1991) in a longitudinal study with rigorous controls, found no relationship between board composition and Tobin's q (the ratio of the market value of the firm to the replacement cost of its assets), a measure thought to capture firm value based on both tangible and intangible assets.

As was pointed out in the Introduction, it is difficult to determine why some studies have found a relationship between board resources, as represented by board composition measures, and firm performance, while other researchers have failed to find evidence of such a relationship. The differences in study design and operationalization of variables make comparisons problematic (Daily et al., 1999). It seems safe to observe that much remains to be learned regarding under what circumstances board influences on performance are most likely to be felt.

It may be, as Wagner, Stimpert, and Fubara (1998) contend, that the relationship between board composition and firm performance is more complicated than assumed. The results of their meta-analysis and follow up study finds a curvilinear relationship between insider and outsider representation and firm performance, with greater homogeneity of composition (either insiders or outsiders) associated with higher performance, as measured by ROA. However, as Hermalin and Weisbach (1991) commented, another reason for the difficulty in detecting patterns of board composition-firm performance relationships could be that different governance structures are optimal for different firms. This view is congruent with the resource dependence

perspective, and highlights the importance of specifying the specific strategic contingencies, or contextual factors, that face the firms being studied, if researchers hope to find influences of board resources on firm outcomes (Zahra & Pearce, 1989)

In spite of the contradictory findings regarding firm performance, we can take the two resource dependence research streams together: (1) the studies demonstrating a relationship between the contingencies facing firms, (which define their resource needs), and the composition of the board of directors, (which represents the resources they bring to the firm), along with (2) the studies finding relationships between board composition and firm outcomes dependent, at least in part, on board resources, and find ample evidence suggesting that boards are influential from a resource dependence perspective in helping firms obtain valuable inputs when they are in need of such assistance. While most of these studies were conducted with firms that are large corporations, some board scholars and researchers anticipate that the influences of the board of directors, such as performance of their resource dependence role, may be felt to a greater degree in smaller firms (Daily & Dalton, 1992, 1993; Whisler, 1988).

**Resource dependence role of the board in smaller firms.** Mace's (1948) report based on interviews with small business presidents and directors regarding the role of the board examined firms run by one or two people. Although these firms are clearly entrepreneurial and smaller than those that are the subject of this dissertation, Mace's observations in this early treatment of the board in the small firm context is echoed by later scholars and researchers and

is, therefore, worth recounting here. Mace concludes his book as follows: "It would be misleading and erroneous, of course, to conclude that competent boards of directors in small corporations are touchstones of business success. It can be concluded however, that active and able board members constitute one source of management assistance to small corporation managements and this source of help can be tapped for advice and counsel on any problem involved in the operations of the business" (1948: 91-92).

Mace (1948) points out that, unlike larger corporations, small businesses usually do not have the specialized expertise in-house to deal with many business issues, such as technical problems that may arise or sophisticated planning for the future. In addition, small business owners may have "blind spots" due to their lack of breadth in education or experience. Due to these limitations, the skills and managerial experiences of outside board members may prove valuable to the president of a small firm who has capable directors upon whom he can draw for supplemental knowledge and ideas. Mace (1948) highlights the objectivity of outside directors in emphasizing their potential value in the small firm context, since they are not hampered by family ties or job security concerns that may restrict the contributions of others associated with the firm.

Mace (1948) gives examples of when the board of directors may be especially helpful to the small business president, who is likely to spend the majority of her time on the daily running of the business itself. Outside board members may detect changing circumstances in the firm's environment that the

president doesn't observe due to her commitment to comfortable routines, which have developed in operating the business. Outside directors can also educate the small business manager in the benefits of budgeting and planning with the capability to forecast cash flow, which may otherwise not seem necessary to the company president who is preoccupied with day-to-day business operations. In general, active outside board members can supplement the limited managerial business experience possessed by many, if not most, small business presidents.

Mace (1948) identifies both dimensions of the resource dependence role of the board, providing advice and counsel and linkages with the external environment as important in small firms. The outside board member "multiplies the channels of information brought to bear on company problems" and "provides more avenues of facts with regard to conditions outside the company which otherwise might never be taken into account by the management" (Mace, 1948: 33).

Although information regarding the long-term success of small businesses is sketchy, the Small Business Administration (1998) reports that, of the new firms started during the 1976-1978 period (the most recent period for which such information is available), only thirty percent of those employing five or more people had survived eight years later. Welbourne and Andrews (1996) found that of 136 nonfinancial firms undergoing an initial public offering in 1988, only sixty percent existed independently five years later. Since small firms seem to be vulnerable to failure, they may benefit to a greater degree from the supplemental resources boards of directors bring to the organization (Eisenhardt

& Schoonhoven, 1990). Finkelstein and Hambrick (1996) make the observation that the amount of managerial talent in smaller firms may be less than in larger firms, creating a need for the contribution of the board of directors' expertise.

Small firms may have more difficulty gaining access to crucial resources and have fewer options for managing their resource dependencies, giving the board of directors an opportunity to fill this void (Pfeffer & Salancik, 1978). Daily and Dalton (1993), in their study of governance structures in small corporations, conclude that, for such firms, the resource dependence role of the board of directors may outweigh its monitoring function in importance. They state that outside directors are "an effective means for overcoming the 'liability of size'" of the small business, since the expertise and resources outside directors offer may "counter any disadvantages experienced as a result of the modest resource base experienced by many small firms" (Daily & Dalton, 1993: 76). Johnson et al. (1996) agree that this resource dependence role of the board may be more important in smaller firms, with the firms' managers welcoming the breadth of knowledge offered by the board.

Pfeffer and Salancik (1978) acknowledge the limited resources that may plague small organizations, leading them to select and utilize board members for their management skills. Castaldi and Wortman (1984) also emphasize the importance of the small firm board as a resource, and identify five board dimensions that are of particular relevance for small firms. Among these dimensions are the technical expertise, management expertise, and "special

economic service," (specific competencies or contracts), directors may offer the small firm.

Zald (1969) makes the point that it is easier in smaller firms for the board of directors to understand how the business works and to be sufficiently well informed to involve themselves in the firm's decision making. Once the firm becomes large and complex, directors are more reliant on management for information regarding business operations (Fama & Jensen, 1983). The reduced complexity of small firms creates fewer constraints on activity and may permit board inputs to be felt more readily (Daily & Dalton, 1993). Dalton et al. (1998) expand on this theme, by stating that boards in smaller firms are positioned to more readily fulfill their resource dependence role. "Moreover, we would expect that boards of smaller, less complex firms would enjoy more discretion with fewer vested interests within the firm as well as external to the firm" (Dalton et al., 1998: 274). They conclude that these factors may make it easier for board contributions to be felt in smaller firms.

There is some empirical support for the view that board resources play an important role within the context of the small business. Mohan-Neill's (1995) study of environmental scanning activities comparing larger and smaller firms showed that smaller firms engage in less environmental scanning activities and are therefore less informed regarding environmental issues. This lack of reliable information regarding the firm's environment is likely to make board executive expertise and cooptation of external resources more valuable. Robinson's (1982) results suggest that this is the case. He found that small firms that

availed themselves of external expertise to assist with their planning processes outperformed those not receiving such resources.

Judge and Zeithaml (1992) found that board involvement in the strategic decision making process in a firm decreased with the increased complexity of the firm's business, suggesting that boards of small firms may have the potential to make a greater contribution when the firm is smaller and less complicated, as other researchers predicted (Fama & Jensen, 1983; Zald, 1969). In a study regarding the impact of small firm boards on firm performance, Gilley, Ford, and Coombs (1999) found that the strategic contributions of boards of directors in high growth firms had a greater impact on performance in smaller versus larger firms. The amount of resources small firms possess does make a difference in how well they perform. Brush and Chaganti (1998) found that when small firms employing up to one hundred employees had more human and organizational resources, such as more owner experience, long-range planning, staff skills, and reporting systems, the net cash flow of the firm was greater. Their results are suggestive of the potential importance of board resources as a supplement to limited managerial resources within the small firm.

Finally, Daily and Dalton (1992) and Hambrick and Crozier (1985) specifically examined the resource dependence role of the board in small publicly held firms undergoing high growth, the context of this study. Both studies found that the most successful high growth firms had a greater representation of outside directors on their boards. Daily and Dalton concluded that the board of directors "provides a sensible tool when striving for the goal of

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firm growth," and that such firms "may need the strategic expertise and resources that a board of directors can best supply" (1992: 376, 383).

**Resource dependence role of the board during periods of crisis and transition.** Another context for the potentially increased impact of the board of directors on firm outcomes to be observed is during a period of turmoil. The resource dependence perspective suggests that, as uncertainty increases, which is the case during crises and transitions, firms will make use of the resources available through their boards of directors to reduce that uncertainty (Pfeffer, 1972, 1973; Pfeffer & Salancik, 1978). As Daily and Dalton point out in their study of board composition and bankruptcy, the resource dependence role of the board "would particularly underscore the necessity of having many external representatives on a board in a time of crisis as their presence would provide access to valued resources and information, facilitate interfirm commitments, and aid in establishing legitimacy (1994: 1606).

Both Mace (1971) and Lorsch and MacIver (1989), in their interview-based research into practices of boards of directors, came to the conclusion that the influence of the board may be at its greatest when the firm is undergoing some type of crisis. Directors appear to be more willing to "make waves" in the organizations on whose boards they sit when the situation facing them calls for some type of decisive action. Affirmative board involvement will be dictated by the nature of the situation facing the firm, either due to its suddenness, e.g. death or illness of the CEO or a hostile takeover attempt, or its severity, e.g. consistent and dramatic firm performance downturns indicating top management

changes must be made (Lorsch & MacIver, 1989; Mace, 1971; Walsh & Seward, 1990).

Zald (1969) agrees that the board of directors may have differing levels of impact on a firm's business depending on what is happening to the firm, but he characterizes these critical junctures somewhat differently than Mace (1971) and Lorsch and MacIver (1989). Zald describes "strategic decision points" that a firm faces as "major phase problems" during which "board power is more likely to be asserted" (1969: 107). Zald (1969) gives examples of the type of events or periods that may constitute a strategic decision point. One is the task of choosing a successor to the current chief executive. This responsibility may be relatively routine if the successor choice is obvious and has the consensual support of the board (Lorsch & MacIver, 1989), but the decision to maintain or replace an incumbent CEO is an occasion upon which the board can make its presence felt (Mizruchi, 1983; Vancil, 1987). The board has the responsibility to accurately assess the degree of distress represented by poor firm performance and to take action regarding the CEO if it determines he is detrimental to the welfare of the shareholders (Walsh & Seward, 1990). Frederickson, Hambrick, & Baumrin (1988) present a theoretical model of the factors affecting the decision to retain or dismiss a CEO, with board of director characteristics and beliefs as two of the four key elements likely to influence the outcome.

Another occasion for the board of directors to assert itself is during what Zald (1969) refers to as "life cycle problems." By life cycle problems, Zald means the organization is undergoing some kind of major transition, such as initial

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formation of the firm; a change in identity due to a merger, acquisition, or alliance; or changes in organizational policies, such as strategic direction or human resources philosophy. The board may need to step in to assure that needed changes take place should the firm's management be hesitant, or to make the difficult choices involved in the firm's adjustment to its transformed or tumultuous circumstances. Mace (1948) also identified this juncture in a firm's development as an opportunity for outside director involvement and contribution to company presidents. He points out that changes in the way in which the business is run will arise as the firm grows, but that managers in small businesses may not recognize the need to make the appropriate changes, or have the capacity to execute them effectively. Mace observed several cases in which "alert members of the boards of directors provided useful assistance during the expansion from intrinsically one-man businesses to larger enterprises" (1948: 49). Furthermore, Johnson (1997) developed a theoretical model relying on the resource dependence perspective which suggests that the resources firms require from their boards of directors will vary depending on the firm's life cycle stage.

Aside from the theoretical and descriptive evidence of the board's influence during firm transitional periods, there is other empirical support for the view that the situation faced by the firm does affect the level of board activity. Corporate restructuring presents an occasion of significant reorientation for a firm that may lead to board action. Johnson, Hoskisson, and Hitt (1993) found that "outside boards," those made up predominantly of outside directors, were

more likely to get involved in corporate restructuring decisions, (divestment of more than two businesses), than "inside boards." Their results suggest that when a firm is undergoing a dramatic change, the board that is not management-dominated becomes actively involved in the business. The level of outside board involvement became more accentuated when the strategic implementation of the firm's top managers was deficient (Johnson et al., 1993). Boards were apparently more inclined to take a "back seat" in the strategic decision making aspect of restructuring, unless they perceived the situation as sufficiently acute so as to call for their involvement. As mentioned earlier, CEO succession is another occasion where the board has the opportunity to become more assertive in its role (Zald, 1969). Weisbach (1988) found that outside boards were more inclined to respond to reports of poor firm performance by removing the chief executive than inside boards. The differential activity level of the outside boards found in both the Johnson et al. (1993) and Weisbach (1988) studies implies that they are drawing upon their outside expertise and, perhaps, increased objectivity compared to insiders, to make contributions to the firm during an important strategic event.

While a decision to restructure a corporation or the selection of a new chief executive are discrete, readily identifiable major events for a firm, declining firm performance is a more gradual process, yet has even more critical implications for the survival of the business. Gales and Kesner (1994) examined the resource dependence perspective in the context of deteriorating firm performance leading to bankruptcy declaration. As Gales and Kesner (1994)

point out, firms in such dire circumstances are likely to draw on whatever resources are available to them, including those represented by their boards of directors, to stave off declines in their businesses. They found that both size of the board of directors and the representation of outsiders on their boards decreased in firms headed toward bankruptcy, suggesting these firms may have felt the effects of reduced board resources during this critical period. Similarly, in a longitudinal study covering a period of ten years, Daily and Dalton (1994) found that five years prior to filing bankruptcy, firms that eventually failed had higher percentages of affiliated directors on their boards, (those with close personal or professional ties with the company), than firms that survived. Daily and Dalton (1994) used lack of director affiliation as a proxy for board objectivity and independence, suggesting that the resources represented on the board influenced firm performance at a critical juncture. Chaganti et al. (1985), in their study comparing failed and nonfailed firms in the retailing industry, found that the amount of board resources available (as measured by size of the board) influenced firm success or failure, with larger boards associated with lack of failure, although they did not find any relationship between outside director representation and firm failure.

I found no studies that directly compared the effects of board of director composition on firm outcomes in periods of relative tranquillity versus periods of turmoil. However, taken as a whole, the evidence collected by board scholars and researchers suggests that board resources are activated and important to firm outcomes during periods of crisis, significant reorientation, or transition. The

strategic decision point I examined in this dissertation is the transition

experienced by relatively small firms entering a period of high growth. In the next

section I discuss the literature regarding organizational structure, with the

implications of this specific transition in mind.

**High Growth Transition**

As Pfeffer points out, one of the strategies that firms can pursue to

"attempt to ensure their survival and continued growth" is to focus on "improving

the efficiency of the internal transformation process" (220:1972). The

organizational transition that is the focus of this dissertation is one that is

engendered by rapid growth of the firm. Although organizational growth can be

conceptualized in a variety of ways (Stemp, 1970 ), the sense in which it is being

used here is "simple growth," or an increase in the size of the organization

(Boulding, 1953). Haire (1959) took the position that organizational growth

results in some predictable ("lawful") processes that originate from within the

firm. His view suggests that, as a firm grows, its internal organization must also

evolve in order to adequately meet the increased demands generated by the

larger entity (Chandler, 1962; Haire, 1959; Khandwalla, 1973). Hambrick and

Crozier agreed that "small firms which are quickly becoming big must modify

some of their organizational arrangements" (1985: 37). As Caplow (1964)

indicated, the points in time at which changes in size of the organization occur

affect the nature of the demands placed on the firm. When an organization is

small to begin with, rapid growth will likely have a different impact than when the

organization has already become a behemoth (Caplow, 1964). The specific

context of this dissertation is the examination of the effects of high levels of growth on relatively small firms.

The need for the firm to make changes during this period of time, that is to move from the nature of the organization as it exists, to the type of organization it must become to support its growth and continue to function effectively, can be characterized as a transition (Greiner, 1972; Hambrick & Crozier, 1985). Miller and Friesen defined transition as "a package of changes that occur between the onset of the imbalance or stress and the time when some equilibrium or tranquil interval is reached" (1984a: 128). In the case of the firms that are the subject of this dissertation, rapid growth signals the onset of stress that begins the need for transition. This transition would be complete upon attainment of equilibrium, or the tapering off of the firm's rate of growth such that the internal organization of the firm is aligned with the organization's size (Greiner, 1972; Miller & Friesen, 1984a). This definition implies there may be periods of time during a transition when a temporary alignment of size and internal organization exist. However, a persistent high growth rate suggests the firm will continue to be in a transition period due to the need for further organizational changes to accommodate its rapid increases in size.

Lundberg (1984) further refined transitions into three types: emergence, transformational, and termination transitions. Emergence transitions encompass the evolution of an organization from a concept to a concrete entity. Termination transitions arise with the onset of organizational decline. Temporally positioned between these two types of transition are transformational transitions, which are

associated with the middle stages of an organization's development. One of the "precipitating conditions" for a transformational transition cited by Lundberg (1984) is organizational growth. In this dissertation, I am interested in the transformational transition associated with rapid growth as a firm leaves its "birth stage" of organizational formulation, and enters a "growth stage" of development (Miller & Friesen, 1984b).

As firms experience significant growth, the stress placed on the existing organization often results in "growing pains," or symptoms that signal the need for the firm to make changes to respond to its increasing size (Flamholtz, 1990). I follow the lead of Hambrick and Crozier (1985), who examined the challenges faced by firms undergoing rapid growth, and focus on factors internal to the firm that are likely to affect the degree of success it realizes from its growth. One of the symptoms of organizational strain due to growth is captured by Robinson's (1934) managerial inefficiency hypothesis. According to Robinson (1934), as a small firm grows in size, the capabilities of the entrepreneur are stretched further and further, until the operational efficiency of the firm suffers due to the inability of one person to meet the organization's managerial needs. Rapidly growing organizations need to develop new coordination, control, planning, and communication functions which were not necessary for the firm to perform effectively when it was smaller (Haire, 1959; Hambrick & Crozier, 1985; Kazanjian, 1988; Stanworth & Curran, 1976). Starbuck reinforced the difference between the informational needs of small organizations, which can be met informally, and the requirements of larger organizations to have information

"supplied regularly and collected in a systematic manner" (1965: 480). Hambrick and Crozier pointed out that successful high growth firms "used all available channels for acquiring crucial information about the environment" (1985: 39). DeCanio, Dibble, and Amir-Atefi, through use of simulation technology, assert that a "failure to take account of organizational [structure] adaptation" would have a serious impact on a firm's ability to implement its plans effectively (1292-3:2000). Thesmar and Thoenig (2000) also emphasize the importance of matching organizational structure to the needs of the organization.

James (2000) reinforces the impact of organizational structure on behavior within organizations. He draws particular attention to three aspects of structure that are influential: (1) reward structure, (2) performance evaluation, and (3) responsibility assignment. As James (2000) points out, there are multiple avenues by which the infrastructure needs of an organization may be addressed. For growing organizations, the prescriptions are in several key areas. One is the addition of "staff" personnel, or those individuals who bring specialized knowledge into the firm (Haire, 1959; Khandwalla, 1973). "The two main functions of the staff are to provide information for control and coordination, and to provide expert assistance beyond the skill or training of line executives" (Haire, 1959: 289). Penrose (1959) echoed this principle when she emphasizes the need of a growing firm for additional information to reduce the uncertainty created by growth. Penrose (1959) recommended that firms experiencing growth increase the heterogeneity of their internal resources by bringing in people who have expertise that is not already possessed by those currently employed. An

increase in specialists also facilitates the division of labor within a growing organization, another need for firms, which become too large to be run effectively by a single manager (Chandler, 1962).

As specialists are added to the upper echelons of the organization, it simultaneously assumes a more functional structure, with increased horizontal differentiation (Blau & Schoenherr, 1971; Hall, 1972; Kazanjian, 1988). A functional structure responds to the higher level of complexity involved in running a business of rapidly increasing size (Chandler, 1962). The more complicated administrative tasks facing the larger organization require a more complex organizational structure (than a pre-bureaucratic form) in order for the organization to perform well in the long run (Miller & Friesen, 1984b; Smith & Gannon, 1987; Tashakori, 1980).

A second means by which increased control and coordination is achieved is through standardization and formalization of policies and procedures of the organization (Blau & Schoenherr, 1971; Hall, 1972). Standardization involves defining or specifying a procedure or policy that has regular application within the firm, while formalization denotes the degree to which policies and procedures are written (Pugh, Hickson, Hinings, & Turner, 1968). Increased levels of standardization and formalization mediate between the information people need to do their jobs and task accomplishment, thereby promoting consistency of operations within an organization that is adding people and/or units at a rapid pace (Katz & Kahn, 1966).

In another response to Robinson's (1934) managerial inefficiency

hypothesis, some researchers emphasize the need for growing organizations to

hire "professional managers" who have had experience in larger business

environments and, presumably, an increased capability to manage such a firm

compared to more entrepreneurially oriented managers (Hambrick & Crozier,

1985; Tashakori, 1980). Providing some empirical evidence for this view, Miller

and Toulouse (1986) found a significant relationship between the profitability of

small firms in dynamic environments and their employment of professional

managers and technocrats.  Penrose (1959) pointed out that the current

management team of a firm places limits on its capacity to support growth

effectively. When those managers do not possess the qualifications to run a

business that is becoming increasingly large at a rapid pace, the capability of the

firm to grow and perform well is compromised (Penrose, 1959). Rapid growth

compounds this problem, as the firm must add managers with the requisite

expertise to run a larger organization prior to the need for them, if it is to succeed

(Hambrick & Crozier, 1985; Penrose, 1959).

Lastly, Dwyer (1970) identified the importance of continuous

communication among the employees of the organization as a key factor in an

effective transition during periods of high growth. "In a growth situation the

meshing of individual goals with company goals is imperative" (Dwyer, 1970: 98).

Hambrick and Crozier (1985) concurred, finding that successful high growth firms

were able to preserve the notable characteristics that helped make them

successful in the first place by maintaining high levels of contact among key personnel.

Empirical research on the characteristics of firms in a "growth stage" of development indicate that the specific internal attributes described above are associated with such firms: organizational structure increases in complexity, usually taking on a functional form; specialized areas of the business are supervised by separate managers with expertise in the area; policies and procedures are standardized and formalized; emphasis is placed on gathering and processing information and monitoring performance; and communication occurs between departments to facilitate coordination (Hanks, Watson, Jansen, & Chandler, 1993; Miller & Friesen, 1984b).

For the transformational transition associated with high growth to occur, the organization requires resources over and above those it needs to carry out its normal business operations (Lundberg, 1984; Penrose, 1959). This places a strain on the existing organization, because a rapidly growing small firm is "suddenly much, much bigger, but without necessarily having any aptitude or preparation for being big" (Hambrick & Crozier, 1985: 35). Firms, which are relatively small often, lack a surplus of resources, which may lead them to draw upon the supplemental resources provided by the board of directors, if they are available, during a period of rapid growth (Dwyer, 1970; Hambrick & Crozier, 1985).

Bearing in mind the demands placed on organizations as they enter a period of transformational transition brought on by rapid growth, I next describe

the theoretical model of relationships and accompanying hypotheses examined

in my dissertation. This section of Chapter II is organized by section of the

model, with the relevant theoretical underpinning presented in advance of the

hypotheses testing each set of relationships. At the conclusion of each section, I

illustrate that portion of the model related to the relationships examined by the

hypotheses presented thus far.

**Relationship of the Composition of the Board of Directors to Firms' High**

**Growth Transition Changes**

The degree to which the board of directors provides additional resources

to a firm undergoing the transformational transition triggered by high growth may

be a key factor in the firm's ability to do so successfully (Hambrick & Crozier,

1985; Whisler, 1988). The relationship between board performance of its

resource dependence role and the firm's implementation of the internal

organizational strategies required to support growth is one of the primary

questions I explored in this study. Both the knowledge directors bring to the

board based on their professional experiences, and their valuable contacts with

other organizations, can be drawn upon by a firm's CEO in the course of this

significant transition in a firm's life. "Boards can do management an invaluable

service by viewing the broader business landscape and helping management

recognize major opportunities and discontinuities that will affect the business"

(Charan, 1998: 8).

The view that the influence of the board has the potential to be felt more

during periods of organizational turmoil can be combined with the resource

dependence perspective that the effectiveness of the board in executing its responsibilities depends on the match of director attributes with the contingencies facing the organization. The result is a position suggesting that the influence of the board in its resource dependence role, i.e. the provision of resources to the firm, may be considerable when the firm is undergoing a significant transition, if the resources it possesses are well-matched to the needs of the firm's ability to make the transition. This dissertation explores the resource dependence role of the board of directors in one such transition: the transformational transition of a high growth firm to its changing internal organizational requirements.

In empirical studies assessing the linkage between resources brought to the firm by the board of director and the resource needs of the firm, the means by which the types of board resources provided by directors are measured is most commonly through the backgrounds of the directors themselves (Johnson et al., 1996)[1]. The resources directors bring to the board are usually captured by classifying them into one of several categories. The most common categories are outside directors, inside directors, and affiliated directors. As pointed out previously, board researchers have expressed concerns over the lack of consistency with which these measures of board resource provision have been operationalized (Daily et al., 1999; Zahra & Pearce, 1989). There have also

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[1] Although some board researchers consider the resource dependence perspective and the research on board interlocks, i.e. a director concurrently sits on the board of more than one company, as one literature, Zahra and Pearce (1989) distinguish the two. In their view, the board interlock approach is primarily concerned with a firm's competitive relationships, while the resource dependence perspective is more generally related to the external environment as a whole. Since the resources secured through board interlocks are not relevant to the board

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been criticisms leveled at the frequent lack of congruence between the measure of director background used and the theoretical foundations relied upon in the study (Daily et al., 1999; Dalton et al., 1998).

Hillman et al. (2000) have addressed this issue related to the resource dependence perspective by identifying four categories of directors, based on the nature of the firm's resources needs that they address. Hillman et al.'s (2000) findings suggest that firms undergoing deregulation in the airlines industry changed the composition of their boards of directors to more closely match their revised resource needs, in accordance with the authors' predictions using their four categories of directors. Two of these designations are relevant to the current study. "Business Experts," (current and former senior officers or professional directors of large for-profit firms), serve as sounding boards for top management, and provide outside managerial business expertise. "Support Specialists," (such as lawyers, bankers, insurance executives, public relations experts), provide specialized expertise in more technical areas of the business. Whisler (1988), in his article regarding the role of the board in firms making the transition to public ownership, uses very similar categories for the appropriate roles of outside directors in such firms, as do Castaldi and Wortman (1984) in their article on the boards in small corporations.

Business experts are in a position to offer general executive expertise in when providing advice and counsel to the CEO. As outside directors, they have a long-term perspective and objectivity that inside directors may lack. They are

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influences being examined here, I adopt Zahra and Pearce's (1989) analysis, and characterize the resource dependence perspective apart from the board interlock literature.

also likely to have contacts with organizations in the external environment that may facilitate the acquisition of resources the firm needs to implement the plans to make the transition to the growth stage of development.

> *Hypothesis 1a:* The number of business experts on the board of directors will be positively related to the extent to which the firm implements high growth transition infrastructure.

Support specialists possess expertise of a more technical nature than business experts. However, they also possess an exposure to the broader business environment that they can draw upon in their positions as directors for growing firms. Their business experiences and objectivity as to the firm's long term needs are also apt to lead them to offer advice and counsel as well as external contacts related to increasing infrastructure complexity.

> *Hypothesis 1b:* The number of support specialists on the board of directors will be positively related to the extent to which the firm implements high growth transition infrastructure.

The figure below illustrates the portion of the research model that corresponds to Hypotheses 1a and 1b just described.

```
┌──────────────┐      ┌──────────────┐
│   Board      │      │ High Growth  │
│ Composition  │ ───► │ Transition   │
│              │      │  Changes     │
└──────────────┘      └──────────────┘
```
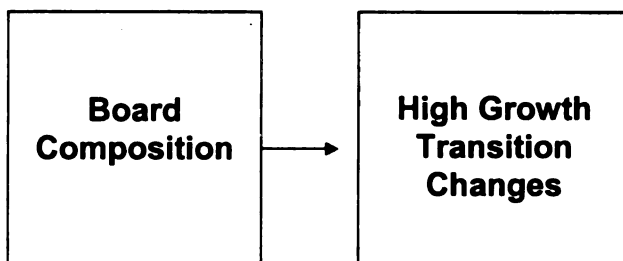
**Figure 2.1 Theoretical Model A**

## Implications for Firm Performance

Increasing organizational complexity and professionalization of management are associated with larger firms in the organizational literature (Chandler, 1962; Haire, 1959; Penrose, 1959) as a means of supporting the needs for coordination and control that are more pronounced in firms that have greater numbers of employees. However, the empirical evidence that the implementation of such changes in firms that are relatively small but undergoing rapid growth will lead to better firm performance than that of firms that ignore such mandates is sparse.

Miller & Friesen (1983) examined the differences between successful and unsuccessful firms (based on growth in profits and sales) at various stages of development. Miller and Friesen (1983) used three variables associated with information processing and three variables associated with decision making as indicators of differences across the firms. Collapsed across stages, there were significant differences between successful and unsuccessful firms on all six variables. Beginning with the growth stage of development, successful firms showed a linear progression of increased sophistication in decision-making and information processing over their life cycle stages, while the unsuccessful firms showed no such pattern. Miller and Friesen (1983) concluded that firms need to continuously improve their skills in these areas as they move through the different stages of development if they wish to remain successful.

Hambrick and Crozier (1985) studied firms that experienced a rapid growth rate and drew conclusions about the attributes of those they

characterized as "stars" versus those considered "stumblers." They found that the high growth firms with stronger performance demonstrated a tendency to hire professional managers, i.e. those with experience in larger firms, in preparation for the demands of a larger organization. They also invested in the training and development of their middle managers, in order to develop managerial talent in-house for future staffing needs. Hambrick and Crozier (1985) also observed that the more successful high growth firms in their study took steps to maintain a high level of communication and commitment throughout the organization as it grew.

Although the empirical evidence of a relationship between internal organizational changes customarily associated with growth and firm performance is scanty, organizational theorists have extensively documented the degree to which firms rely upon their internal resources to support growth (Chandler, 1962; Galbraith, 1973; Penrose, 1959) and the importance of aligning their structures with the strategic needs of the organization (Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Woodward, 1958). The implication of this alignment is that managers who fail to take notice of and respond to the signals that their firm is in need of internal changes will pay a price for their neglect. There is, therefore, reason for me to expect that the degree to which a firm responds appropriately to the transitional demands of its growth will have an effect on the subsequent performance of the firm.

> *Hypothesis 2:* The extent to which the firm implements high growth transition infrastructure will be positively related to subsequent firm performance.

The relationship of board resources to firm performance has been debated in the board of director literature. Some researchers have found a significant link between the type of directors sitting on a firm's board and the performance of the firm (Baysinger & Butler, 1985; Pearce & Zahra,1992; Schellenger et al., 1989). There is countervailing evidence, however, that board composition and firm performance are unrelated (Chaganti et al., 1985; Hermalin & Weisbach, 1991; Zahra & Stanton, 1988). In their meta-analysis of board composition and firm financial performance using 54 empirical studies and 159 different samples of firms, Dalton et al. (1998) found no practically meaningful relationship between composition and firm performance.

However, in a study specifically set in the same context as this dissertation, smaller growth-oriented firms, Daily and Dalton (1992) found a statistically significant relationship between the composition of the board of directors and firm performance as assessed by a market measure of performance. The high-growth firms that performed the best had higher proportions of outside directors represented on their boards than their counterparts. Similarly, Hambrick and Crozier found that successful high growth firms "try to tap big-company expertise on their boards of directors" in advance of problems surfacing, so they could draw on the experience of their directors to help avoid mistakes being made (1985: 37).

Although Hillman et al. (2000) did not test the relationship of board composition to firm performance using their four director categories, their study does address one of the criticisms being leveled at research regarding board

composition, the congruence of measurement with underlying theory. As reported earlier, they found that their categorizations of directors were related to firms undergoing changes in their resource needs. This study employs two of Hillman et al.'s (2000) measures of board composition based on the provision of resources by the board, business experts and support specialists. In light of the mixed evidence regarding the relationship of director type and firm performance, and the use of theoretically relevant operationalizations of board composition in this study, I offer the following hypotheses:

*Hypothesis 3a:* The number of business experts on the board of directors will be positively and directly related to subsequent firm performance.

*Hypothesis 3b:* The number of support specialists on the board of directors will be positively and directly related to subsequent firm performance.

Although the board of directors literature has not been able to reliably assess the relationship between board composition and firm performance, there is evidence that the resources the board brings to the firm are important for outcomes that are more proximal to board influence, such as selection of a new CEO (Boeker & Goodstein, 1993), fund raising (Provan, 1980; Zald, 1967), and borrowing practices (Stearns & Mizruchi, 1993). The nature of firms' strategic decisions have also been successfully linked to board of director composition (Baysinger, Kosnik, & Turk, 1991; Hill & Snell, 1988; Zahra & Stanton, 1992). It is likely that these interim outcomes, given that they are integrally related to important functions of the firm, ultimately have an effect on firm performance.

However, few studies have explicitly tested a mediation model of the influence of board resources on firm performance.

Judge and Zeithaml (1992) examined the effects of board composition on an interim firm outcome, board involvement in strategic decision-making, and the subsequent effect of that outcome on firm performance. In their study using structural equation modeling, Judge and Zeithaml (1992) found some evidence of indirect effects of board composition on firm performance. In another study using structural equation modeling to assess board influences on corporate. divestiture intensity, Hoskisson, Johnson, and Moesel (1994) found a significant positive relationship between the proportion of outside directors on the board, and relative debt intensity of the firm. Relative debt intensity was, in turn, significantly negatively related to the firms' relative market performance, again suggesting a mediated effect of board composition on performance.

In this research model, I have already hypothesized that the composition of the board of directors influences the interim outcomes of the degree to which a firm makes the internal organizational changes associated with a successful high growth transition. I have also presented the theoretical reasoning behind the anticipated effects of these transitional changes on subsequent firm performance. I further expect that these high growth transition changes will mediate the relationship between board composition and subsequent firm performance, such that at least part of the effect of board composition on firm performance will be felt through the degree to which it affects internal organizational changes associated with high growth.

*Hypothesis 4a:* The relationship between the number of business experts

on the board of directors and the subsequent performance of the firm will

be partially mediated by the extent to which the firm implements high

growth transition infrastructure.

*Hypothesis 4b:* The relationship between the number of support

specialists on the board of directors and the subsequent performance of

the firm will be partially mediated by the extent to which the firm

implements high growth transition infrastructure.

Figure 2.2 illustrates the research model with the firm performance

implications added.
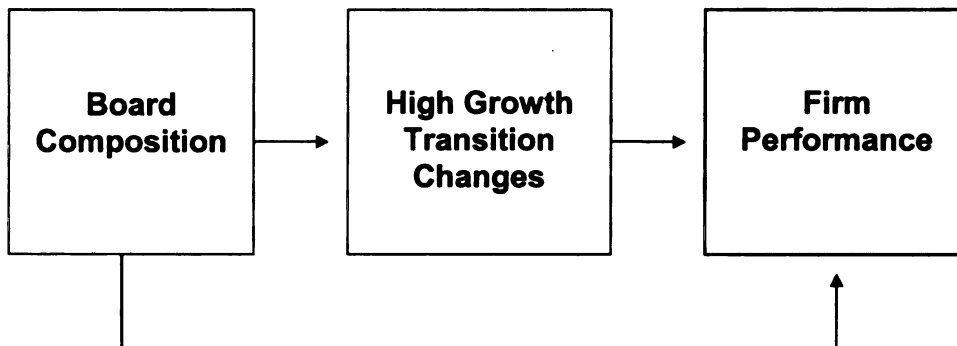


**Figure 2.2 Theoretical Model B**

## The Role of the Chief Executive Officer

The chief executive of the firm also represents resources the firm may

draw upon in making a high growth transition. Much attention has been given in

the research literature to identification of the differences in attributes between

"entrepreneurs" and "professional managers" (Daily & Dalton, 1992; Dyer, 1989;

Tashakori, 1980; Willard, Krueger, & Feeser, 1992). Robinson's (1934)

"managerial inefficiency hypothesis" discussed earlier is consistent with the view that the capabilities of the founder can only be stretched so far before firm results will begin to deteriorate. The common conclusion is that entrepreneurs who found firms must be replaced with professional managers in accordance with the changing demands placed on the firm by its growth in order for it to succeed long term (Dyer, 1989; Tashakori, 1980). However, Smith and Miner (1983) identify two types of entrepreneur. The first is considered a "craftsman" who is "characterized by narrowness in education and training, low social awareness and involvement, a feeling of incompetence in dealing with the social environment, and a limited time orientation" (1983: 326). The second type of entrepreneur is "opportunistic" and exhibits characteristics that are the counterpoint to those of the craftsman entrepreneur, e.g. has a breadth of education, is socially adept, and relates to a time frame in the future. Smith and Miner (1983) conclude that when the organization grows to the point of needing professional management, it is the orientation of the entrepreneur that is relevant, not the fact that she founded the firm, in determining whether she needs to be replaced for the firm to progress.

Rubenson and Gupta (1992, 1996) take an approach that is compatible with that of Smith and Miner (1983). If the organizations needs are changing, as they are when firms are undergoing the birth-to-growth transition, then the relevant question becomes, is the founder able to adapt? Rubenson and Gupta (1996) suggest that the level of education, general management experience, breadth of functional experience, and industry experience of the founder be used

as criteria in assessing the likelihood of his ability to make the transition successfully. They conclude that "it is only when the firm's development calls for more change that the founder is able or willing to make that the founder's replacement by a 'professional manager' should be necessary (1996: 54).

The supplemental resource needs of the organization in making the growth stage transition are, therefore, likely to be dependent on the managerial qualifications of its chief executive (Hambrick & Crozier, 1985; Mace, 1948). When the CEO of the firm has the background to draw upon to effect the firm's transition successfully, less reliance may be placed on the board of directors to supplement the firm's deficient resources (Golden & Zajac, 2001; Rubenson & Gupta, 1996; Westphal & Frederickson, 2001). Therefore, when CEOs already possess sufficient experience to identify and execute the changes involved with a high growth transition, I expect the influence of the board of directors will be reduced.

> *Hypothesis 5a:* The relationship between the number of business experts on the board of directors and the extent to which the firm implements high growth transition infrastructure will be weaker when the managerial qualifications of the CEO are greater.
>
> *Hypothesis 5b:* The relationship between the number of support specialists on the board of directors and the extent to which the firm implements high growth transition infrastructure will be weaker when the managerial qualifications of the CEO are greater.

Figure 2.3 illustrates the addition of the moderating role of the chief

executive officer in the research model.
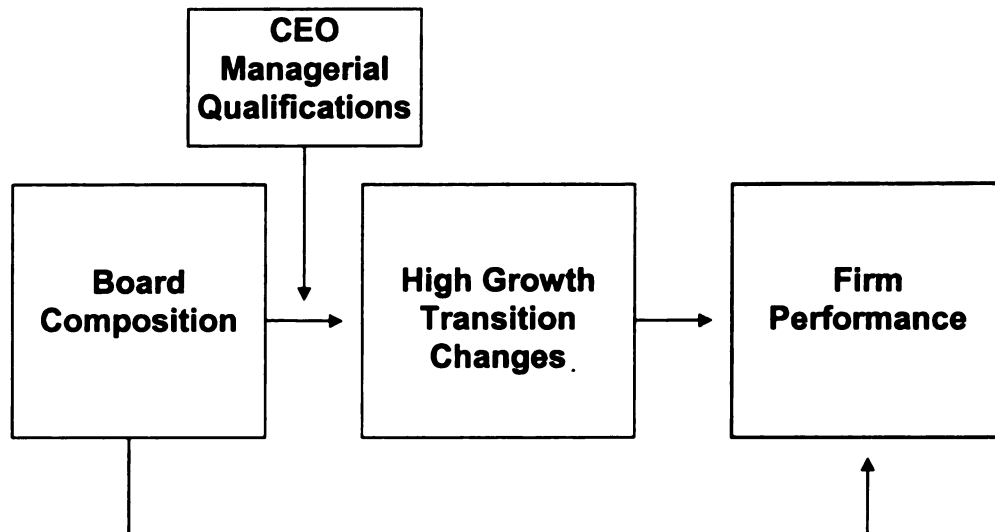


Figure 2.3 Theoretical Model C

**Implications of the Rate of Growth of Firms**

Firms that have undertaken plans to grow are likely to vary in how quickly

their firms undertake this strategy.  For some firms, the plan may be to grow in a

controlled, gradual manner that does not overly tax the organization's resources

(Churchill & Lewis, 1983).  For others, their strategies may involve exploitation of

the immediate opportunities presented by the marketplace as quickly as possible

to usurp the moves of any competitors that may seek to enter (Hambrick &

Crozier, 1985).  For these firms, a faster growth rate would be expected.

In addition, the faster the firm is growing, the more likely it is to have a

need to have these internal resources in place in order to perform well (Penrose,

1959).  As Hambrick and Crozier point out, "the successful firms tend to

introduce these new systems gradually and often in advance of when they are

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absolutely crucial" (1985: 37). A failure to allow time for the assimilation of new people and other resources may make them less useful to the firm (Penrose, 1959).

Therefore, the growth rate of the firm should have an effect on the relationship between the degree to which it has accomplished a high growth transition and subsequent firm performance. Since growth is dictating the necessity of the internal changes in order to support the expanding firm's requirements, the rate at which the firm is growing is likely to have an effect on how the firm fares later on as a result of the effectiveness of these changes. For firms that are growing more rapidly, the failure to implement internal organizational changes will likely have a more detrimental impact on performance. When firms are growing more slowly, the effects of the transitional modifications are less likely to be felt on later firm performance, since the firm will not be as burdened by the demands of its growth.

*Hypothesis 6:* The relationship between the extent to which the firm has implemented high growth transition infrastructure and subsequent firm performance will be stronger when the growth rate of the firm is greater.

Figure 2.4 presents the full research model tested in this study, along with the hypotheses representing each relationship that was tested. Next, Chapter III presents the research design, data collection and coding procedures, the variables included in this study, as well as the methods of analysis I used.
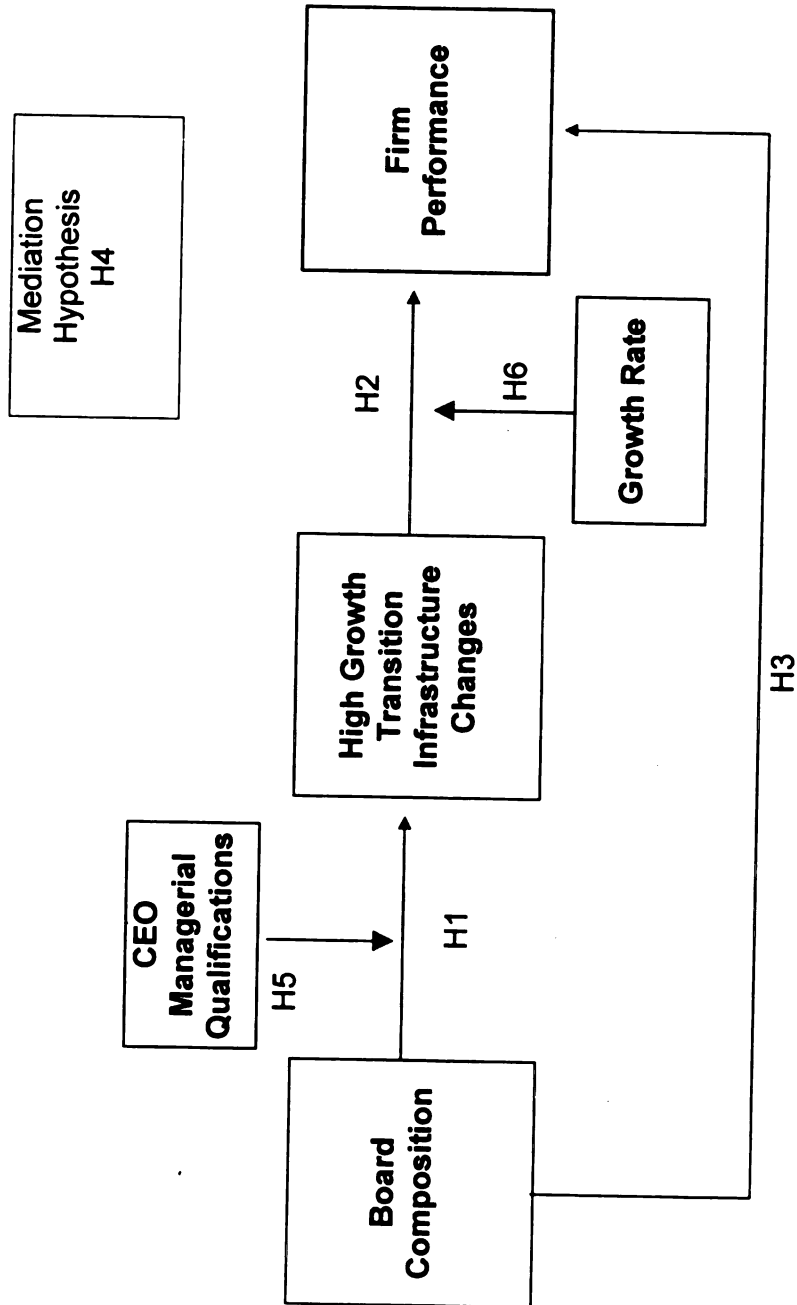
**Figure 2.4 Complete Theoretical Model**

# CHAPTER III

## RESEARCH DESIGN AND METHODS OF ANALYSIS

In this chapter I describe the research design I used for this study, the variables in the analyses, and the methods of analysis I used to test my hypotheses.

**Research Design**

Due to the relationships of interest in this study, (1) the impact of the resources represented on the board of directors on the degree to which a firm makes future high growth transition changes, and (2) the effects of both the board of directors and the nature of the firm's high growth transition on subsequent performance, I selected a longitudinal research design. I expected that examining these relationships over an extended period would provide a more complete picture of the relationships of the constructs to one another since they require time to develop. The sources of data for this study are archival, with data collected at varying points over a four-year period. I provide more information regarding the data collection process below.

**Sample**

The profile of firms I selected for testing the hypotheses of this study are firms that are poised to move into a period of growth. To meet this criterion, the sample was randomly drawn from the population of firms that made an initial public offering (IPO) of their stock in 1996. Firms undergoing an IPO are typically seeking an infusion of cash to support future growth (Lipman, 1994; Weiss, 1988). I eliminated firms from the sample that (1) did not include growth as a

stated purpose of their IPO, (2) produced no good or service and, therefore, had little need for an organizational structure, (3) were not U.S. firms, (4) had over 2,000 full-time employees (Miller and Friesen's [1984b] empirical study capped the size of growth stage firms at 2,000 employees), (5) were not still in business as an independent entity in 1999 (since this was the year for which I collected subsequent performance data). Based on a power analysis for this study, data on 250 - 300 firms were needed to detect an effect size of .20 with 90% likelihood. In the absence of any guidance from previous studies in this area, I selected an effect size of .20 since it is midway between a small and a medium effect size according to the parameters set out in Cohen and Cohen, 1983. I collected data on a total sample of 296 firms, although missing data reduced the number of firms for some analyses.

**Data Collection and Coding**

Data were collected from archival sources including the prospectus associated with the firm's IPO, 10Ks, and annual reports. See Appendix A for a complete list of the documents used and the timing of data collection for each of the variables in this study. I was able to secure prospectuses and 10Ks for 1997 and 1998 for all firms included in my sample. For some firms, however, annual reports were not available. (For 1997, annual reports for 50 firms were not available; for 1998, annual reports for 104 firms were not available). Therefore, I included two dummy variables in my analyses, one for the 1997 annual report (1 if present, 0 if missing) and one for the 1998 annual report (1 if present, 0 if missing).

A standardized format was used to record relevant information from the archival sources and to code the data after it was collected. See Appendix B for a copy of my Data Collection and Coding Sheet. I describe the specific procedures used to collect data for each of the study variables below.

**Independent Variable Measures**

**Board Resources.** The two measures of board resources I used in this study were outside directors who are either "business experts" or "support specialists" (Hillman et al., 2000). *Business experts* are those directors who are current and former senior officers or professional directors of large for-profit firms. *Support specialists* are directors who provide specialized expertise, such as attorneys, financial experts (including bankers and representatives of investment firms), public relations personnel, and insurance company representatives. To measure business experts and support specialists, I counted the number in each category sitting on the board. *Board size* was used as a control variable to scale the raw number of business experts and support specialists.

Since I was searching for a relationship between board resources and the changes in infrastructure subsequent to the firm's IPO (I collected data on the infrastructure variables at the end of the fiscal years 1997 and 1998), I wanted to measure board composition at the point in time most likely to be associated with the implementation of such changes. I found that board composition frequently changed shortly after the IPO, perhaps based on the CEO's or other board members' reassessments of what types of directors were most suitable for the

growing firm. Sixty-two percent of the firms had some kind of change in the composition of their board of directors between the dates of the 1996 IPO prospectus and the 1997 proxy statement, although the size of the board remained much the same (an average of 5.98 directors in 1996 and 6.18 in 1997). More specifically, over a third of the boards had a different number of business experts and support specialists as of the 1997 proxy compared to the 1996 IPO prospectus. With this degree of change in the boards during this short period, I concluded that the 1996 board did not accurately represent the directors most likely to influence future infrastructure changes. Therefore, I decided that the board composition in early 1997 was more likely to be related to changes in infrastructure occurring in 1997 and 1998. I collected data regarding the composition of the board from the firm's proxy statement filed in 1997.[1]

**CEO Managerial Qualifications.** I adapted the criteria for measuring the managerial qualifications of the CEO from Rubenson and Gupta (1996). Rubenson and Gupta's model (1996) drew on the conceptual foundations of Hambrick and Mason (1984) which described the influence of the backgrounds and experiences of key organizational decision makers on their perceptions and behavior in their positions. I measured four areas of CEO managerial qualifications with all data collected from the CEO biographical information provided in the firm's 1996 prospectus. First, the *level of education* of the CEO was obtained. Educational level is an important consideration in evaluating managerial capability since increased education is likely to enhance critical

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[1] I also ran the analyses including the board resource variables with 1996 board data. There was no difference in the results I obtained, so I maintained the 1997 board variables in my final

thinking and the ability to consider issues in a systematic fashion and on a broad

scale. I measured the highest level of education obtained by the CEO using an

ordinal scale, where 0 = no college education, 1 = some college education, 2 =

undergraduate college degree, 3 = master's degree, and 4 = advanced or

professional degree. Due to the lack of consistent reporting of CEO educational

background in company filings (data were available on only 149 out of 296

CEOs), this variable was subsequently dropped from my analyses.

Second, I collected data on the *years of general management experience*

the CEO had prior to joining the IPO firm. Experience in a corporate setting at

the senior management level is likely to enable the CEO to anticipate the issues

that will confront her growing organization and deal with them more effectively. I

calculated the total number of years of prior experience the CEO had had in

corporate business positions with titles of CEO, COO, President, and Executive

Vice President. Prior experience as a Senior Vice President was also included if

the position entailed heading a business division of a large corporation.

Experience was not counted if the CEO had been the founder of the business or

if the organization was not a for-profit business organization.

The third aspect of CEO background I measured was *breadth of*

*functional experience.* A diversity of functional experiences may enable the CEO

to identify problems and opportunities in a variety of areas of the business while

she is in the process of assembling a complete management team of specialists.

I counted each major area of functional experience in which the CEO had

previously worked, including operations, manufacturing/production, sales and

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analyses.

marketing, research and development, finance, business development and strategic planning, or specialized experience in a discipline related to the IPO firm's business, e.g. engineering, information technology, medicine, real estate, etc. An area of functional experience was counted whether or not it had been obtained in the same industry as the IPO firm for which the CEO currently worked. This data, like educational level, was not consistently available from company filings (data were obtained on 174 of 296 CEOs). Therefore, this variable was also subsequently dropped from my analyses.

Lastly, I measured the number of *years of industry experience* the CEO had prior to joining the IPO firm. Issues confronting the firm may be idiosyncratic to the particular industry in which it competes and the CEO with previous experience in that industry may be better able to understand and prioritize the specific needs of her firm as it grows. I relied upon general industry descriptions in calculating the number of years of prior industry experience. The prospectus provided a detailed description of the IPO firm's business and the biographical data for the CEO was sufficiently detailed to assess if the experience were in the same or a different industry. For instance, the prospectus for IPO Company X indicated it was in the business of providing optical storage systems. Its CEO had previous experience as Director of Marketing for a duplicating machine company and was President of a marketing services company. I concluded that he had no prior industry experience. In IPO Company Y's prospectus, on the other hand, its business description indicated it sold motor vehicle installment contracts. This company's CEO had prior experience as the Executive Vice

President of an auto finance division of a large finance corporation, where he managed a $1 billion portfolio of automobile loan receivables. I considered this experience to be in the same industry as the CEO's current firm.

**Rate of Growth.** I measured the actual rate of growth of the firm subsequent to its IPO in two ways: growth in employees and growth in revenues. Growth in employees and growth in revenues are the two primary means by which previous studies in the business environment have assessed organizational growth (Price & Mueller, 1986). As discussed in Chapter 2, I expected rate of growth of the firm to be a major influence on the relationship between firm infrastructure development and subsequent firm performance. I followed the lead of other empirical studies of organizational growth (cf. Baum, Locke, & Smith, 2001; Hanks et al., 1993) and measured growth rate by subtracting firm employees, (or revenues) in 1996 from number of employees (or revenues) in 1998 and dividing by the 1996 level of the variable. I collected information on both measures of growth from the firm's 1996 IPO prospectus and its 1998 10K.

**Dependent Variable Measures**

**High Growth Transition Infrastructure Variables.** Miner (1982) points out the problems associated with measuring variables to represent the types of constructs included in this study, especially given the archival nature of the data collection process. The variables presented here are intended to be representative of the issues raised in the literature describing the characteristics of organizational infrastructure needed to support firm growth. Wherever

possible, I relied on definitions of constructs available in the research literature in developing my measures.

The infrastructure measures I devised and the data collected were also influenced by the sources of data I had available for this study. Data for these variables were collected at three different times. Time 1 was from the firms' 1996 IPO prospectuses. This measurement of each variable served as a control variable representing the degree to which the firm had implemented infrastructure prior to its IPO. Time 2 data collection was from firms' 10Ks and annual reports for 1997 with Time 3 collection from these same documents for 1998. Data for 1997 and 1998 were combined to form the high growth transition infrastructure change dependent variables. By collecting data from these three sets of documents, I was able to capture the presence or absence of infrastructure in support of the firm's high growth transition just before and for two years following the actual IPO event.

For measures coded in a binary fashion (0 if absent and 1 if present), the maximum value was 1. This means that once one of these measures was detected as present in the firm, no further instance of the measure was counted. Appendix C contains a complete list of the measures comprising each of the high growth transition infrastructure variables, which documents and years were used for data collection for each measure, what method was used to identify the relevant data, how the measure was operationalized for analysis, and an example of the type of data collected for each measure.

For each measure, I developed a series of "key words" to search for evidence of the specific aspect of infrastructure. (Most of the SEC filings for this sample of firms were submitted as "Word" documents, which permitted the search of their contents through the use key words). These key words were identified based on a pilot study with firms not included in the sample. I developed an initial list of key words based on the organizational structure literature, supplemented by a general reading of company filings and documents. For instance, to locate information regarding the "management development" measure, I initially identified the following keywords: "training," "development," "seminar," "recruiting," and "recruitment." Similarly, I looked for evidence of the existence of a strategic planning process using keywords "strategy," "strategic plan," "planning," and "decision making."

The key words I initially developed were then used to perform actual searches of documents and edited to a list of those that were most effective and reliable in identifying evidence of each of the measures of interest. For instance, the final list of keywords for management development became "management development," "train," "seminar," "recruit." Through the use of my original list of keywords for management development, I discovered that using the keyword "development" resulted in many "hits" in the documents on development of products and services, which were not relevant to my search. Therefore, I specified "management development" as a keyword, which made the search far more productive. I also substituted "train" for the keyword "training" that I had used in the pilot study, since adding the gerund unnecessarily restricted the

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search. Evidence of management development programs could then be located if the words "train," "trained," "trains," or "training" appeared in the document. Similarly, "recruiting" and "recruitment" were shortened to "recruit." The keyword "seminar" was maintained unchanged.

In using this methodology to look for indications of high growth transition variables in sample firms, I was seeking to assess evidence of infrastructure development from three vantage points: (1) as an indication that the firm is cognizant that changes need to be made to support growth, (2) as representative of the changes a particular firm is in the process of making and, (3) as evidence that the firm is sending signals to its shareholders that it is undertaking the changes expected of it as it continues to grow.

I developed a total of fourteen measures that I expected to form five variables representing key aspects of infrastructure for high growth firms: standardization and formalization (six measures), shared goals (five measures), professionalization (one measure), management development (one measure) and specialization (one measure). I planned to create a numerical value for variables with more than one underlying measure by summing the scores on the measures that comprised it. As mentioned earlier, Appendix C contains detailed information on the collection of data for the high growth transition infrastructure variables. I describe the infrastructure variables and measures I used in this study in detail below.

A total of four recorders were used to collect the data for most of the infrastructure variables for this study: me and three graduate students who were

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trained by me to collect the data. The training process for the graduate students was conducted in two stages. The first stage was an orientation and formal data collection criteria session that lasted approximately an hour and a half. Graduate students were given a detailed set of instructions for collecting data, which I thoroughly reviewed with them. I then gave each student several firms for which they collected data using the Data Collection and Coding Sheet (shown in Appendix B). I also collected data on the same firms. I then met with each graduate student to compare my data collection results to theirs. We discussed any discrepancies, I answered questions, and we fine-tuned their data collection techniques, if necessary. Next, I describe each of the high growth transition variables used in my study.

**Standardization and formalization.** As a firm grows, having policies and procedures standardized is a critical means of insuring coordination and consistency within an increasingly larger organization (Charan, Hofer, & Mahon, 1980). Pugh et al. describe formalization as the "extent to which rules, procedures, instructions, and communications are written" (1968: 75). To identify instances of this type of infrastructure development, I developed a list of measures that serve as indicators of a firm's level of standardization and formalization. I relied upon descriptions in Pugh et al. (1968), Hanks et al. (1994), and Miller and Friesen (1984b) in arriving at the following measures for this variable.

First, evidence was sought for the formalization of *policies and procedures* within the firm. To assess the degree to which this aspect of infrastructure

existed within the firm, data collection focused on indications that policies and procedures existed and were codified (such as the existence of quality control, ISO standards, operating manuals, etc.). This measure was coded as "0" if no evidence was found and "1" if there was evidence of formalized policies and procedures. Second, I sought evidence of *employee training program* since training is a means by which companies can insure standardization of the way in which employees perform their jobs. Examples of ongoing employee training programs were coded either 0 (absent) or 1 (present).

Next, I examined the degree to which *performance measurement and compensation plans* existed within the firm. I sought indications of objective criteria for appraisal of performance and administration of compensation decisions for this measure. I identified two separate measures for performance and compensation: those that related specifically to *top management* (coded 0 or 1) and those that included *employees* below the top management level (coded 0 or 1). I also examined documents for the existence of *financial reporting and budgets*. Examples of this measure consisted of information systems reporting of firm performance, budgetary processes, and systems of financial controls. This measure was also coded 0 or 1. Lastly, I sought indications that the firm had a formal *strategic planning* process, coded 0 or 1. This variable was coded 1 only if the documents showed evidence of a complete strategic plan being in place, with multiple areas of the business being addressed.

**Shared goals**. A key aspect of making a successful high growth transition is the ability to sustain cohesion among the employees of the firm, as well as

alignment of employees' interests with those of the firm. Flamholtz (1990) and Hambrick and Crozier (1985) emphasized the importance of maintaining a common bond within the firm that creates a sense of involvement and commitment to the organization's goals. I developed three measures related to shared goals, relying on Flamholtz (1990), Hambrick and Crozier (1985), and Miller and Friesen (1984b).

First, I looked for evidence of the existence of a *mission or vision statement*. A published mission or vision statement available to employees is one means of insuring a unified view of broad organizational goals. This measure was coded as absent (0) or present (1). Second, I looked for company-wide *communication tools*, such as newsletters, e-mail systems, or other communication programs. The presence of such systems would indicate efforts are being made to keep employees consistently informed regarding critical company decisions and events. Evidence of this measure was coded 0 or 1. Third, I sought indications of three types of risk sharing plans, including *employee stock option plans, employee bonus plans,* and *employee stock purchase plans*. Ownership of a company's stock and bonuses based on performance are typical means by which firms attempt to align the interests of employees with those of the company as a whole. To be counted as evidence of shared goals, such plans had to include employees in general (not just top management). Coding for these three measures was 0 or 1, with each of three plans (stock option program, bonus plan, and employee stock purchase plan) counted as present or absent.

**Professionalization of management.** Chandler (1962) and Parsons (1960) both refer to the professionalization of management in the modern corporation as the increased presence of non-owner managers with the capability to administer the firm's business within a formalized structure. More specifically, professionalization of management in the context of a high growth transition indicates senior management that uses "written plans, formal evaluations, reward systems, and formal structure" in order to accomplish organizational goals (Tashakori, 1980: 21-22). Professional managers are "people who are adept at formal administration, planning, organization, motivation, leadership, and control" (Flamholtz, 1990: 40). Professional managers are characterized by having had experience in a corporate environment and thereby gaining an understanding of how to run a more complex business (Daily & Dalton, 1992; Flamholtz & Randle, 1987; Hambrick & Crozier, 1985; Miller & Friesen, 1984b).

Based on the characterizations of professionalization in the literature, I measured *professionalization of management* by averaging the number of years of previous management experience of the executive officers of the firm, excluding the CEO. This measure provided an indication of the degree to which the members of senior management had "professional" experience. This information was collected from the biographical information provided in the firm's 1996 IPO prospectus and its 1998 10K. (In some cases, this information was not provided in the 10K document. Instead, it was incorporated by reference to the firm's proxy statement. In these situations, I used biographical information

from the 1999 proxy statement for those officers who were employed as of the end of the 1998 fiscal year).

A second indicator of the firm's professionalization of management that is important for an effective growth stage transition, according to Flamholtz (1990), is the introduction of *management development programs* to prepare future managers for the firm's growing needs. Hambrick and Crozier (1985) agree this is a critical means of building a professional team for the future. Therefore, a second measure of professionalization of management I used was whether or not the firm had a program for developing managerial skills. This measure was scored as "present" with a "1" or "absent" with a "0."

Because one of these measures is continuous (years of corporation experience) and one is dichotomous (management development program), interpretation of a variable composed of the two measures combined would be very difficult. Therefore, the measure of years of prior management experience of the executive officer group is used in my analyses as one measure of professionalization (hereinafter referred to as the "professionalization" variable) and the existence of a management development program (hereinafter referred to as the "management development" variable) is treated as a second measure of professionalization.

**Specialization.** Another aspect of making a successful high growth transition is increasing specialization of the functions of the organization (Miller & Friesen, 1984b). According to Pugh et al., specialization is "concerned with the division of labor within the organization, the distribution of official duties among a

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number of positions" (1968: 72-73). Specialization permits the firm to accomplish two objectives important to making a successful growth stage transition: (1) to add specialized expertise to the organization to handle specific problems related to important areas of the business, and (2) to assist in the development of a functional structure designed to permit the separation of tasks under the supervision of an expert in the area.

I measured this variable by counting the number of different reporting relationships that were represented by the executive officer group plus any other members of the top management team the firm identified. I elected to take a broad approach to measuring specialization because I wanted to capture the dual aspects of the variable as described above. That is, specialization represents both "specialized expertise" and "separation of responsibility." Titles of senior managers ranged from those that clearly indicated technical expertise, such as "Vice President of Immunology" or "Chief Technology Officer" to those that weighed in more heavily on the segmentation of responsibility, such as "Senior Vice President of Eastern Operations" or "Vice President for International Sales." There were also members of senior management who managed a distinct business segment, with titles such as "President, Shoe Division." By including these variations of specialization, ( i.e. functional, product, and geographic), I was also capturing the three basic types of organizational structure identified by Mintzberg (1979).

Generally speaking, the levels of titles represented by top management and included in the specialization variable were "Chief (functional area) Officer,"

"Executive Vice President," "Senior Vice President," and "Vice President." If an individual with the title of "Director" was specifically identified as a member of the top management team, he or she was also included. The CEO and COO titles were not considered evidence of specialization since these functions are very broad and consist primarily of oversight of the top management team. Table 3.1 in the Appendices presents a sampling of areas of responsibility included in the specialization variable from a group of 30 firms. This table shows how many instances of the title were counted and the general industry categories in which it appeared.

Specialization was measured with data collected from the firm's 1996 IPO prospectus and 1998 10K (or 1999 proxy statement, as described for data collection for the professionalization variable above).

Following the primary data collection process, I recollected data on 25 (10%) of the firms for which data were collected by the graduate students so I could assess inter-collector reliability. I used Cohen's Kappa (Cohen, 1960) to measure degree of association of the two sets of measurements at the item level, since the measures were operationalized as binary (0 = absent, 1 = present). Cohen's Kappa is considered a more accurate and conservative measure of association than simple percent agreement in scores, since it uses the actual distribution of scores from the two sources to correct for chance in the level of agreement (Cohen, 1960). In addition, I assessed the level of agreement at the variable level using Kendall's tau-c. Kendall's tau-c assesses degree of association by comparing relative rankings of pairs of cases obtained

from multiple sources (Kendall, 1962). Cohen's Kappa requires a symmetrical table of scores from both raters, which is easier to obtain when the variable is binary. Kendall's tau-c is a more suitable measure of association with variables that are not binary (my variables are the total of the values of their measures) since the tables of raters' scores do not have to be symmetrical (Kendall, 1962).

The results of the inter-collector reliability analyses are reported in Table 3.2 under the Cross Collection columns. Unfortunately, for some of the measures (particularly for the 97-98 time period), the measure of association could not be calculated. This was due to one or both of the collectors having only one value (0 or 1) for all the cases on that measure. When all the scores of a rater on a measure have just one value, a measure of association cannot be obtained. In these situations, I calculated a simple percent agreement (uncorrected for chance), which is denoted in the table by a superscript.

Following data collection, I numerically coded the data based on the values established for the measures in my study. Inter-coder reliability was evaluated by having another Ph.D. student whom I trained code infrastructure data from 30 firms (approximately 10% of the sample). His training consisted of a review of the list of measures along with the criteria for each. I used the instructions developed for the data collectors, a list of variables from SPSS, and samples already coded by me for the training session. Prior to coding the 30 firms, we independently coded data on 10 other firms and compared results to identify any misunderstandings in the coding criteria. Inter-coder agreement was measured by the same methods I used for inter-collector agreement. The

results of the inter-coder reliability tests are reported in Table 3.2 under the Inter-Coder Reliability columns.

I interpreted the acceptability of the level of agreement for the inter-collector and inter-coder results based on the guidance of Fleiss (1981), who takes the position that the reliabilities generated by measures of association such as Cohen's kappa and Kendall's tau are subject to the same standards as any reliability statistic, such as alpha. Nunnally (1967) provides standards for the determining what level of reliability is satisfactory, depending on the maturity of the research area and measurement tools available. For measures of a construct that are in the "early stages" of research, (such as the measures I devised for this dissertation), Nunnally states "reliabilities of .50 to .60 will suffice" (1967: 226). Therefore, I used the criteria of .60 as a cut-off for interpreting the results of the inter-collector and inter-coder reliabilities I calculated for the measures underlying the standardization and formalization construct. On this basis, only the *policies and procedures* measure and the *strategic planning* measure have sufficiently high reliability to include in my analyses. The existence of an overall standardization and formalization construct was not supported. Instead, I used the two reliable measures as separate variables in my analyses. As with the standardization and formalization construct, some of the measures underlying the shared goals construct had low inter-collector and/or inter-coder reliability. Only the existence of a *mission statement* and existence of an *employee stock purchase plan* were sufficiently reliable for inclusion in my analyses. My primary analyses including the infrastructure

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variables thus included the following variables: *policies and procedures, strategic planning, mission statement, stock purchase plan, management development, professionalization*, and *specialization*.

As an external validity check on the degree to which my use of archival data collection sources for infrastructure variables were indicative of the actual level of infrastructure development of the firms in my sample, I also collected data on these variables for a sub-sample of 20 randomly selected firms. For each of these firms, I sent a brief survey via e-mail to the highest-ranking member of the current top management team who had been with the firm since its IPO in 1996. See Appendix D for a copy of the cover letter and survey used to collect this data.

This survey was necessarily retrospective. I asked the respondents to indicate whether or not the named areas of infrastructure were present or absent at two different points in time: in 1996 at the time of the firm's IPO and again in 1998 at the end of the company's fiscal year. The results of the comparison of the survey data with the data I collected from archival sources are shown in Table 3.2 in the External Validity columns. Cohen's Kappa was again used to assess degree of association. Where association could not be calculated, the uncorrected percent agreement is reported (and noted as such in the table). There is very little agreement between the executive survey and my archival data collection measurement of the infrastructure variables. The only measure with good reliability is *employee stock purchase plan*. Therefore, I ran a supplemental set of analyses using only this variable, management

development, professionalization, and specialization to see if it made a difference in my results. These results are reported in Chapter 4.

**Firm Performance.** A wide variety of firm performance measures have been used in research regarding the board of directors and firm performance (Johnson et al., 1996). Both accounting measures of performance and market-based measures of performance have been widely employed (Dalton et al., 1998). Given the debate as to the efficacy of one set of performance measures over another (Bentson, 1982; Chakravarthy, 1986; Venkatraman & Ramanujam, 1986), it seems prudent to include multiple measures of firm performance in efforts to adequately assess the construct, as recommended by Zahra and Pearce (1989) in their review of the board of directors literature.

The measurement of performance in firms that have recently become public companies and are rapidly growing presents some special issues. Traditional accounting measures, while they have the advantage of being widely used, may not accurately reflect firm value when firms are making substantial investments in and outlays for their businesses, as is frequently the case with growing firms (Horngren, Sundem, & Stratton, 1999). One of the criticisms of accounting measures of firm performance is that the manner in which they are calculated is largely under the control of the firm's management and may vary from firm to firm (Bentson, 1982). In firms which are inexperienced at reporting their financial results to the public, this concern may be magnified, as the management groups of their respective firms are in the process of developing and fine-tuning their newly-formatted accounting systems (Flamholtz, 1990;

Miller & Friesen, 1984b). On the other hand, for a firm with a recent influx of new owners, such as those in this sample, the value attached to the firm by its shareholders is likely to be a significant factor in assessing firm performance. Increases in market returns are one manner in which an expanding newly public firm can finance its growth through acquisitions (Hof, 1999; Lipman, 1994).

As a result of these competing concerns, I used four measures of firm performance in this study. I planned to use two frequently used accounting measures since they are useful for comparability of results across studies: *return on assets (ROA)* and *return on equity (ROE)*. In addition, I intended to use two market-based measure of performance: the firm's *price/earnings (P/E) ratio* and the *ratio of a firm's market value to its replacement value (MV/RV)*. A firm's P/E ratio provides an indication of investors' beliefs in the firm's growth opportunities and its value relative to its risk (Brealey & Myers, 1996). In a study of corporate governance in growth-oriented firms, Daily and Dalton (1992) found a significant relationship between board composition and the firms' P/E ratios. Tobin's *q* is frequently used to represent a measure of the overall value of a firm (including its intangible assets) from the perspective of its shareholders (Tobin, 1969; Lindenberg & Ross, 1981). Calculation of Tobin's q, however, is complex and requires the availability of data to which I did not have access. Variaya, Kerin, and Weeks (1987) compare the value creation (or destruction) implications of Tobin's *q* compared to the ratio of market value to book value and concluded they were equivalent from a theoretical point of view. They also conducted an empirical assessment of the market value to book value ratio as a measure of

firm value to shareholders and found it behaved very similarly to Tobin's $q$.

Therefore, I used the ratio of a firm's market value (price of a share of the firm's

stock at fiscal year-end multiplied by the number of shares of common stock

outstanding at year-end) to book value (shareholder's equity) as my second

performance variable designed to measure shareholder value of the firm.

Out of necessity, variations of three of these performance measures were

used in my analyses. For ROE, twenty-seven firms had negative values for

shareholders' equity (their liabilities exceeded their assets). This led to an

uninterpretable value for ROE. (If net income were also negative, the firm had a

positive ROE, which was misleading). Therefore, I decomposed the ROE

variable into a dependent variable (net income) and a control variable

(shareholders' equity). Negative values for shareholders' equity led to similar

difficulties in interpreting MV/BV. Since shareholders' equity is the denominator

in this measure, negative values for shareholders' equity would lead to negative

values for the ratio. Logically, a firm with a positive market value and negative

shareholders' equity would have a higher MV/BV in the eyes of shareholders

than one with positive shareholders' equity and the same market value, yet the

MV/BV ratio would be lower, since it is a negative number. Therefore, I

decomposed MV/BV into a dependent variable of market value and a control

variable of shareholders' equity. Third, a negative earnings per share value led

to values for a firm's P/E ratio that were also misleading. For example, a firm with

an earnings per share of -$.20 and a stock price of $5.00 per share would have a

lower P/E ratio than a firm with the same stock price but with earnings per share

of +$.20. Yet the poorer performing firm (with regard to eps) would be considered to have better stock performance in light of its earnings than the firm with the same stock price and positive eps. The source I used for industry data calculated P/E ratio as market value (stock price multiplied by number of common shares outstanding) divided by net income. I used the same measures at the firm level for the firm P/E measure when I decomposed it. The dependent variable thus became market value and net income was used as a control variable. The performance measure of ROA remained in its typical composite form in my analyses.

Raw data for 1999 firm performance measures were obtained from the firm's 10K whenever possible. ROA was calculated by dividing net income by total assets. The number of common shares outstanding at the end of the year was collected for the calculation of MV. Performance data for firms for which no 10K was available were collected from Compustat. Compustat was also used to collect data on a firm's share price at year-end to calculate MV. If the data for a firm were not available through Compustat, (some firms in my sample were not included in the Compustat database), an on-line source was used, which obtained its information from the Primark database. This occurred primarily in the collection of fiscal year-end stock price information.

For 12 firms in my sample, performance data were available only through the third quarter of 1999. Since I did have data for three quarters of 1999 fiscal

year, I substituted fourth quarter performance data for fiscal year 1998 for the fourth quarter 1999 data that were not available.[2]

**Control Variables**

**Industry.** I considered general industry type important to include as a control variable in this study since a firm's industry may affect the manner in which it makes a high growth transition, i.e. differing organizational structures and/or management practices may be appropriate given the nature of the business of the firm. Burns and Stalker (1961) and Lawrence and Lorsch (1967) were early researchers favoring a contingency approach to organizational structure, whereby the nature of a firm's internal design relates to industry in which it competes. The more recent findings of Thesmar and Thoenig (2000) support this assumption. They found that the organizational structure of firms employing highly skilled labor were more decentralized and flatter than those relying more heavily on unskilled labor. They also found that firms that were in more innovative industries (experienced more product changes) were likely to have a functional structure that was more flexible than that of less turbulent industries. Similarly, Rajan and Zingales (2001) found differences in organizational structure among different types of industries based on whether they were physical capital-intensive or human-capital intensive. Based on a review of the relevant literature, I made three distinctions in this study with regard to industry type: manufacturing, service, and knowledge-intensive. Manufacturing firms customarily have fewer employees than service firms, while knowledge-

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[2] I included a dummy variable representing my use of 4th quarter 1998 data for these 12 firms in the firm performance analyses to determine if this data substitution affected my results. Since it

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intensive firms tend to have less formalized structures and fewer employees than either service or manufacturing.

In general, manufacturing firms are those that produced a tangible product for sale from raw inputs. Examples of manufacturing firms included in my sample are a company that manufactures home improvement specialty tools and one that is a flat-rolled steel mini-mill. Service firms are those that provide an intangible service, including distribution and sales of products. Examples include a seafood restaurant and a company that provides linen service for hospitals. Knowledge-intensive firms are those that rely heavily on intellectual capital to produce a good or service, such as pharmaceutical firms, software firms, and telecommunications firms. Examples include a firm that provides information technology outsourcing services and another that creates engineering software products.

Unfortunately, current broad Standard Industrial Classification codes do not distinguish between these industry types in a clear-cut fashion. For instance, SIC 3 includes both manufacturing firms and knowledge-intensive firms; SIC 3714 includes a firm that designs, produces, and sells wheels and wheel accessories, (a manufacturing industry), while SIC 3577 includes firms that develop technology-based color printing systems, (a knowledge-intensive industry). Since each firm's prospectus contained a detailed description of its business and four-digit SIC codes were available for all firms, I used this information to classify firms into one of the three industry categories, using the basic descriptions of each given above. I created two dummy variables for

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did not, this variable was excluded from my final analyses in the interest of parsimony and power.

industry type, one for service firms and one for knowledge-intensive firms, with manufacturing being the omitted category.

As a means of checking on the reliability of my industry codings into the three categories of manufacturing, service and knowledge-intensive, a colleague also coded each firm into one of these categories, based on a very brief description of its business. The Kendall's tau-c for the cross-coding of industry categories was .73 ($p < .01$). This level of reliability supports my original coding scheme (Fleiss, 1981; Nunnally, 1967). To be conservative, I ran all analyses twice, first using my original industry codings and then with the codings arrived at by my colleague.[3]

**Firm Size.** The size of the firm at the time of its IPO is an important control variable since the size of the firm is likely to be associated with the nature of the subsequent implementation of high growth transition infrastructure. The *number of employees* of an organization is the most frequently-used measure of firm size in the organizational structure literature (Kimberly, 1976; Price & Mueller, 1986) and was the indicator of size used by Blau and Schoenherr (1971) in their landmark study of organizational changes in state employment security agencies. I recorded the number of employees of the firm as reported in its 1996 IPO prospectus. The second most-frequently-used measure of firm size is *revenues* (Price & Mueller, 1986). Therefore, I also collected data on annual revenues for fiscal 1996 from the firm's 1996 10K.

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[3] The results were unchanged using my colleague's coding of firm industry. Therefore, the results of the analyses reported in Chapter 4 reflect my original industry codings.

**Size and Tenure of the Board.** The *number of directors* has been used as an indication of the resources represented by the board in a number of studies of board composition (e.g. Chaganti et al., 1985; Pfeffer, 1972; Zahra & Stanton, 1988; also see Dalton et al., 1998). In addition, the size of the board is likely to be related to the number of business expert and support specialist directors represented. The total number of directors on the board was obtained from both the firm's 1996 IPO prospectus and its 1997 proxy statement. Based on the rationale I gave in the description of the business expert and support specialist measures, I used the board size in early 1997 in the analyses. In addition, the length of time the board has worked together may also have an impact on its influence in infrastructure changes. Therefore, median *board tenure* was also included as a control variable.[4]

**CEO Stock Ownership.** The amount of power wielded by the CEO may influence the degree to which the members of the board of directors can affect firm outcomes, such as high growth transition changes or firm performance (Pfeffer, 1981). The CEO may either support or refuse to support actions that directors recommend. Finkelstein (1992) found that the percentage of the firm's stock owned by the CEO was a reliable and valid measure of the amount of power of the CEO. Therefore, I collected the *percentage of the company's stock owned by the CEO following the IPO* from the 1996 prospectus to represent CEO power.

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[4] Analyses including board variables were also run using mean board tenure, rather than median. There was no difference in the results.

**High Growth Transition Changes.** These variables were described earlier in the Dependent Variable Measures section. They are: policies and procedures, strategic planning, mission statement, stock purchase plan, professionalization, management development, and specialization. The status of the firm's high growth transition prior to its IPO is likely to be related to the degree to which it implements additional high growth transition changes, as well as to subsequent firm performance and growth rate of the firm. In measuring these variables as control variables, I followed the same data collection procedures as I used for the measurement of their dependent variable counterparts, except that the data were collected from the firm's 1996 IPO prospectus.

**Average Industry Performance.** For each of the firm performance measures, (ROA, ROE, P/E, and MV/BV), I collected average industry performance for 1999 from Ibbotson Associates' Cost of Capital 2000 Yearbook. Whenever possible, I collected industry average performance data at the 4-digit SIC code level, using the SIC codes for each of the firms included in the study. Due to the inherent volatility of the performance data of the firms in my sample, I wanted to use the most specific industry average data available to scale firm performance. The more closely related the industry data were to the firm data, the more appropriate the scaling was likely to be. Therefore, I used 4-digit data as available and substituted fewer digit data for the remainder of the firms' industries. Four-digit SIC industry average data was available for 77% of the sample (227 firms), 3-digit data for 14% (40 firms), 2-digit data for 8% (24 firms),

and the industry average data for the remaining 5 firms was at the 1-digit level. Because not all industry data were at the 4-digit level, I included an indicator variable in my analyses representing the number of digits in the SIC code used for the industry average performance data to determine if this difference affected my results.[5]

## Methods of Analysis

I used hierarchical logistic regression to test those hypotheses with binary dependent variables, i.e. when the high growth transition variables of policies and procedures, strategic planning, mission statement, stock purchase plan, or management development was the dependent variable. For all other analyses, I used ordinary least squares hierarchical regression. For all hierarchical regressions, the control variables were entered in Step 1, the independent variables in Step 2, and, where appropriate, interaction terms in Step 3. For Hypothesis 4, the mediation hypothesis, I planned to follow the guidelines provided by Baron and Kenny (1986).

For the analyses using hierarchical logistic regression, the key statistics I report at each step are: the unstandardized regression coefficient (b), the Wald statistic (along with its level of statistical significance), the percent of cases correctly classified (by the dependent variable), and $X^2$ (or change in $X^2$) and its level of statistical significance. For the analyses using hierarchical OLS regression, I reported: the standardized regression coefficient (B), the t-statistic and its level of statistical significance, $R^2$ (or change in $R^2$), and the F-statistic

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[5] There was no difference in the results when this dummy variable was included in the analyses. Therefore, it was dropped from my final analyses in the interest of parsimony and power.

and its level of statistical significance. For all analyses, I was looking for a statistically significant change in explanatory value (either $X^2$ or $R^2$) at the final step of the regression to find support for my hypotheses. In addition, for those hypotheses with interaction terms that appeared to be supported, I plotted the interaction to determine if the relationship between the variables were in the predicted direction.

**Variable Screening and Transformations**

Dependent variables were screened for skewness and kurtosis to assess the deviation of their distributions from normality. When dependent variables' distributions varied from normality, I used the guidelines for variable transformation described in Tabachnik and Fidell (1996). I ran the analyses with both the untransformed variable values and the transformed variable values. I assessed the normality of the distribution of the residuals of the regression (using the Lilliefors test, a modification of the Kolmogorov-Smirnov test) to determine which variation of the variable to use in the final analyses, i.e. the transformed value was used if it improved the normality of the distribution of the residuals. Transformed dependent variables used in the analyses are noted in Table 4.1, which reports descriptive statistics and correlations.

Following the recommendation of Aiken and West (1991), variables that I combined to test for interaction effects were centered (the variable's mean was subtracted from the value of the variable for all cases) to reduce the likelihood of multicollinearity arising in the regression analyses. This transformation was

made prior to inclusion of these variables as main effects in the analyses and

prior to combining them to create the interaction terms used in the analyses.

# CHAPTER IV

# RESULTS

Table 4.1 shows the descriptive statistics and correlations between the variables used in the analyses. The means and standard deviations for variables that were transformed for the analyses are reported based on the variables' values prior to transformation for easier interpretation.

## Predictors of High Growth Transition Infrastructure Changes

Hypothesis 1 predicted that the representation of resources on the board of directors (the number of business experts and the number of support specialists) would be positively related to the development of infrastructure subsequent to the firm's IPO. Five hierarchical logistic regression analyses were run to test this hypothesis, one for each of the dichotomous infrastructure dependent variables of policies and procedures, strategic planning, mission statement, stock purchase plan, and management development program. In addition, two hierarchical OLS regression analyses were run, one for specialization and the other for prior management experience. Table 4.2 reports the results of these analyses. These tests showed no evidence of the predicted relationships, thus Hypothesis 1 was not supported.[6]

## Predictors of Subsequent Firm Performance

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[6] Since both business experts and support specialists were included in all analyses testing hypotheses related to the board of directors' influence, I do not distinguish between the "a" and "b" versions of my hypotheses in reporting my results. Where the results of analyses indicate a difference in the effects of business experts and support specialists, I make the distinction in my description of the results.

Hypothesis 2 proposed that the degree to which infrastructure was developed post-IPO would have a positive relationship with subsequent firm performance. Four OLS hierarchical regression analyses were used to test for the relationship of the seven high growth infrastructure variables with firm ROA, net income (ROE), market value (P/E) and MV/BV. Table 4.3 reports the results of these analyses. The addition of the infrastructure variables to the regression equation led to significantly improved prediction of ROA ($\Delta R^2$ = .07, $\Delta F$ = 2.21, p < .05). The only infrastructure variable relationship that provided any support for Hypothesis 2 was the positive relationship between the degree of specialization and ROA (B = .23, t = 2.66, p < .01). Therefore, I have to conclude that Hypothesis 2 was not supported.

My third hypothesis predicted a positive relationship between board resources (business experts and support specialists) and firm performance. Four hierarchical OLS regression analyses tested the relationships between board resources and each of the firm performance measures. Table 4.4 reports these results. Of the four performance variables only the regression predicting net income (ROE) had a statistically significant change in the F statistic in step 2 of the hierarchical regression ($\Delta R^2$ = .02, $\Delta F$ = 3.28, p < .05). One of the two predicted relationships was statistically significant; the number of business experts on the board was positively related to net income (ROE) (B = .15, t = 2.14, p < .05). Since the contribution of the board resource variables to predicting subsequent firm performance is minimal, Hypothesis 3 was not supported.

## Mediation Model

Hypothesis 4 predicted that the relationships, if any, between board resources and subsequent firm performance would be mediated by high growth transition infrastructure development post-IPO. To have a basis for testing this hypothesis, I needed to find a statistically significant relationship between board resources and firm performance as well as a statistically significant relationship between infrastructure and the same measure(s) of firm performance. This did not occur with any of the firm performance variables (only ROA had a positive relationship with high growth infrastructure variables and only net income [ROE] had a positive relationship with board resources). Therefore, analyses testing Hypothesis 4 could not be performed.

## Interaction Effects

Hypothesis 5 predicted that greater CEO qualifications would weaken the positive relationship between board resources and high growth transition infrastructure development. Five hierarchical logistic regression analyses were run to test this hypothesis, one for each of the five dichotomous elements of infrastructure. Two hierarchical OLS regressions were run for the dependent infrastructure variables of specialization and professionalization. The results from these seven analyses are reported in Table 4.5. The only support for Hypothesis 5 was found in the analyses predicting professionalization of the executive officer group. The change in F for step 3 of this regression, (the step in which the interaction terms were introduced), was statistically significant ($\Delta R^2 = .05$, $\Delta F = 3.59$, $p < .01$).

Three of the four interaction terms for this regression were statistically significant. First, the number of business experts on the board interacted with years of CEO general management experience in predicting professionalization (B = .40, t = 3.42, p < .01). The nature of this relationship, however, did not support Hypothesis 5 when the interaction was plotted (see Figure 4.1). When CEOs had greater general management experience, the relationship between business experts and management experience of the executive officers was positive, not negative as predicted. Support specialist representation on the board also interactively significantly with CEO general management experience (B = .35, t = 2.61, p < .01). The plot of this interaction yielded a pattern similar to the interaction of CEO general management experience with business experts. Figure 4.2 illustrates this plot. When CEOs had greater prior general management experience, the relationship between support specialists and executive officer management experience was positive, in contradiction to the prediction of Hypothesis 5. Lastly, business expert resources interacted with prior CEO industry experience (B = -.19, t = -2.40, p < .01). Figure 4.3 shows the plot of this interaction. The nature of the interaction between business expert representation and CEO industry experience generally supports Hypothesis 5. When CEOs have more industry experience, the relationship between business experts and executive officer management experience is weaker. Based on these results, I have to conclude that there is only weak support for Hypothesis 5.

Hypothesis 6 also predicted interaction effects, this time between high growth transition infrastructure variables and rate of firm growth in predicting firm performance. I expected to find that higher rates of firm growth would strengthen the positive relationship between infrastructure and performance. Unfortunately, when these hierarchical regressions were run using the rate of growth variables described earlier, significant multicollinearity problems arose. The variance inflation factor values went into the hundreds, well over the accepted maximum value of ten for multicollinearity (Neter, Wasserman, & Kutner, 1990). One interaction term was even excluded from the analysis due to redundancy.

To contend with this problem, I controlled for number of employees and level of revenues for the year of the IPO and used the number of employees and level of revenues in 1998 as indicators of size. I proceeded with this revised model, expecting that the size of the firm in 1998, (controlling for its original size in 1996), would similarly strengthen the positive relationship between infrastructure and performance. When I tested this model, new multicollinearity problems arose, this time with the strategic planning variable. Variance inflation factors again were in the hundreds. In addition, the interaction term between strategic planning and 1998 revenues was excluded from the analyses due to redundancy. (The correlation between the changes in strategic planning variable and the strategic planning/revenues interaction term was -.85 and the correlation between this interaction and the interaction of strategic planning and employees was .78). Therefore, I dropped the strategic planning variables (control, main effect, and interaction terms) from the analyses testing Hypothesis 6 altogether.

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There were no statistically significant results, however, leading me to conclude

there was no support for Hypothesis 6. These results are reported in Table 4.6.

**Supplementary Analyses**

For some of the analyses, I assessed the effects of substituting another

variable measuring the same construct to determine if it produced different

results in the analyses. I will first discuss the results of variable substitution with

regard to control variables. Nine dummy variables representing *one-digit SICs*

were substituted for the service and knowledge-intensive industry dummy

variables and the analyses were rerun. None of the results of the analyses were

changed when the SIC variables were included rather than the two dummy

variables of service and knowledge-intensive industries nor was the fit of the

models improved. The results of the analyses were also unaffected by the use

of transformed (logged) versions of the number of employees and revenues, two

variables that were quite skewed in their distributions.

Based on the executive survey results of a sub-sample of 20 firms on the

dichotomous infrastructure variables, only the variable of stock purchase plan

had acceptable reliability using Cohen's Kappa (.73, p < .01). Therefore, I reran

the regression analyses with infrastructure variables as independent variables

including a *reduced variable set*, including only stock purchase plan,

specialization, management development, and executive officer management

experience. This included the analyses testing Hypotheses 2 and 6. There was

no change in the overall fit of the models, but there was a slight change in the

results for two of the analyses with regard to Hypothesis 2. Using the reduced

set of infrastructure variables, both stock purchase plan and specialization were significantly and positively related to subsequent firm ROA (rather than only specialization). The results of the revised analyses in testing Hypothesis 6 were no stronger than when the full set of infrastructure variables were included.

To assess the explanatory value of having separate board resource variables for business experts and support specialists, I re-ran the analyses including board variables with a composite board resource variable, created by adding together the number of business experts and the number of support specialists on the board. There was no change in my results.

I also replaced 1997 board of director independent and control variables with their counterparts from the *1996 board of director composition*. There was no substantial change in results. Also, due to the reduced number of firms for which specialization data were available for the full top management team, I substituted a version of the *specialization variable representing the executive officer group only*. This variation produced weaker results than the original specialization variable.

I tested the effects of using a decomposed version of ROA, with net income as the dependent variable, controlling for total assets. Since I used decomposed versions of the other performance measures (out of necessity, given the nature of the data for this sample of firms), I thought it was prudent to examine ROA in a similar fashion. The fit of the models using this form of ROA was either the same or worse than using the composite form of the variable.

The last set of robustness analyses I ran were designed to examine the *appropriateness of my research model* and to determine if any of the effects I found were due to a misspecification of the relationships between the variables. To do this, I first regressed business expert and support specialist representation on the CEO industry and general management experience variables, controlling for industry, firm size, CEO stock ownership, board tenure, and board size. I found no relationship between the CEO independent variables and business experts or support specialists. I then reversed the direction of the analysis and regressed the CEO variables on the board composition variables. In this case, both business experts and support specialists were significantly (and positively) related to CEO industry experience (but not related to general management experience). This raised the possibility that business experts and support specialists on the board of directors influenced the background experience of the person in the CEO position, which, in turn, affected the changes in infrastructure. However, in testing Hypothesis 1, neither business experts nor support specialists were related to any of the infrastructure change variables, eliminating the mediation model alternative. This same (lack of) finding also eliminated the possibility that a spurious relationship between board resources and CEO industry experience influenced the results of the analyses.

Lastly, I performed the same tests using the high growth transition infrastructure variables as the predictors of subsequent firm size (employees and revenues) and vice versa. The control variables were industry, CEO stock

ownership, employees and revenues in 1996, and the 1996 infrastructure variables. None of these regressions produced statistically significant results.

**Post Regression Tests**

Following the running of the regressions testing my hypotheses, I looked at the results of two tests to determine if multicollinearity might have influenced my results. The statistical tests I used were the values of the variance inflation factors, where a value in excess of 10 indicates a problem (Neter et al., 1990), and values of the conditioning index where a value in excess of 30 indicates a problem (Belsley, Kuh, & Welsch, 1980; Tabachnick & Fidell, 1996). The only evidence of multicollinearity problems I found was noted earlier, when I ran the regressions to test Hypothesis 6 using rate of firm growth as the moderating variable. Substituting firm size for growth and deleting the strategic planning variables minimized the multicollinearity in this set of analyses. (There were still a several high VIFs for the employee and revenue variables, but none higher than 17).

To test for outlier cases for the regressions, I used casewise diagnostics in SPSS to identify any dependent variable values in excess of three standard deviations from the mean predicted value. I subsequently adjusted my screening for dependent variable outliers to those with values in excess of four standard deviations from the mean due to the pattern of values for many of my variables (i.e. too many cases were classified as outliers using the 3 standard deviation criterion). I re-ran regressions where there were outliers identified to see if the fit of the model were improved with these values deleted. By deleting these values,

the adjusted $R^2$ for the model was improved or the distribution of the residuals was improved or both were improved. Table 4.7 shows the cases for which dependent variable values were deleted by hypothesis.

I assessed the degree of fit of the models used in the OLS regression equations through several methods. First, I used the Lilliefors test (a modification of the Kolmogorov-Smirnov test) to test for the normality of the distribution of the studentized residuals from the regressions. Because this test is quite sensitive when sample sizes get larger, (tending to readily find a lack of normality as sample size increases), I followed Tabachnik and Fidell's (1996) recommendation to also examine the residuals visually. Therefore, I also looked at a frequency histogram of the studentized residuals, a scatterplot of the standardized predicted values against the studentized residuals, and a normal P-P plot of the residuals with observed cumulative probabilities of values plotted against expected cumulative values.

For the OLS regressions, a Lilliefors statistic of .10 and below corresponded to visual representations of a distribution of residuals that appeared to be normal. Where the Lilliefors statistic was higher than .10, I tested the fit of the model for curvilinearity in the relationship between the independent and dependent variables to determine if this were the underlying cause of the lack of normality. I did this by two methods: using the curve estimator test for linear, quadratic, and exponential relationships available in SPSS and by adding squared versions of the independent variables to the regressions to see if the fit improved. Four out of sixteen of the OLS regression

equations produced Lilliefors statistics in excess of .10; none of them had improved fit with nonlinear models, however. In all cases, the models with poor fit were those with accounting measures of performance as the dependent variable (either ROA or net income [ROE]).

In the next chapter, I discuss the factors that may have contributed to my lack of findings, how I might contend with these issues in future studies on this topic, as well as directions for additional research in this domain.

# CHAPTER V

## DISCUSSION AND FUTURE RESEARCH

The two fundamental research questions I set out to answer in this study were: (1) what is the interrelationship between board of director resources and the CEO in predicting the development of high growth transition infrastructure and (2) what is the interrelationship between development of high growth transition infrastructure and rate of firm growth in predicting subsequent firm financial performance. My analyses produced little or no support for the relationships predicted in my hypotheses. My results are reported in summary form in Table 5.1. They are disappointing since they provide very little support for my hypotheses.

In this chapter, I will first describe the key findings from my analyses based on my predictions. Next, I will discuss the limitations of my study and some potential reasons for my failure to find support for my hypotheses. Third, I will present some ideas for future research in this general domain and lastly, I will provide a brief conclusion.

### Key (Non)Findings

The main effects hypotheses, (Hypotheses 1 – 3), served as a prelude to the mediation and moderation hypotheses to follow. If my later hypotheses, (Hypotheses 4 – 6), were descriptive of the relationships between the variables, then there should have been little in the way of statistically significant relationships in the earlier main effects hypotheses. Table 5.1 summarizes my findings by hypothesis for each of the dependent variables. Out of the 50

relationships investigated as main effects across three sets of regression analyses, only 3 (6%) were statistically significant, a result that could easily have occurred by chance. Further, in only one case was the second step of the regression statistically significant. For Hypothesis 1, representation of business experts on the board of directors was positively related to the infrastructure variable of employee stock purchase plan. For Hypothesis 2, specialization of the top management team was positively related to subsequent ROA (and the second step of the regression was also statistically significant). For Hypothesis 3, representation of business experts was positively related to net income (ROE).

I had hoped to find more support for my hypotheses when it came to the second set of hypotheses. One implication of the lack of findings from testing the first three hypotheses was that there were no relationships I could test for the mediation model I proposed in Hypothesis 4. Hypothesis 5 proposed that the relationship between the resources on the board of directors and the development of high growth transition infrastructure post-IPO would be moderated by the managerial qualifications of the CEO. I expected to find that when the CEO was more qualified, the relationship between business experts and support specialists on the board and infrastructure development would be weakened. My rationale was that the CEO would have less need of input from the board when she had more experience coming into the job. Out of 76 predicted relationships, only 6 (8%) were statistically significant. Of these relationships, half occurred in the testing of Hypothesis 5, where the third step of the hierarchical regression of market value (MV/BV) on board resources/CEO

qualifications interactions was significant. Unfortunately, the specific nature of the relationship between the variables in two of these three cases was not as I had envisioned. When CEOs had more general management experience prior to joining the firm, the influence of business experts and support specialists on professionalization was enhanced, not reduced. Only in the interaction of CEO industry experience with business experts was the interaction generally in the predicted direction, with CEOs who had more prior industry experience apparently substituting their influence for that of the board.

More specifically, the plot of this particular interaction shows that professionalization is at the same high level when there are fewer business experts on the board and the CEO has more industry experience or when there are more business experts on the board and the CEO has less industry experience. These relationships support my prediction of substitutability of board expertise and CEO qualifications. However, professionalization of the executive officers is at its lowest when there are both more business experts on the board and the CEO has more industry experience. I would have expected that it would be the case that professionalization would be lowest when there were fewer business experts on the board and the CEO had less industry experience.

It is plausible to interpret this unanticipated relationship in a couple of ways. It may be that when CEOs with more years of industry experience have higher levels of general management business expertise on their boards, they see this as a resource that reduces the need for managers with previous experience. In other words, business experts on the board and executive officer

experience are considered substitutable resources by industry-experienced CEOs. Another possible interpretation is that the combination of more business experts on the board and CEOs with more industry experience leads to an impasse in decision making regarding professionalization of the executive officer group. Perhaps industry-experienced CEOs seek to bring in cronies from companies where the CEO previously worked, while the business experts on the board resist this effort.

Although these findings are very limited, they do suggest that some CEO characteristics may supplement board resources to influence firm outcomes, while others may have the opposite effect of suppressing the impact of the board of directors. Perhaps CEOs with more general management experience are compatibly aligned with board members with business backgrounds and capitalize on this mutuality of interest to support the firm's internally directed strategies. CEOs with more general management experience would likely also have had more experience in working with boards and understand how to utilize directors' business backgrounds more effectively in accomplishing strategic firm goals.

It seems likely that the nature of the outcome makes a difference. One of the motivations for this study was the fact that past studies have found little in the way of evidence that board composition influences firm performance. I also failed to find this relationship, while I found some slight encouragement for the hypothesis that board resources, in interaction with CEO qualifications, have an influence on a less distal outcome, such as the development of firm

infrastructure. The interaction of the board and CEO may also be a critical component of a model assessing board influences. While I found no statistically significant main effects of board resources on infrastructure, I did find some statistically significant interaction effects in predicting professionalization of the executive officer group. Post hoc analyses including both board resources and CEO qualifications as main effects found no significant relationships.

**Limitations of Study**

In the following sections of the Discussion, I will review what I consider, in hindsight, to be the most problematic aspects of my study. I will also present alternative approaches that may address these issues in future research.

**Data collection procedures.** Using archival data collection procedures for this study had some advantages and disadvantages. On the positive side, it allowed me to collect data longitudinally without having to wait a period of time to obtain it. I also had access to comparable data from all firms in the sample, i.e. SEC filings, and did not have to be concerned about a poor response rate to a survey or biases that may result from respondents from within companies. Although same source bias may have been a problem, in that SEC filings were my primary source of data, I did not have to contend with issues of memory loss over time, as I would have if I were attempting to collect historical data from human sources through surveys or interviews. I also had the ability to key word search the filings since they were submitted in Word document format to the SEC starting in 1996, which gave me a consistent, thorough method for data collection.

There were, of course, significant downsides to archival data collection processes for this study. There were aspects of infrastructure development that I could not measure by examining SEC filings that may be important predictors of subsequent firm performance. Examples include delegation of authority, reporting relationships within the organization, and corporate values. For some of the data I was collecting, I was at the mercy of what companies chose to include in their filings. Some of the data I was collecting fell into the category of required reporting, such as backgrounds of the board of directors and executive officers, CEO stock ownership post-IPO, and the existence of stock option and stock purchase plans. Other data I collected seemed to be regularly reported, although not specifically required, such as the existence of a strategic plan and management compensation programs. Other data was strictly voluntary, such as CEO educational and functional background, communication and training programs, and employee compensation programs. This led to missing data problems once I got to the analysis stage. Two CEO background variables had to be eliminated due to an insufficient number of cases with complete data to maintain the power needed for my analyses.

To the degree that firms varied in their reporting of this information, my collection method yielded unreliable data. I attempted to minimize this inherent problem by coding many of the infrastructure variables as either present or absent, rather than attempting to assign a more refined value. The reporting of biographical information of officers (used for the board of director coding, the CEO qualifications of general management and industry experience, and the

specialization and professionalization variables) was typically specific, leading to effective data collection.

A complicating factor in the nature of information reporting in SEC filings that I discovered once I was into the data collection process was that the prospectus documents contained much more detailed information of the kind I was interested in collecting than did subsequent 10Ks. Since the prospectus serves as a publicity piece for the firm to attract prospective shareholders, companies are more forthcoming with detailed information that they believe . potential investors will find informative in making their investment decisions. Once the firm is public, it has less vested interest in establishing credibility with non-financial information disclosure, since its stock price and financial reports provide the type of information investors want to know and a track record of some sorts has been established. To the degree that some firms are not performing as well as others in their industries, however, they may add more infrastructure details to the 10K than the better performers in an effort to offset their results. If this does in fact occur, then it would make my data collection methodology more conservative, since I would be less likely to find a relationship between infrastructure and subsequent performance.

A related reliability issue with my data collection process was the disappointing inter-rater agreement level between the data the MBA students collected, which was the majority of my infrastructure data, and my own data collection. I trained the students in advance and checked their work early on, making corrections in their methods where necessary. It appears, however, that

I should have been more specific in my instructions. Alternatively, it could be that my coding standards were not sufficiently detailed, since it was the coding of the data I compared. Although I did all the coding myself, it is possible that this methodology was unreliable, rather than the data collection itself. If this were the case, it is correctable by establishing a more rigorous set of coding guidelines and re-coding the data. (The low level of agreement between the secondary coder of a sub-sample of firms and me indicates the coding guidelines I used were a problem, absent another explanation for our lack of agreement).

Additionally, the results I received from a survey of a sub-sample of 20 firms designed to check on the external corroboration of my archival data collection also suggested that my data collection was unreliable. Of the 11 dichotomous infrastructure variables I included on my survey, only the employee stock purchase plan variable was supported with a reasonably high level of agreement between company respondents and my variable coding. The data I collected from company respondents did suffer from reliance on memory since the status of infrastructure development at the time of the IPO was approximately six years earlier. As mentioned in the Results chapter, I re-ran my analyses using only those variables I believed to be most reliable, but my findings were not substantially different.

In retrospect, I believe that using real-time surveys completed by company executives to gather data on infrastructure variables is much more likely to lead to reliable data collection and variable measurement than the archival data collection method I used, at least for the non-biographical variables.

**Infrastructure variables.** I could not use the individual measures of infrastructure to form composite infrastructure variables as I had envisioned when I designed this study. The reliabilities of the composite standardization/formalization and shared goals scales were very low (for the standardization scale, $\alpha = .20$, for the shared goals scale, $\alpha = .06$). Therefore, I resorted to using individual infrastructure measures as my infrastructure variables. To the degree that I did find any significant results from the infrastructure variable analyses, they were with the continuous variables of specialization and professionalization, rather than the dichotomous measures. The present/absent coding of the dichotomous measures of infrastructure created a ceiling effect since the maximum value for each was "1." Because I was measuring infrastructure at two points in time, in 1996 and again for the 1997-1998 time period, once the infrastructure element had been observed, no further development of that aspect of infrastructure was counted. This could have created a problem in measuring the policies and procedures and strategic planning variables, since their average values in 1996 were .66 and .83, respectively, leaving little room for subsequent development in the 1997-1998 period.

In general, I found that the firms in my sample were further along in their development of infrastructure at the time of their IPOs than I had expected. In addition to the 1996 values of the policies and procedures and strategic planning variables just mentioned, the average level of specialization in 1996 was 5.69 versus 6.05 in 1998, (an increase of only 6%) and the average level of

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professionalization in 1996 was 6.89 versus 7.15 in 1998, (an increase of only

4%). Since the number of employees and the revenues of the firms increased

substantially from 1996 to 1998 (over 200% for employees and over 100% for

revenues), it appears that firms preparing for their initial public offerings of stock

develop their infrastructure with an eye to future growth. There are numerous

handbooks available to guide executives through the preparation for an IPO

(such as the one written by Blowers, Griffith, & Milan, 1999 for Ernst and Young),

not to mention the availability of advice from venture capital investors and

investment banks, two sources of information with extensive experience with the

IPO process. In light of this situation, I would restructure the design of my study

to use the combined value of the infrastructure variables (i.e. as of the end of

fiscal 1998) in my model, rather than controlling for the level of these variables in

1996. Logically, it is the relationship of the *total* development of infrastructure

with board resources, CEO qualifications, firm growth, and subsequent

performance that is likely to be important, not merely infrastructure development

subsequent to the firm's IPO.

In addition, all the infrastructure measures used in the study were

weighted equally, which may or may not be representative of their actual

influence within the firm. From my review of previous research in this area,

however, this is the method commonly used by researchers of organizational

structure (Blau & Schoenherr, 1971; Hanks et al., 1993; Smith & Gannon, 1987).

A possible approach to this issue would be to gather data from company

executives who have experienced an IPO and the subsequent growth of their firms regarding the relative importance of the various aspects of infrastructure.

**Sample.** My choice of the population of firms to study was designed to address some of the previous concerns of governance research on the effects of board composition on firm outcomes. There were, however, issues that arose during my study that caused difficulties because of my choice of context. Sampling across industry inevitably led to differences for which I could not control. From my analyses, it appeared that the use of the three industry categories I used was as effective as SIC dummy variables in partialling out the effects of industry. There is little guidance in the literature for segregating firms on the basis of industry when board of director and infrastructure variables are included in the study. I suspect that some other categorization of firms than the two I used would be more effective in controlling for industry effects. Perhaps the new NAIS industry codes will be more applicable to this type of study than the out-dated SICs. I might find more significant relationships by following a set of firms in the same general industry group over time, rather than attempting to find patterns across industries. The advantage of collecting data from firms across industries was the ability to generate a data set with a sufficient number of firms, while controlling for general external environment issues, such as the economy, since all the IPOs occurred in the same year.

Another difficulty with the research design was the decision to use subsequent firm performance as the dependent variable. This meant that any firms no longer in existence as independent entities as of 1999 were excluded

from my sample, creating a survivor bias. This approach restricted the sample of firms due to the elimination of those with lower levels of performance if I assume that the firms that did not survive were poorer performers. By doing some follow up research, however, it appeared that many, if not a majority, of the firms that did not "survive" until 1999 were acquired by or merged with other firms. With all the companies going public in the late 90s (with money to spend based on funds raised from new shareholders) and the high price/earnings ratio of many companies' stocks during this period, there was ample cash and/or market capitalization available in the financial markets for firms to buy other firms. The mergers and acquisitions that occurred were not necessarily due to the operation of the market for corporate control because of poor management, but simply a desire on the part of many companies to expand within a given industry and create greater market power. Nevertheless, the generalizability of my results is limited to those firms surviving as independent entities three years out from their IPOs.

Inclusion of the firms no longer in existence in 1999 might have added richness and depth to my sample and my results, as well as increased the generalizability of my findings. Finding a way to meaningfully measure the dependent variable of performance was the obvious problem. Perhaps some method that takes into consideration the non-surviving firms' performance prior to acquisition or the price paid for the firm (as a multiple of its stock price or earnings) compared to the industry as a whole could be fashioned. A control variable for the period covered (IPO date to date performance data were

collected) for all firms could be added to the regression model, permitting firms that did not survive independently until 1999 to be included. There is also the situation of the firms that were in bankruptcy before 1999 to consider. Firms in bankruptcy are exempt from filing 10Ks, (unless they voluntarily choose to do so), which means performance data is only available up to the time of bankruptcy declaration. The best alternative here would seem to be the same as above, using the latest performance data available and including the time period since IPO as a control variable.

The final significant issue I would like to raise with regard to my population choice was the volatility of the firm performance. The fact that almost 10% of the firms had *negative values* for shareholders' equity is an example of the high degree of variation in performance among these firms compared to a more mature group of companies. This created measurement problems for three out of four of my dependent performance variables. Negative shareholders equity combined with negative earnings (a likely combination) led to a positive ROE. This is clearly not indicative of the firm's performance that fits this description. Negative shareholders' equity (book value) also led to uninterpretable MV/BVs, since a negative book value would lead to a lower MV/BV performance when this firm was actually performing better, (from a MV/BV standpoint), than one with a positive BV. A comparable problem arose with negative earnings for calculation of the P/E ratio. One hundred seventy-four firms in my sample (59% percent) had negative earnings in 1999. If a company had negative earnings and was still trading, then its P/E ratio would be negative. In a sense, however, it had a

higher P/E than a firm with a comparable stock price and positive earnings, since it was performing as well in the market on financial performance that was weaker. My approach to this problem was to decompose the variables, using the numerator of the ratio as the dependent variable and controlling for the denominator of the ratio to scale the dependent variable.

Although this method of measuring performance was unconventional and may lead to less accumulation of results of the research in this area, it had the advantage of breaking firm performance into its components, rather than using a ratio dependent variable, which may lead to results that are less interpretable (Cohen & Cohen, 1983). Since most of the firms in my sample were relatively young, (their average age was just over 8 years), they were likely still struggling to establish themselves three years after their IPOs. This could mean that they were focusing on the most basic elements of performance, such as revenue generation, stock price and net income, rather than the ratios used as measuring sticks by more mature companies.

Not being able to use the ratio form of three of my performance variables did produce a potential problem, however, in scaling for industry average performance. I did not have data at the industry level that could be broken down into the components of the performance variables, such as shareholder's equity, net income, and market value. Therefore, I could not directly scale each firm's performance to that of its industry. I included the industry average performance in ratio form as a control variable instead. Since ROA was the only performance measure for which I had data at both the firm and industry level, I scaled firm

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ROA directly, by dividing it by industry average ROA. I re-ran the analyses for Hypotheses 2, 3, and 6, which are those containing performance dependent variables. In all cases the $R^2$ dropped significantly and the model fit deteriorated. The values of my scaled ROA variable were distributed in a relatively normal fashion, with no apparent outliers. Although this is a very limited test, my findings do call into question the wisdom of dividing firm performance by industry performance to scale it, a common practice among strategy researchers.

**Model specification and theory**. Although a substantial proportion of the total variance explained by my model was present after step one of the hierarchical regression, i.e. was contributed by the control variables, surprisingly few of the control variables were statistically significant. In addition, the overall variance explained (adjusted $R^2$) averaged .28 for the moderation analyses predicting specialization and professionalization infrastructure and .35 for the moderation analyses predicting subsequent firm performance.[7] This suggests there is room for improvement with regard to the specification of my research model.

Within the limitations of my data collection method, there are a number of changes I would make to the model based on hindsight. First, as I mentioned earlier, I believe the infrastructure variables (pre-IPO from 1996 and post-IPO from 1997-1998) would be more explanatory if combined into one variable. In retrospect, there is little theoretical reason to treat them separately. The firms in my sample had implemented a significant amount of infrastructure prior to filing

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[7] The average total $R^2$ for these hypotheses is considerably higher, .37 and .50, respectively, indicating the impact of error on the explanatory value of the models.

their prospectuses, in preparation for going public, just as Penrose (1959) advocated.

A difficulty with this approach, however, is determining the appropriate measure of board of director resources to use in predicting cumulative infrastructure. The composition of the board at the time of the prospectus would likely be more related to total infrastructure development than the 1997 board, which I used in my study. The tenure of the business experts and support specialists on the board is an important factor to consider in determining their influence on infrastructure development, since some infrastructure was likely implemented prior to the directors' appointments to the board. One possible solution would be to weight the director categories by their average tenures. Thus, a board with 3 business experts with an average tenure of 2 years would produce a weighted influence variable with a value of 6, whereas a board with 2 business experts with an average tenure of 5 years would have an influence value of 10. Assuming that infrastructure has developed over a period of time, using board resource variables weighted by tenure seems appropriate. (A similar approach to calculating influence was used by Walsh, Henderson, and Deighton, 1988).

Access to executives with IPO experience could assist with an assessment of the timing of board influence on infrastructure (or other interim outcomes) since they would know when directors began their association with the firm. For example, a substantial number of the firms in my sample (approximately 25%) appeared to have formed their board of directors very close

to the time of the IPO, yet the directors themselves may have been advising the CEO prior to their formal appointments as directors. I have been unable to find any studies supplying evidence that this is the case, so interviews with CEOs may provide some insight into this issue.

The business expert and support specialist categories are more closely tied to the resource dependence view than the more general categories of insider and outsider often used in governance studies based on agency theory. For instance, Fiegener, Brown, Dreux, and Dennis (2000), in their study of privately-owned firms, found that adoption of outside boards was more connected to the degree of outside ownership of the firm than to the resources such directors could provide. Their study suggests that the measurement of these categories may require additional refinement to be more predictive of changes internal to a firm about to go public. (The lack of difference in the results I obtained with a combined board resource variable compared to separate variables for business experts and support specialists suggests that further refinement may be informative). With regard to business experts, for instance, the degree to which their executive background is in the same or a related industry (in value chain terms) may be a key distinction in their levels of influence. Additionally, the support specialist category is quite broad in its definition, including those directors with backgrounds in virtually every area of running a business except general management. There may be an increase in explanatory power if this variable is broken into more delineated categories, such as financial, operations, professional, technical, etc. For many of the firms in my

sample, their products or services were based on the development of technology or on medical knowledge. These boards often had engineers, chemists, or physicians in director positions. These types of directors would be likely to have a different effect on infrastructure development than those directors with more general functional business backgrounds, such as marketing or finance. The findings of Golden and Zajac (2001), whose study evaluated the impact of boards on strategic change in hospitals suggest that occupational heterogeneity on the board is an important consideration in assessing its influence. Therefore, a more refined approach to board composition measurement, rather than the typical broad-based categorization, may be more revealing.

The measurement of the CEO variables could also be expanded beyond years of prior general management and industry experience. Although my efforts to collect data on educational level and prior functional experience were not successful, there are other elements of CEO background or status that may affect the level of influence of board members. Examples are stock ownership (as an independent variable, rather than a control variable), tenure with the company, whether or not the CEO is also Chairman of the Board, and whether or not the CEO is the founder of the firm. Although there is limited evidence from prior research that the latter two variables are influential in predicting CEO effectiveness, they may be more meaningful when combined with additional CEO attributes and when included in interaction with board composition variables.

Other dependent variables may be relevant also. Besides the more traditional financial and market measures of performance I used in my study, there are other performance measures that may be appropriate given the context I chose. One is the degree to which a firm's stock is underpriced for its IPO. If infrastructure development serves as a signal to potential investors of the readiness of the firm for growth, those firms with appropriate infrastructure in place prior to their IPOs may experience reduced underpricing in the market. A recent study of the signaling effect of board membership on underpricing . suggests this may be a fruitful investigation (Certo, Daily, & Dalton, 2001).

Another possible dependent variable is firm growth. Increase in revenues is often considered an appropriate measure of success in the literature studying young, growth-oriented firms (Hanks et al., 1993; Smith & Gannon, 1987). Size at the time of the IPO may be an important predictor of infrastructure development (the number of employees seems to be slightly more important in this regard than revenues, based on my results), but the level of future revenues the firm generates may also be higher when supported by the presence of high growth infrastructure.

Additionally, an important control variable in this model might be the amount of money raised in the firm's IPO. A portion of the money raised by offering equity to the public is often used to pay off debt; this information is usually reported in the firm's 10K following its IPO. I could segregate the IPO funds remaining following debt payment and use it as a control variable in predicting both infrastructure development and growth. In addition, infrastructure

development may be differentially related to growth depending on whether that growth is organic (generated by the firm itself) or based on acquisitions of existing firms. Less infrastructure may be required to increase revenues through acquisition, since acquired firms possess their own infrastructure that can be utilized by the acquirer to support its larger size.

**Directions for Future Research**

**Present study research questions.** In spite of the discouraging results from this study, I believe the general research questions I asked are worth exploring using improved methodology and a somewhat different configuration of the variables. Recent studies by Golden and Zajac (2001) and Westphal and Frederickson (2001) provide evidence that the balance of power between the board of directors and the CEO is an important consideration in evaluating the influence of the board on interim firm outcomes. Given the proper measurement of variables representing my constructs, I believe the general model I developed for this study is a reasonable representation of the relationships I am interested in exploring.

I plan to develop a theoretical basis for this research that is more refined than that presented here. Over time, as I have worked with the data I have collected and discovered more about the nature of the firms in my sample, I have come to view the upper echelon influences on the development of infrastructure as an example of success or failure in *adaptation* occurring within the firm. It isn't just a matter of the degree to which directors provide access to valuable outside resources in the form of their business expertise, as the traditional

resource dependence view suggests. The typical application of resource dependence theory suggests that obtaining critical resources (such as director expertise) from outside the firm will reduce the uncertainty inherent in a firm's *external* environment, giving the firm an increased likelihood of survival and success. Implicit in this view is that the primary source of uncertainty is external to the firm, that the management of the firm has a firm grasp on the potentially disruptive forces within the company itself.

In light of what I have learned about firms that are new to the public arena, this is not likely to be true. The reduction of *internal* uncertainty for these growing firms is also critical, since the management team of most of them have not experienced this particular transition before. The resources represented on the board of directors, in interaction with those of the CEO, may have the potential to reduce internally generated uncertainty through the pooling of knowledge needed to identify the changes that must be made to navigate this transition successfully (Kuwada, 1998). Once the *need to internally adapt* to the firm's changing circumstances, (impending high growth), by making changes such as increasing infrastructure development, these upper echelon resources are also critical to *implementing* the changes in an effective manner. DeCanio, et al. (2000) emphasize the importance of completing such an organizational structure transition appropriately for a firm to successfully adapt to changing circumstances.

By modifying the resource dependence view to direct its focus toward reducing uncertainty within the firm and combining it with the literature on

adaptation, I think the theoretical foundation for my research questions becomes more interesting and perhaps more readily testable.

Lastly, the likelihood of detecting the types of relationships in this model would be increased with more information regarding the processes behind the results. My next steps with this line of research will be to conduct on-site interviews with executives of a handful of recent IPO firms to gain insight into how the top managers and board interact in achieving internal strategic changes such as infrastructure development. For instance, I hypothesized in this study that increased experience on the part of the CEO, regardless of its source, would result in a diminished role of the board on infrastructure development. It may be that the interaction of the board and CEO is more refined, i.e. that in some cases (such as when the CEO's and directors' experience is general management-based) that a supplementary effect occurs, where the CEO and the board pool their resources to effect change. I would like on-site interviews to prepare me to conduct qualitative research with a small number of firms, from which I can induce a refined theoretical framework to guide further research in this area.

**Firm development.** There are two specific avenues I am interested in pursuing related to upper echelons questions in firms as they evolve over time. The first was triggered by my observation that the composition of the boards of directors for firms with IPOs on the horizon or that have recently undergone an IPO is very different from the composition of the large, mature firms that are the context for most board studies. Pfeffer (1972, 1973) established 30 years ago that firms' resource needs influence the make-up of the board of directors. I am

curious as to whether there are predictable changes that occur in board resources as firms within an industry age and grow. To answer this research question, I plan to collect data regarding board and top management team composition for firms within several different industries, i.e. traditional manufacturing, service, research and development intensive, and technology-based. This study would be cross-sectional, thus controlling for within-industry effects, by examining firms of varying stage of development at one point in time. Flamholtz's (1990) book, <u>Growing Pains</u>, presents a firm development pyramid that describes the stages a firm needs to move through in priority order if it is to succeed long-term. This type of framework provides a potential basis for the formulation of hypotheses. In addition to these developmental factors, I expect the resources represented by the CEO and the rest of the firm's top management team to affect the backgrounds of the directors chosen for the board. For instance, holding TMT expertise constant, younger, smaller firms more are likely to seek out directors with industry-specific expertise to assist the company in developing its business strategy and market niche, the two lowest levels on the Flamholtz pyramid. Golden and Zajac (2001) found a curvilinear relationship between board attributes such as diversity of experience and size and strategic decision involvement. Board demographics other than directors' professional backgrounds may also vary as a firm grows and matures.

Additional infrastructure issues arise in the firm development context besides the research questions related to upper echelons. For instance, is there such a thing as too much infrastructure? Hambrick and Crozier (1985) advocate

maintaining an entrepreneurial culture if a firm is to enjoy long-term success, an effort that is more likely to be realized if the firm remains less bureaucratic. Organizational theorists and researchers have identified factors such as too many layers of organizational structure and centralization as potential barriers to adaptation (March & Simon, 1958; Miller, 1994; Perrow, 1970; Slevin & Covin, 1997). Can infrastructure be over-developed, even though a firm is still growing, to the point where it interferes with firm performance? Khandwalla's (1973) exploratory research highlights the importance of aligning elements of organizational structure with the firm's size and the uncertainty of its environment. Slevin and Covin (1997) also support a contingency perspective. They found that organic (decentralized, flexible) versus mechanistic (hierarchical, rule-oriented) organizational structures were better suited to firms with emergent strategies and operating in benign environments.

What are the other factors that impinge on this outcome? For instance, can a firm handle more infrastructure successfully if its management team or board possesses certain characteristics? How does turnover of the top management team impact the firm? Does it matter if the CEO and her top managers have worked together in the past or how long they have worked together at the current firm?

The second firm development-based research question I would like to investigate relates to a subset of firms that have an initial public offering. These are firms called "development-stage companies." They are in the process of developing products or services but have not yet reached the commercialization

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stage. For instance, in 1996, there were 20 firms that had their IPOs with less than $100,000 in revenues. These firms present an opportunity to study infrastructure development over time, since they typically have very little in place at the time of their IPOs. The focus of investors in assessing the attractiveness of the opportunity to buy shares in these firms is on the viability of the concept when (and if) it reaches the point of commercialization. Besides examining the role of the board and top management team resources on infrastructure development, development stage companies also provide a context for studying how the type and the degree of infrastructure impacts subsequent performance. In this case, subsequent performance may be the company's success or failure in bringing the product to market, as well as the revenues it generates or the market share it captures.

**Impact of investors.** One of the unique attributes of board composition in IPO firms is the representation of investors. Understandably, individuals or firms that have invested in the firm prior to its IPO have a strong interest in the strategic decisions the firm makes and desire representation on the board for the purposes of monitoring top management. For the purposes of this study, investor directors were classified as support specialists, based on their expertise in financial matters. Under this coding scheme, all investors were treated similarly in terms of their anticipated influence. It is likely, however, that the nature of the investor sitting on IPO firm boards makes a difference in terms of the director's involvement in firm decisions. For instance, research published in finance journals finds effects related to venture capitalist investment in IPO firms

on outcomes such as underpricing or size of the offering (Barry, Muscarella, Peavy, & Vetsuypens, 1990; Gorman & Sahlman, 1989). Venture capitalists are generally considered more activist than other types of investors in their involvement in internal firm matters such as the background of the CEO, the make-up of the top management team, and the selection of an investment bank that ultimately represents the company in its IPO (Barry et al., 1990; Fried, Bruton & Hisrich, 1998; Lerner, 1995).

The types of investors represented on the boards of the IPO firms in my sample ranged from the professional venture capitalist investor, to investors representing small local (often personally owned) investment firms, to corporate entities (either parent companies or other firms with an interest in the IPO firm's success), to individual investors ("angel" investors), to family members, to the current or former managers of the firm itself. The size of the financial investment of these investors varies considerably, as well as their goals from their investments. Venture capitalists are generally interested in realizing the gains from their initial investment as soon after the IPO as is feasible without jeopardizing the firm, while firm managers may be interested in the long term value of their investments. The finance literature contains contradictory findings regarding the impact of stock ownership of officers and directors on firm outcomes. Jain and Kini (1994) found that the equity retention by the original entrepreneurs of the company had a positive relationship with post-IPO operating performance of the firm. On the other hand, Mikkelson, Partch, and Shah (1997) found no such relationship in their study of IPO firms.

The typical insider/outsider distinction is likely to be a less important consideration in this research setting than other attributes of investor directors. Based on the level of their investments, their investment goals, and their professional backgrounds, some investors are likely to be more passive in their involvement in infrastructure development or other strategic outcomes, (such as individual investors or those representing small local firms), while others are apt to take on a more active role in firm decision making (such as VCs, corporate parents, and firm management). Characteristics and qualifications of the top management team also remain as moderating influences in this situation. For instance, venture capitalists are less likely to have an impact if the CEO and her management team have corporate experience and/or a track record of prior business accomplishments.

Related to the role of investors on the board is the choice of an investment bank to take the firm through the IPO process. This factor may also prove a moderating influence on interim outcomes such as infrastructure development pre-IPO. Depending on the length of time the investment bank has been retained and the type of investment bank chosen, it may have more or less influence on how the firm prepares for its IPO. As mentioned earlier, investor directors themselves may have an influence on this selection.

**Survival.** The final direction for future research I will discuss involves examining the upper echelon and infrastructure factors that predict survival among IPO firms. As I mentioned earlier in regard to limitations of the current study, those firms no longer in existence as independent entities as of the end of

fiscal 1999 were automatically dropped from my sample. Considering that firms that reach the point of offering their stock to the public have already survived the initial start up phase, it would be interesting to gain insight into why they succeed or fail once they receive an infusion of outside funding.

Using a dependent variable that doesn't necessitate firms being in business as of a particular date in the future would lead to a more complete sample and more generalizable results. The "survival" dependent variable could take multiple "values:" dissolution, bankruptcy, acquired (good performance), acquired (poor performance), independent survival (change in strategy), and independent survival (original strategy), for instance. Jain and Kini (1999) examined the differences in survival rate for post-IPO firms that fell into three categories: survive as an independent firm, fail outright, or get acquired. Their study focused on financial factors such as risk and industry attractiveness variables. I would like to examine managerial and internal preparation factors in this regard, with a more specific delineation of outcomes, as described above.

**Conclusion**

Although the lack of results associated with the present study are disappointing, to say the least, I believe this area or research has considerable potential to contribute to our understanding of how businesses pass through the high growth transition that typically comes on the heels of an IPO and go on to become stable, mature companies. If we can establish some of the key factors, such as the interaction between a board of directors and a CEO, the qualifications of the other top managers, and the development of infrastructure to

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support growth, that are associated with subsequent success or failure, we will have made significant strides in this area of research.

We will also be in a position to assist and guide managers and investors as they approach the IPO event and consider its implications with more knowledge and understanding of the potential consequences of their decisions at this critical juncture. Although it is highly unlikely there will ever be "one right way" to handle this transition, conducting research that demonstrates the superiority of certain strategies over others in regard to firm outcomes would be of significant practical importance.

**TABLES**

**Table 3.1 TMT Titles Counted for Specialization Variable
in a Sub-sample of Thirty Firms**

| TITLE | TOTAL | MFGR | SERVICE | KNOWL |
|---|---|---|---|---|
| Chief Financial Officer or Finance & Administration | 17 | 4 | 7 | 6 |
| Operations or Supply Chain | 13 | 2 | 6 | 5 |
| Corporate or Business Development | 11 | 1 | 4 | 6 |
| Sales & Marketing | 9 | 3 | 2 | 4 |
| (Regional) Operations | 9 | 4 | 2 | 3 |
| Research & Development or Chief Scientific Officer | 8 | 2 | 0 | 6 |
| Sales or Sales Operations | 7 | 2 | 3 | 2 |
| Chief Accounting Officer or Controller | 6 | 1 | 5 | 0 |
| Corporate Counsel | 6 | 1 | 3 | 2 |
| Marketing or Public Relations | 6 | 1 | 4 | 1 |
| Human Resources or Training | 5 | 0 | 2 | 3 |
| Chief Technology Officer or New Technology | 5 | 1 | 0 | 4 |
| Chief Medical Officer or Drug Development | 4 | 0 | 0 | 4 |
| Business Division or Strategic Business Unit | 4 | 1 | 1 | 2 |
| Quality Assurance or Quality Control | 4 | 2 | 1 | 1 |
| Manufacturing or Production | 4 | 2 | 1 | 1 |
| Engineering | 4 | 3 | 0 | 1 |
| Account Management or Client Relations | 4 | 1 | 2 | 1 |
| Construction | 3 | 0 | 3 | 0 |
| Chemistry/Biology or Immunology | 3 | 0 | 0 | 3 |
| Materials or Facilities Acquisition | 3 | 0 | 1 | 2 |

**Table 3.1 (cont'd)**

| TITLE | TOTAL | MFGR | SERVICE | KNOWL |
|---|---|---|---|---|
| Product Development | 3 | 1 | 1 | 1 |
| Patents or Scientific Licensing | 2 | 0 | 0 | 2 |
| Enterprise Consulting | 2 | 0 | 1 | 1 |
| Merchandising | 2 | 0 | 2 | 0 |
| Specific Product or Service | 2 | 0 | 1 | 1 |
| Regulatory Affairs | 2 | 0 | 0 | 2 |
| Franchising | 2 | 0 | 2 | 0 |
| Administration | 2 | 1 | 1 | 0 |
| International | 2 | 0 | 0 | 2 |
| Chief Information Officer or Information Tech. | 2 | 0 | 1 | 1 |
| Corporate Communications | 1 | 0 | 1 | 0 |
| Brewing Operations | 1 | 0 | 1 | 0 |
| Food & Beverage | 1 | 0 | 1 | 0 |
| Store Operations | 1 | 0 | 1 | 0 |
| Special Projects | 1 | 0 | 1 | 0 |
| Publishing | 1 | 0 | 0 | 1 |
| Health Care | 1 | 0 | 1 | 0 |
| Telecommunications | 1 | 0 | 0 | 1 |
| Real Estate | 1 | 0 | 1 | 0 |
| Credit & Collections | 1 | 0 | 1 | 0 |
| Tax | 1 | 0 | 0 | 1 |
| Education | 1 | 0 | 1 | 0 |

**Table 3.2 Variable and Item-Level Reliability**

| Variables & Items | Inter-Collector Reliability | | Inter-Coder Reliability | | External Validity | |
|---|---|---|---|---|---|---|
| | 96 | 97-98 | 96 | 97-98 | 96 | 97-98 |
| **Standardization[1]** | **.55**\*\* | **.33**\*\* | **.59**\*\* | **.42**\*\* | | |
| Financial Reporting | .66** | .40* | .55** | .20 | .73** | .12 |
| Strategic Planning | .75** | .96[a] | .90** | .97[a] | .24 | .00 |
| Policies & Procedures | .69** | 1.00[a] | .92** | .67** | .00 | 1.00[a] |
| Training | .58** | .92[a] | .92** | .71** | .16 | .33 |
| Management Perf & Comp | .96[a] | .96[a] | .46* | .97[a] | .75[a] | .75[a] |
| Employee Perf & Comp | .51** | .96[a] | .43* | .27 | .32 | .33 |
| **Shared Goals[1]** | **.54**\*\* | **.48**\*\* | **.65**\*\* | **.67**\*\* | | |
| Mission Statement | 1.00** | 1.00** | 1.00[a] | .87** | .12 | .00 |
| Communication | .46** | 1.00[a] | 1.00** | .65** | .50[a] | .19 |
| Bonus | .42* | .96[a] | .33[a] | .93[a] | .00 | .75[a] |
| Stock Options | .67** | 1.00** | .92** | .46** | .00 | .00 |
| Stock Purchase Plan | .92** | .96[a] | .81** | .71** | .87** | .71** |
| **Professionalization** | | | | | | |
| Management Development | .96[a] | 1.00** | .97[a] | 1.00[a] | NA | NA |
| **N** | 25 | 25 | 30 | 30 | 20 | 20 |

Statistics are Cohen's Kappa, unless otherwise indicated.  *p < .05; **p < .01
[1] Kendall's tau-c was used to measure association
[a] Measure of association could not be calculated; statistic reported is uncorrected percent agreement

# Table 4.1 Descriptive Statistics and Correlations

| Variables | N | Mean | S.D. |
|---|---|---|---|
| 1. Service industry | 296 | .28 | .45 |
| 2. Knowledge-intensive industry | 296 | .47 | .50 |
| 3. Number of employees (1996) | 296 | 306 | 447 |
| 4. Revenues (1996) ($000's) | 295 | 61,345 | 126,794 |
| 5. CEO stock ownership (%) | 296 | 17.87 | 20.07 |
| 6. Board tenure | 295 | 3.06 | 3.03 |
| 7. Board size | 296 | 6.18 | 1.66 |
| 8. Policies and procedures pre-IPO | 296 | .66 | .47 |
| 9. Strategic planning pre-IPO | 296 | .83 | .38 |
| 10. Mission statement pre-IPO | 296 | .03 | .16 |
| 11. Stock purchase plan pre-IPO | 296 | .39 | .49 |
| 12. Specialization pre-IPO | 225 | 5.69 | 2.96 |
| 13. Management development pre-IPO | 296 | .03 | .18 |
| 14. Professionalization pre-IPO | 284 | 6.89 | 3.84 |
| 15. Annual report 97 | 296 | .83 | .37 |
| 16. Annual report 98 | 296 | .65 | .48 |
| 17. Business experts | 296 | 1.38 | 1.18 |
| 18. Support specialists | 296 | 2.18 | 1.36 |
| 19. Policies and procedures post-IPO | 296 | .11 | .32 |
| 20. Strategic planning post-IPO | 296 | .02 | .13 |
| 21. Mission statement post-IPO | 296 | .18 | .38 |
| 22. Stock purchase plan post-IPO | 296 | .14 | .34 |
| 23. Specialization post-IPO[a] | 225 | 6.05 | 3.50 |
| 24. Management developmnt post-IPO | 296 | .02 | .15 |
| 25. Professionalization post-IPO | 280 | 7.15 | 3.84 |
| 26. CEO general mgt experience | 237 | 3.54 | 4.86 |
| 27. CEO industry experience | 242 | 8.65 | 7.61 |
| 28. Number of employees (1998) | 291 | 971 | 1,926 |
| 29. Revenues (1998) ($000's) | 295 | 126,021 | 266,731 |
| 30. Firm ROA[a] | 292 | -.15 | .19 |
| 31. Firm net income ($000's) | 294 | -2,331 | 27,777 |
| 32. Firm shareholders' equity ($000's) | 295 | 72,206 | 116,791 |
| 33. Firm market value ($000's)[a] | 288 | 1.80 | .91 |
| 34. Industry average ROA | 296 | .06 | .08 |
| 35. Industry average ROE | 296 | .01 | .06 |
| 36. Industry average MV/NI (P/E) | 252 | 86.23 | 117.16 |
| 37. Industry average MV/BV | 295 | 9.92 | 9.06 |

[a]These variables were logged prior to their inclusion in analyses

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Table 4.1 (cont'd)

| Vars | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | -.58** | | | | | | | |
| 3 | .34** | -.30** | | | | | | |
| 4 | .12* | -.20** | .57** | | | | | |
| 5 | .20** | -.11* | .17** | .13* | | | | |
| 6 | -.15** | .12* | .01 | -.06 | -.12* | | | |
| 7 | .02 | -.10 | .21** | .15* | -.11 | -.06 | | |
| 8 | .11 | -.08 | .05 | -.08 | .04 | .13* | .05 | |
| 9 | .08 | .08 | .18** | .11 | .08 | .03 | .02 | .12* |
| 10 | .13* | -.07 | .13* | -.03 | .02 | -.03 | .01 | -.01 |
| 11 | -.10 | .11 | -.03 | .01 | -.06 | .08 | .01 | -.07 |
| 12 | .13* | -.08 | .27** | .21** | .17* | -.03 | .20** | -.02 |
| 13 | .22** | -.14* | .38** | .18** | .04 | -.04 | .04 | .09 |
| 14 | .08 | -.14* | .06 | .03 | .01 | -.15* | .10 | -.04 |
| 15 | -.09 | .07 | .19** | .10 | -.03 | .12* | .12* | .05 |
| 16 | .07 | -.06 | .26** | .17** | -.01 | .13* | .06 | .03 |
| 17 | -.01 | -.01 | .07 | .15* | -.07 | .04 | .39** | -.07 |
| 18 | -.01 | -.03 | -.06 | -.12* | -.21** | -.11 | .38** | .07 |
| 19 | -.08 | .08 | -.07 | .07 | -.01 | -.13* | -.01 | -.41** |
| 20 | .04 | -.02 | -.03 | -.05 | -.02 | -.02 | .03 | -.02 |
| 21 | -.07 | .12* | .09 | .03 | -.08 | .04 | .01 | .05 |
| 22 | -.11 | .01 | .04 | .04 | -.08 | .06 | .12* | -.03 |
| 23 | .06 | -.10 | .23** | .12 | .05 | .03 | .12 | .00 |
| 24 | .05 | -.01 | .06 | -.01 | .06 | -.03 | -.07 | -.03 |
| 25 | .06 | -.09 | .15* | .11 | .00 | -.10 | .09 | .04 |
| 26 | .00 | -.13* | .09 | .06 | .01 | -.16* | .09 | -.02 |
| 27 | .00 | .01 | .05 | -.03 | -.06 | .00 | .08 | -.11 |
| 28 | .29** | -.22** | .68** | .53** | .18** | -.11 | .19** | .05 |
| 29 | .16** | -.18** | .49** | .90** | .16** | -.09 | .20** | -.07 |
| 30 | .14* | -.09 | .22** | .18** | .00 | .04 | .07 | -.01 |
| 31 | .04 | -.11 | .22** | .31** | .12* | .00 | -.03 | -.01 |
| 32 | .04 | .02 | .37** | .46** | .09 | -.11 | .20** | -.02 |
| 33 | -.08 | .17** | .31** | .29** | .06 | .01 | .17** | -.02 |
| 34 | -.24** | .27** | -.14* | -.12* | -.02 | .01 | -.13* | .08 |
| 35 | .09 | -.13* | .00 | .07 | .12* | -.12* | -.10 | .04 |
| 36 | -.22** | .34** | -.14* | -.13* | -.21** | .07 | .03 | -.01 |
| 37 | -.38** | .51** | -.28** | -.24** | -.13* | .01 | -.12* | -.14* |

*p < .05
**p < .01

# Table 4.1 (cont'd)

| Vars | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | .02 | | | | | | | |
| 11 | .15** | -.05 | | | | | | |
| 12 | .09 | .00 | .20** | | | | | |
| 13 | .08 | .08 | -.07 | .12 | | | | |
| 14 | -.10 | .05 | -.09 | -.05 | .07 | | | |
| 15 | .21** | .07 | .13* | .06 | .03 | .04 | | |
| 16 | .16** | .08 | .13* | .07 | .06 | .04 | .04 | |
| 17 | -.07 | .07 | .01 | .08 | -.01 | .03 | .03 | .06 |
| 18 | .07 | -.02 | .03 | .11 | -.03 | .06 | .03 | -.07 |
| 19 | -.41** | -.06 | -.02 | .00 | -.01 | .01 | -.04 | -.01 |
| 20 | -.29** | .14* | .00 | .03 | -.03 | .02 | .06 | -.01 |
| 21 | .14* | -.08 | .02 | -.05 | .06 | .01 | .16** | .21** |
| 22 | .07 | -.01 | -.31** | -.04 | -.02 | .13* | .10 | .02 |
| 23 | .16* | -.04 | .08 | .49** | .12 | .00 | -.10 | .00 |
| 24 | -.05 | .11 | -.03 | .07 | -.03 | .06 | .07 | .07 |
| 25 | .06 | -.04 | -.03 | .02 | .03 | .57** | .14* | .09 |
| 26 | -.10 | .04 | -.06 | -.04 | .01 | .08 | .10 | .00 |
| 27 | .03 | .00 | -.02 | -.04 | .00 | .17* | .21** | .08 |
| 28 | .15* | .04 | -.09 | .22** | .36** | .03 | .14* | .19** |
| 29 | .12* | .00 | -.02 | .21** | .24** | .05 | .11 | .17** |
| 30 | .11 | .05 | .10 | .11 | .05 | -.07 | .13* | .20** |
| 31 | .04 | .04 | -.04 | -.00 | .11 | -.01 | .05 | .10 |
| 32 | .12* | .00 | .10 | .12 | .19** | .01 | .18** | .25** |
| 33 | .26** | .05 | .28** | .19** | .09 | -.06 | .27** | .33** |
| 34 | .06 | .03 | .06 | .05 | -.08 | -.11 | .06 | .05 |
| 35 | -.06 | .04 | -.12* | -.01 | .05 | .01 | -.01 | .01 |
| 36 | -.05 | -.07 | .18** | -.01 | -.09 | -.04 | .09 | -.04 |
| 37 | .06 | -.06 | .20** | -.01 | -.15** | -.06 | .03 | -.06 |

*p < .05
**p < .01

## Table 4.1 (cont'd)

| Vars | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | -.30** | | | | | | | |
| 19 | .03 | -.08 | | | | | | |
| 20 | .07 | -.06 | .12* | | | | | |
| 21 | .01 | .01 | -.02 | -.06 | | | | |
| 22 | .15* | .06 | .11 | .03 | .00 | | | |
| 23 | .00 | .07 | .03 | -.02 | -.05 | -.01 | | |
| 24 | -.03 | -.02 | .02 | .33** | -.01 | .13* | -.02 | |
| 25 | .08 | -.03 | -.05 | -.04 | -.04 | .15* | -.06 | .03 |
| 26 | .10 | .03 | .01 | -.06 | .01 | .03 | .07 | -.04 |
| 27 | .11 | .10 | -.01 | .02 | -.08 | .20** | -.09 | .22** |
| 28 | .04 | -.07 | .01 | -.02 | .07 | .04 | .23** | .03 |
| 29 | .16** | -.08 | .11 | -.04 | .01 | .04 | .15* | -.01 |
| 30 | .06 | -.01 | -.04 | -.04 | .04 | .03 | .20** | .05 |
| 31 | .13* | -.15** | -.06 | -.04 | .06 | .09 | -.03 | .04 |
| 32 | .08 | -.06 | .06 | -.02 | .13* | -.05 | .21** | .03 |
| 33 | .10 | -.01 | .02 | .02 | .16* | -.02 | .15* | .01 |
| 34 | -.07 | -.01 | .06 | .03 | .10 | .06 | -.07 | .05 |
| 35 | -.04 | -.02 | .02 | .04 | -.01 | .06 | -.01 | .05 |
| 36 | .06 | .11 | -.06 | .01 | .04 | -.05 | -.05 | -.07 |
| 37 | -.12* | .06 | .12* | -.03 | .11 | -.02 | -.02 | -.07 |

*p < .05
**p < .01

**Table 4.1 (cont'd)**

| Vars | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|------|------|------|------|------|------|------|------|------|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | .07 | | | | | | | |
| 27 | .10 | .19** | | | | | | |
| 28 | .15* | .11 | -.06 | | | | | |
| 29 | .11 | .06 | -.05 | .68** | | | | |
| 30 | -.01 | -.02 | .07 | .15* | .17** | | | |
| 31 | .05 | .06 | .07 | .16** | .33** | .28** | | |
| 32 | .07 | .09 | .05 | .48** | .56** | .21** | .25** | |
| 33 | -.01 | .00 | .09 | .27** | .33** | .33** | .19** | .63** |
| 34 | -.01 | -.11 | -.13* | -.10 | -.10 | .03 | .17** | -.04 |
| 35 | .04 | -.01 | -.05 | .01 | .06 | .06 | .25** | -.02 |
| 36 | .07 | .01 | .02 | -.13* | -.13* | -.05 | -.12 | -.01 |
| 37 | -.01 | -.03 | -.04 | -.21** | -.23** | -.06 | -.10 | -.02 |

*p < .05
**p < .01

Table 4.1 (cont'd)

| Vars | 33 | 34 | 35 | 36 |
|------|------|--------|--------|--------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | | | | |
| 28 | | | | |
| 29 | | | | |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | .02 | | | |
| 35 | -.01 | .51** | | |
| 36 | .14* | -.18** | -.47** | |
| 37 | .07 | .43** | -.09 | .37** |
| *p < .05 | | | | |
| **p < .01 | | | | |

**Table 4.2 Regression of High Growth Transition Infrastructure Changes on Board Composition**

| Variables | Policies and Procedures | | | | |
| --- | --- | --- | --- | --- | --- |
| | Step 1 | | | Step 2 | |
| | b | Wald | | b | Wald |
| **Step 1: Controls** | | | | | |
| Service | -.23 | .12 | | -.18 | .07 |
| Knowledge | .34 | .42 | | .40 | .58 |
| Employees 96 | .00 | 3.72* | | .00 | 4.04* |
| Revenues 96 | .00 | 3.67 | | .00 | 3.53 |
| CEO stockownership % | .00 | .02 | | .00 | .09 |
| Board tenure | -.19 | 2.70 | | -.20 | 2.97 |
| Board size | .06 | .24 | | .20 | 1.34 |
| Annual report 97 | -.38 | .37 | | -.39 | .36 |
| Annual report 98 | .54 | 1.00 | | .54 | .98 |
| Policies & procedures 96 | -2.87 | 25.95** | | -2.84 | 25.30** |
| Strategic planning 96 | | | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 | | | | | |
| Management develop. 96 | | | | | |
| Specialization 96 | | | | | |
| Professionalization 96 | | | | | |
| | | | | | |
| **% Correct** | | **89.1** | | | |
| $X^2$ | | **57.3**** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| Business experts | | | | -.10 | .20 |
| Support specialists | | | | -.30 | 2.11 |
| | | | | | |
| **% Correct** | | | | | **90.1** |
| $\Delta X^2$ | | | | | **2.3** |
| | | | | | |
| | | | | | |
| | | | | | |
| **N** | | | | | **294** |

*p < .05
**p < .01

## Table 4.2 (cont'd)

| Variables | Strategic Planning | | | | |
| | Step 1 | | | Step 2 | |
| | b | Wald | | b | Wald |
|---|---|---|---|---|---|
| **Step 1: Controls** | | | | | |
| Service | -1.06 | .05 | | | |
| Knowledge | 1.76 | .53 | | | |
| Employees 96 | .04 | 2.61 | | | |
| Revenues 96 | .00 | 1.58 | | | |
| CEO stockownership % | .02 | .04 | | | |
| Board tenure | -.39 | .68 | | | |
| Board size | .30 | .31 | | | |
| Annual report 97 | 11.78 | .00 | | | |
| Annual report 98 | 1.17 | .29 | | | |
| Policies & procedures 96 | | | | | |
| Strategic planning 96 | -60.22 | .58 | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 | | | | | |
| Management develop. 96 | | | | | |
| Specialization 96 | | | | | |
| Professionalization 96 | | | | | |
| | | | | | |
| **% Correct** | | **98.9** | | | |
| $X^2$ | | **37.4\*\*** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| | | | | | |
| Business experts | | | | NA | NA |
| Support specialists | | | | NA | NA |
| | | | | | |
| **% Correct** | | | | | **NA** |
| $\Delta X^2$ | | | | | **NA** |
| | | | | | |
| | | | | | |
| | | | | | |
| **N** | | | | | **294** |

*p < .05
**p < .01
NA = Solution not found after 20 iterations

**Table 4.2 (cont'd)**

| Variables | Mission Statement | | | | |
| | Step 1 | | | Step 2 | |
| | b | Wald | | b | Wald |
|---|---|---|---|---|---|
| **Step 1: Controls** | | | | | |
| Service | -.08 | .02 | | -.09 | .03 |
| Knowledge | .91 | 4.31* | | .91 | 4.29* |
| Employees 96 | .00 | 4.88* | | .00 | 4.91* |
| Revenues 96 | .00 | .70 | | .00 | .69 |
| CEO stockownership % | -.01 | 2.17 | | -.01 | 1.94 |
| Board tenure | -.03 | .26 | | -.03 | .24 |
| Board size | -.07 | .49 | | -.09 | .49 |
| Annual report 97 | 1.12 | 2.04 | | 1.10 | 1.96 |
| Annual report 98 | 1.19 | 6.69** | | 1.19 | 6.76** |
| Policies & procedures 96 | | | | | |
| Strategic planning 96 | | | | | |
| Mission statement 96 | -6.18 | .24 | | -6.19 | .24 |
| Stock purchase plan 96 | | | | | |
| Management develop. 96 | | | | | |
| Specialization 96 | | | | | |
| Professionalization 96 | | | | | |
| | | | | | |
| **% Correct** | | 82.3 | | | |
| $X^2$ | | 32.6** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| | | | | | |
| Business experts | | | | .03 | .04 |
| Support specialists | | | | .04 | .06 |
| | | | | | |
| **% Correct** | | | | | 82.7 |
| $\Delta X^2$ | | | | | .1 |
| | | | | | |
| | | | | | |
| | | | | | |
| **N** | | | | | 294 |
| *p < .05 **p < .01 | | | | | |

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**Table 4.2 (cont'd)**

| Variables | Stock Purchase Plan | | | | |
|---|---|---|---|---|---|
| | Step 1 | | | Step 2 | |
| | b | Wald | | b | Wald |
| **Step 1: Controls** | | | | | |
| Service | -1.53 | 6.01** | | -1.56 | 6.08** |
| Knowledge | -.49 | 1.18 | | -.35 | .58 |
| Employees 96 | .00 | .93 | | .00 | 1.97 |
| Revenues 96 | .00 | .44 | | .00 | .72 |
| CEO stockownership % | -.01 | 1.58 | | -.01 | .94 |
| Board tenure | .09 | 2.04 | | .08 | 1.55 |
| Board size | .20 | 2.99 | | -.04 | .06 |
| Annual report 97 | 1.08 | 2.29 | | .92 | 1.62 |
| Annual report 98 | -.05 | .01 | | -.03 | .00 |
| Policies & procedures 96 | | | | | |
| Strategic planning 96 | | | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 | -9.29 | .40 | | -9.24 | .39 |
| Management develop. 96 | | | | | |
| Specialization 96 | | | | | |
| Professionalization 96 | | | | | |
| | | | | | |
| **% Correct** | | **85.7** | | | |
| **$X^2$** | | **63.7*** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| | | | | | |
| Business experts | | | | .41 | 3.75* |
| Support specialists | | | | .29 | 2.31 |
| | | | | | |
| **% Correct** | | | | | **85.0** |
| **$\Delta X^2$** | | | | | **4.3** |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **N** | | | | | **294** |
| *p < .05  **p < .01 | | | | | |

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## Table 4.2 (cont'd)

| | Management Development | | | | |
|---|---|---|---|---|---|
| | Step 1 | | | Step 2 | |
| | b | Wald | | b | Wald |
| **Step 1: Controls** | | | | | |
| Service | .41 | .10 | | .39 | .09 |
| Knowledge | .45 | .14 | | .45 | .14 |
| Employees 96 | .00 | 2.40 | | .00 | 2.39 |
| Revenues 96 | .00 | 1.03 | | .00 | .98 |
| CEO stockownership % | .01 | .45 | | .01 | .47 |
| Board tenure | -.12 | .49 | | -.12 | .46 |
| Board size | -.51 | 2.40 | | -.55 | 1.65 |
| Annual report 97 | 7.29 | .04 | | 7.27 | .04 |
| Annual report 98 | .73 | .40 · | | .72 | .39 |
| Policies & procedures96 | | | | | |
| Strategic planning 96 | | | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 · | | | | | |
| Management develop. 96 | -8.35 | .01 | | -8.31 | .01 |
| Specialization 96 | | | | | |
| Professionalization 96 | | | | | |
| | | | | | |
| **% Correct** | | **97.6** | | | |
| $X^2$ | | **10.4** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| | | | | | |
| Business experts | | | | .03 | .00 |
| Support specialists | | | | .08 | .04 |
| | | | | | |
| **% Correct** | | | | · | **97.6** |
| $\Delta X^2$ | | | | | **.0** |
| | | | | | |
| | | | | | |
| | | | | | |
| **N** | | | | | **294** |

*p < .05
**p < .01

# Table 4.2 (cont'd)

| Variables | Specialization | | | | |
|---|---|---|---|---|---|
| | Step 1 | | | Step 2 | |
| | B | t | | B | t |
| **Step 1: Controls** | | | | | |
| Service | -.09 | -1.03 | | -.10 | -1.05 |
| Knowledge | -.16 | -1.84 | | -.16 | -1.85 |
| Employees 96 | .11 | 1.24 | | .11 | 1.21 |
| Revenues 96 | -.05 | -.62 | | -.05 | -.54 |
| CEO stockownership % | .02 | .25 | | .02 | .31 |
| Board tenure | .08 | 1.12 | | .08 | 1.18 |
| Board size | .08 | 1.10 | | .07 | .77 |
| Annual report 97 | -.15 | -2.13* | | -.15 | -2.10* |
| Annual report 98 | .03 | .46 | | .04 | .49 |
| Policies & procedures96 | | | | | |
| Strategic planning 96 | | | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 | | | | | |
| Management develop. 96 | | | | | |
| Specialization 96 | .45 | 6.28** | | .44 | 6.14** |
| Professionalization 96 | | | | | |
| | | | | | |
| $R^2$ | | .30 | | | |
| F | | 6.50** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| Business experts | | | | .00 | -.04 |
| Support specialists | | | | .04 | .43 |
| | | | | | |
| $\Delta R^2$ | | | | | .00 |
| $\Delta F$ | | | | | .13 |
| | | | | | |
| | | | | | .30 |
| | | | | | .24 |
| N | | | | | 164 |

*p < .05
**p < .01

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**Table 4.2 (cont'd)**

| Variables | Professionalization | | | | |
| | Step 1 | | | Step 2 | |
| | B | t | | B | t |
|---|---|---|---|---|---|
| **Step 1: Controls** | | | | | |
| Service | -.04 | -.52 | | -.03 | -.47 |
| Knowledge | -.02 | -.34 | | -.02 | -.35 |
| Employees 96 | .06 | .83 | | .06 | .81 |
| Revenues 96 | .05 | .74 | | .04 | .56 |
| CEO stockownership % | -.01 | -.25 | | -.02 | -.43 |
| Board tenure | -.04 | -.72 | | -.05 | -.89 |
| Board size | -.02 | -.45 | | -.01 | -.19 |
| Annual report 97 | .05 | .96 | | .06 | .97 |
| Annual report 98 | .01 | .21 | | .01 | .16 |
| Policies & procedures96 | | | | | |
| Strategic planning 96 | | | | | |
| Mission statement 96 | | | | | |
| Stock purchase plan 96 | | | | | |
| Management develop. 96 | | | | | |
| Specialization 96 | | | | | |
| Professionalization 96 | .55 | 10.59** | | .55 | 10.59** |
| | | | | | |
| $R^2$ | | .33 | | | |
| F | | 13.16** | | | |
| | | | | | |
| **Step 2: IVs** | | | | | |
| | | | | | |
| Business experts | | | | .02 | .33 |
| Support specialists | | | | -.06 | -.86 |
| | | | | | |
| $\Delta R^2$ | | | | | .00 |
| $\Delta F$ | | | | | .84 |
| | | | | | |
| | | | | | .34 |
| | | | | | .31 |
| N | | | | | 272 |

*p < .05
**p < .01

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## Table 4.3 Regression of Firm Performance on High Growth Transition Infrastructure Changes

| Variables | Return on Assets | | | |
|---|---|---|---|---|
| | Step 1 | | Step 2 | |
| | **B** | **t** | **B** | **t** |
| **Step 1: Controls** | | | | |
| Service | .19 | 1.83 | .23 | 2.31* |
| Knowledge | -.02 | -.18 | .04 | .35 |
| Employees 96 | .18 | 1.83 | .16 | 1.59 |
| Revenues 96 | .08 | .96 | .12 | 1.39 |
| CEO stock % | .04 | .57 | .05 | .65 |
| Policies 96 | -.20 | -2.56** | -.19 | -2.22* |
| Planning 96 | .14 | 1.90 | .09 | 1.09 |
| Mission 96 | -.03 | -.40 | -.05 | -.65 |
| Stock purchase 96 | -.02 | -.28 | .02 | .28 |
| Specialization 96 | .00 | -.01 | -.11 | -1.24 |
| Mgt develop. 96 | .02 | .30 | .05 | .66 |
| Professional. 96 | -.06 | -.76 | .01 | .10 |
| Annual report 97 | -.08 | -1.03 | -.04 | -.51 |
| Annual report 98 | .29 | 3.69** | .29 | 3.74** |
| Industry Avg ROA | .13 | 1.72 | .16 | 2.10* |
| Shareholders' equity | | | | |
| Industry Avg ROE | | | | |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | | | | |
| **$R^2$ and F** | .29 | 3.84** | | |
| **Step 2: IVs** | | | | |
| Policies Δs | | | -.01 | -.15 |
| Planning Δs | | | -.06 | -.81 |
| Mission Δs | | | -.09 | -1.14 |
| Stock purchase Δs | | | .13 | 1.70 |
| Specialization 98 | | | .23 | 2.66** |
| Mgt develop. Δs | | | .04 | .54 |
| Professional. 98 | | | -.12 | -1.19 |
| **$\Delta R^2$ and $\Delta F$** | | | .07 | 2.21* |
| **Total $R^2$** | | | .36 | |
| **Adjusted $R^2$** | | | .26 | |
| **N** | | | 156 | |

*$p < .05$
**$p < .01$

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## Table 4.3 (cont'd)

| Variables | Net Income (ROE) | | | |
| | Step 1 | | Step 2 | |
| | B | t | B | t |
|---|---|---|---|---|
| **Step 1: Controls** | | | | |
| Service | -.07 | -.65 | -.04 | -.39 |
| Knowledge | -.01 | -.09 | -.00 | -.03 |
| Employees 96 | .13 | 1.31 | .09 | .85 |
| Revenues 96 | .00 | .01 | .01 | .14 |
| CEO stock % | .10 | 1.31 | .12 | 1.56 |
| Policies 96 | -.07 | -.92 | -.14 | -1.71 |
| Planning 96 | .01 | .14 | .01 | .14 |
| Mission 96 | .05 | .66 | .05 | .68 |
| Stock purchase 96 | .00 | .02 | .03 | .40 |
| Specialization 96 | -.08 | -1.05 | -.08 | -.96 |
| Mgt develop. 96 | .03 | .33 | .04 | .44 |
| Professional. 96 | -.12 | -1.63 | -.18 | -1.79 |
| Annual report 97 | .07 | .86 | .08 | .99 |
| Annual report 98 | .06 | .76 | .06 | .72 |
| Industry Avg ROA | | | | |
| Shareholders' equity | .14 | 1.85 | .16 | 2.01* |
| Industry Avg ROE | .44 | 5.83** | .43 | 5.60** |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | | | | |
| $R^2$ and F | .29 | 3.61** | | |
| **Step 2: IVs** | | | | |
| Policies $\Delta$s | | | -.18 | -2.18* |
| Planning $\Delta$s | | | .01 | .07 |
| Mission $\Delta$s | | | .03 | .43 |
| Stock purchase $\Delta$s | | | .08 | .93 |
| Specialization 98 | | | -.01 | -.10 |
| Mgt develop. $\Delta$s | | | .01 | .15 |
| Professional. 98 | | | .08 | .77 |
| $\Delta R^2$ and $\Delta F$ | | | .04 | 1.00 |
| Total $R^2$ | | | .33 | |
| Adjusted $R^2$ | | | .21 | |
| N | | | 157 | |

*p < .05
**p < >01

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## Table 4.3 (cont'd)

| Variables | Market Value (P/E) | | | |
|---|---|---|---|---|
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | -.11 | -.99 | -.13 | -1.15 |
| Knowledge | .16 | 1.42 | .18 | 1.42 |
| Employees 96 | .19 | 1.86 | .22 | 2.01* |
| Revenues 96 | .16 | 1.71 | .15 | 1.54 |
| CEO stock % | .13 | 1.51 | .11 | 1.27 |
| Policies 96 | -.11 | -1.33 | -.08 | -.80 |
| Planning 96 | .01 | .11 | .02 | .22 |
| Mission 96 | .12 | 1.56 | .13 | 1.51 |
| Stock purchase 96 | .24 | 2.71** | .19 | 1.96* |
| Specialization 96 | .10 | 1.12 | .08 | .82 |
| Mgt develop. 96 | .00 | -.02 | -.01 | -.06 |
| Professional. 96 | -.01 | -.18 | .03 | .30 |
| Annual report 97 | -.18 | -2.19* | -.17 | -2.07 |
| Annual report 98 | .12 | 1.47 | .12 | 1.45 |
| Industry Avg ROA | | | | |
| Shareholders' equity | | | | |
| Industry Avg ROE | | | | |
| Net income | .21 | 2.61** | .23 | 2.79 |
| Industry Avg P/E | .12 | 1.32 | .13 | 1.44 |
| Industry Avg MV/BV | | | | |
| **$R^2$ and F** | **.33** | **3.61**\*\* | | |
| **Step 2: IVs** | | | | |
| Policies $\Delta$s | | | .09 | .98 |
| Planning $\Delta$s | | | .00 | -.03 |
| Mission $\Delta$s | | | -.04 | -.47 |
| Stock purchase $\Delta$s | | | -.11 | -1.26 |
| Specialization 98 | | | .05 | .50 |
| Mgt develop. $\Delta$s | | | .00 | -.02 |
| Professional. 98 | | | -.04 | -.38 |
| **$\Delta R^2$ and $\Delta F$** | | | **.02** | **.51** |
| **Total $R^2$** | | | **.35** | |
| **Adjusted $R^2$** | | | **.22** | |
| **N** | | | **132** | |

*p < .05
**p < >01

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**Table 4.3 (cont'd)**

| Variables | Market Value (MV/BV) | | | |
| --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | -.07 | -.84 | -.10 | -1.19 |
| Knowledge | .18 | 2.10* | .16 | 1.84 |
| Employees 96 | .13 | 1.62 | .17 | 2.03* |
| Revenues 96 | .02 | .33 | .01 | .08 |
| CEO stock % | .03 | .53 | .03 | .42 |
| Policies 96 | -.10 | -1.69 | -.05 | -.79 |
| Planning 96 | .01 | .18 | .02 | .37 |
| Mission 96 | .09 | 1.57 | .08 | 1.38 |
| Stock purchase 96 | .15 | 2.41* | .15 | 2.17* |
| Specialization 96 | .03 | .48 | .07 | .92 |
| Mgt develop. 96 | -.01 | -.19 | -.02 | -.31 |
| Professional. 96 | -.05 | -.77 | .00 | .05 |
| Annual report 97 | -.06 | -1.01 | -.08 | -1.28 |
| Annual report 98 | .12 | 1.90 | .12 | 1.93 |
| Industry Avg ROA | | | | |
| Shareholders' equity | .59 | 9.51** | .60 | 9.40** |
| Industry Avg ROE | | | | |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | -.01 | -.18 | -.04 | -.49 |
| $R^2$ and F | .56 | 10.86** | | |
| **Step 2: IVs** | | | | |
| Policies $\Delta$s | | | .12 | 1.78 |
| Planning $\Delta$s | | | .01 | .21 |
| Mission $\Delta$s | | | -.03 | -.46 |
| Stock purchase $\Delta$s | | | -.02 | -.29 |
| Specialization 98 | | | -.08 | -1.08 |
| Mgt develop. $\Delta$s | | | -.04 | -.64 |
| Professional. 98 | | | -.06 | -.75 |
| $\Delta R^2$ and $\Delta F$ | | | .02 | .82 |
| Total $R^2$ | | | .58 | |
| Adjusted $R^2$ | | | .50 | |
| N | | | 154 | |

*p < .05
**p < >01

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## Table 4.4  Regression of Firm Performance on Board Composition

| Variables | Return on Assets | | | |
| --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | .13 | 1.69 | .13 | 1.67 |
| Knowledge | .02 | .24 | .02 | .23 |
| Employees 96 | .15 | 1.86 | .15 | 1.90 |
| Revenues 96 | .09 | 1.22 | .09 | 1.14 |
| CEO stock % | -.05 | -.79 | -.04 | -.70 |
| Board tenure | .05 | .90 | .05 | .87 |
| Board size | .03 | .46 | .01 | .13 |
| Industry Avg ROA | .09 | 1.41 | .09 | 1.42 |
| Shareholders' equity | | . | | |
| Industry Avg ROE | | | | |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | | | | |
| | | | | |
| $R^2$ | .07 | | | |
| F | 2.69** | | | |
| | | | | |
| **Step 2: IVs** | | | | |
| Business experts | | | .04 | .49 |
| Support specialists | | | .01 | .16 |
| | | | | |
| $\Delta R^2$ | | | .00 | |
| $\Delta F$ | | | .13 | |
| | | | | |
| **Total $R^2$** | | | .07 | |
| **Adjusted $R^2$** | | | .04 | |
| N | | | 289 | |
| *p < .05 <br> **p < .01 | | | | |

## Table 4.4 (cont'd)

| Variables | Net Income (ROE) | | | |
| --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | -.08 | -1.12 | -.08 | -1.21 |
| Knowledge | -.07 | -1.07 | -.08 | -1.18 |
| Employees 96 | .08 | 1.02 | .09 | 1.23 |
| Revenues 96 | .18 | 2.53** | .16 | 2.17* |
| CEO stock % | .05 | .91 | .06 | .98 |
| Board tenure | .06 | .99 | .05 | .80 |
| Board size | -.08 | -1.39 | -.14 | -1.85 |
| Industry Avg ROA | | | | |
| Shareholders' equity | .16 | 2.43* | .16 | 2.47** |
| Industry Avg ROE | .23 | 4.23** | .23 | 4.24** |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | | | | |
| | | | | |
| $R^2$ | .19 | | | |
| F | 7.12** | | | |
| | | | | |
| **Step 2: IVs** | | | | |
| Business experts | | | .15 | 2.14* |
| Support specialists | | | -.00 | -.02 |
| | | | | |
| $\Delta R^2$ | | | .02 | |
| $\Delta F$ | | | 3.28* | |
| | | | | |
| Total $R^2$ | | | .20 | |
| Adjusted $R^2$ | | | .17 | |
| N | | | 291 | |
| *p < .05 **p < .01 | | | | |

## Table 4.4  (cont'd)

| Variables | Market Value (P/E) | | | |
|---|---|---|---|---|
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | -.06 | -.86 | -.07 | -.86 |
| Knowledge | .20 | 2.59** | .20 | 2.60** |
| Employees 96 | .29 | 3.61** | .29 | 3.59** |
| Revenues 96 | .12 | 1.49 | .12 | 1.54 |
| CEO stock % | .10 | 1.65 | .11 | 1.67 |
| Board tenure | .05 | .87 | .06 | .91 |
| Board size | .09 | 1.55 | .09 | 1.11 |
| Industry Avg ROA | | | | |
| Shareholders' equity | | | | |
| Industry Avg ROE | | | | |
| Net income | .12 | 1.92 | .12 | 1.95* |
| Industry Avg P/E | .13 | 2.04* | .13 | 1.99* |
| Industry Avg MV/BV | | | | |
| | | | | |
| $R^2$ | .23 | | | |
| F | 7.61** | | | |
| | | | | |
| **Step 2: IVs** | | | | |
| Business experts | | | -.02 | -.20 |
| Support specialists | | | .03 | .34 |
| | | | | |
| $\Delta R^2$ | | | .00 | |
| $\Delta F$ | | | .17 | |
| | | | | |
| Total $R^2$ | | | .23 | |
| Adjusted $R^2$ | | | .19 | |
| N | | | 241 | |
| *p < .05 **p < .01 | | | | |

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**Table 4.4 (cont'd)**

| Variables | Market Value (MV/BV) | | | |
|---|---|---|---|---|
| | Step 1 | | Step 2 | |
| | B | t | B | t |
| **Step 1: Controls** | | | | |
| Service | -.03 | -.56 | -.04 | -.64 |
| Knowledge | .18 | 3.02** | .18 | 2.96** |
| Employees 96 | .16 | 2.56** | .17 | 2.71** |
| Revenues 96 | -.04 | -.58 | -.04 | -.66 |
| CEO stock % | .05 | 1.09 | .07 | 1.38 |
| Board tenure | .05 | 1.09 | .05 | 1.14 |
| Board size | .04 | .81 | -.02 | -.33 |
| Industry Avg ROA | | | | |
| Shareholders' equity | .58 | 10.82** | .58 | 10.91** |
| Industry Avg ROE | | | | |
| Net income | | | | |
| Industry Avg P/E | | | | |
| Industry Avg MV/BV | .03 | .53 | .03 | .55 |
| | | | | |
| $R^2$ | .45 | | | |
| F | 25.79** | | | |
| | | | | |
| **Step 2: IVs** | | | | |
| Business experts | | | .08 | 1.36 |
| Support specialists | | | .07 | 1.23 |
| | | | | |
| $\Delta R^2$ | | | .00 | |
| $\Delta F$ | | | 1.01 | |
| | | | | |
| Total $R^2$ | | | .45 | |
| Adjusted $R^2$ | | | .43 | |
| N | | | 284 | |

*$p < .05$
**$p < .01$

**Table 4.5 Regression of High Growth Transition Infrastructure Changes on Board Composition Moderated by CEO Qualifications**

| Variables | Policies and Procedures | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | | Step 2 | | Step 3 | |
| | b | Wald | b | Wald | b | Wald |
| **Step 1: Controls** | | | | | | |
| Service | -.37 | .18 | -.25 | .08 | -.28 | .08 |
| Knowledge | .47 | .47 | .67 | .81 | .68 | .70 |
| Employees 96 | .00 | 3.05 | .00 | 3.27 | .00 | 3.59 |
| Revenues 96 | .00 | 3.75* | .00 | 3.63 | .00 | 4.50* |
| CEO stock % | .00 | .02 | .00 | .00 | .00 | .02 |
| Board tenure | -.22 | 2.30 | -.23 | 2.29 | -.22 | 2.05 |
| Board size | .06 | .15 | .24 | 1.41 | .26 | 1.60 |
| Annual report 97 | -.26 | .12 | -.10 | .02 | -.28 | .11 |
| Annual report 98 | .51 | .59 | .47 | .47 | .63 | .74 |
| Policies/procedures 96 | -4.01 | 14.57** | -4.00 | 14.43** | -4.14 | 14.43** |
| | | | | | | |
| **% Correctly classified** | | 89.0 | | | | |
| $X^2$ | | 53.4** | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | -.21 | .60 | -.25 | .73 |
| Support specialists | | | -.32 | 1.45 | -.37 | 1.79 |
| CEO General mgt | | | .03 | .27 | .23 | 1.79 |
| CEO Industry experience | | | -.01 | .05 | -.01 | .03 |
| **% Correctly classified** | | | | 90.0 | | |
| $\Delta X^2$ | | | | 1.9 | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | .06 | 1.41 |
| SS * CEO General Mgt | | | | | .06 | .50 |
| BE * CEO Industry Exp | | | | | .03 | .01 |
| SS * CEO Industry Exp | | | | | .03 | .24 |
| **% Correctly classified** | | | | | | 89.5 |
| $\Delta X^2$ | | | | | | 2.3 |
| **N** | | | | | | 219 |
| *p < .05  **p < .01 | | | | | | |

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## Table 4.5 (cont'd)

| Variables | Strategic Planning | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | | Step 3 | |
| | b | Wald | b | Wald | b | Wald |
| **Step 1: Controls** | | | | | | |
| Service | -8.94 | .00 | | | | |
| Knowledge | 5.90 | 1.34 | | | | |
| Employees 96 | .10 | 1.89 | | | | |
| Revenues 96 | .00 | .87 | | | | |
| CEO stock % | .00 | .00 | | | | |
| Board tenure | -.54 | .57 | | | | |
| Board size | -.25 | .06 | | | | |
| Annual report 97 | 13.14 | .00 | | | | |
| Annual report 98 | 1.39 | .13 | | . | | |
| Strategic planning 96 | -98.61 | .07 | | | | |
| | | | | | | |
| **% Correctly classified** | | 99.5 | | | | |
| $X^2$ | | 31.9** | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | NA | | | |
| Support specialists | | | NA | | | |
| CEO General mgt | | | NA | | | |
| CEO Industry experience | | | NA | | | |
| **% Correctly classified** | | | | **NA** | | |
| $\Delta X^2$ | | | | **NA** | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | | |
| SS * CEO General Mgt | | | | | | |
| BE * CEO Industry Exp | | | | | | |
| SS * CEO Industry Exp | | | | | | |
| **% Correctly classified** | | | | | | |
| $\Delta X^2$ | | | | | | |
| **N** | | | | | | |

*p < .05
**p < .01
NA = Solution not found after 20 iterations

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# Table 4.5 (cont'd)

| Variables | Mission Statement | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | | Step 3 | |
| | b | Wald | b | Wald | b | Wald |
| **Step 1: Controls** | | | | | | |
| Service | .19 | .10 | .14 | .05 | .00 | .00 |
| Knowledge | .86 | 3.06 | .97 | 3.62 | .96 | 3.39 |
| Employees 96 | .00 | 2.09 | .00 | 3.05 | .00 | 2.91 |
| Revenues 96 | .00 | .54 | .00 | .69 | .00 | .75 |
| CEO stock % | -.01 | 1.23 | -.01 | 1.01 | -.01 | .77 |
| Board tenure | -.02 | .09 | -.01 | .04 | -.01 | .03 |
| Board size | -.07 | .45 | -.19 | 1.65 | -.17 | 1.30 |
| Annual report 97 | 1.52 | 1.96 | 1.65 | 2.28 | 1.67 | 2.31 |
| Annual report 98 | 1.10 | 4.73* | 1.23 | 5.67* | 1.18 | 5.16* |
| | -6.03 | .11 | -6.30 | .13 | -6.45 | .14 |
| | | | | | | |
| **% Correctly classified** | | 81.3 | | | | |
| $X^2$ | | 22.8** | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | .11 | .30 | .12 | .29 |
| Support specialists | | | .22 | 1.59 | .26 | 1.74 |
| CEO General mgt | | | .01 | .07 | -.03 | .04 |
| CEO Industry experience | | | -.07 | 5.65* | -.07 | 5.56* |
| **% Correctly classified** | | | 80.4 | | | |
| $\Delta X^2$ | | | 7.2 | | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | .04 | .01 |
| SS * CEO General Mgt | | | | | .02 | .25 |
| BE * CEO Industry Exp | | | | | -.02 | .37 |
| SS * CEO Industry Exp | | | | | .01 | .26 |
| **% Correctly classified** | | | | | | 80.1 |
| $\Delta X^2$ | | | | | | 1.4 |
| **N** | | | | | | 219 |
| *p < .05<br>**p < .01 | | | | | | |

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# Table 4.5 (cont'd)

| Variables | Stock Purchase Plan | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | | Step 2 | | Step 3 | |
| | b | Wald | b | Wald | b | Wald |
| **Step 1: Controls** | | | | | | |
| Service | -1.45 | 4.32* | -1.56 | 4.32* | -1.44 | 3.57 |
| Knowledge | -.73 | 2.24 | -.72 | 1.86 | -.63 | 1.26 |
| Employees 96 | .00 | .02 | .00 | .04 | .00 | .00 |
| Revenues 96 | .00 | .04 | .00 | .02 | .00 | .01 |
| CEO stock % | -.01 | .75 | -.01 | .14 | .00 | .07 |
| Board tenure | .10 | 1.62 | .09 | 1.12 | .10 | 1.47 |
| Board size | .14 | 1.27 | -.07 | .11 | -.11 | .25 |
| Annual report 97 | .88 | 1.38 | .71 | .85 | .79 | .96 |
| Annual report 98 | .11 | .05 | .05 | .01 | -.12 | .05 |
| Stock purchase plan 96 | -9.33 | .29 | -9.31 | .29 | -9.43 | .30 |
| | | | | | | |
| **% Correctly classified** | | 83.6 | | | | |
| $X^2$ | | 51.5** | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | .25 | 1.75 | .44 | 2.26 |
| Support specialists | | | .23 | 1.59 | .25 | .92 |
| CEO General mgt | | | .04 | .88 | -.05 | .11 |
| CEO Industry experience | | | .03 | 4.64* | .08 | 6.22** |
| **% Correctly classified** | | | | 84.9 | | |
| $\Delta X^2$ | | | | 9.0 | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | .05 | 2.50 |
| SS * CEO General Mgt | | | | | -.03 | .50 |
| BE * CEO Industry Exp | | | | | -.06 | 4.70* |
| SS * CEO Industry Exp | | | | | -.03 | 1.06 |
| **% Correctly classified** | | | | | | 87.7 |
| $\Delta X^2$ | | | | | | 7.9 |
| **N** | | | | | | 219 |

*p < .05
**p < .01

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## Table 4.5 (cont'd)

| Variables | Management Development | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | | Step 2 | | Step 3 | |
| | b | Wald | b | Wald | b | Wald |
| **Step 1: Controls** | | | | | | |
| Service | -.95 | .25 | -2.26 | .58 | | |
| Knowledge | .88 | .31 | .93 | .15 | | |
| Employees 96 | .00 | 3.65 | .01 | 3.38 | | |
| Revenues 96 | .00 | 2.03 | .00 | 2.54 | | |
| CEO stock % | .04 | 1.49 | .06 | 2.10 | | |
| Board tenure | -.09 | .17 | -.28 | .64 | | |
| Board size | -1.07 | 4.34* | -2.79 | 2.54 | | |
| Annual report 97 | 7.93 | .01 | 6.81 | .00 | | |
| Annual report 98 | 10.04 | .03 | 13.15 | .02 | | |
| Management develop. 96 | -11.08 | .00 | -7.88 | .00 | | |
| | | | | | | |
| **% Correctly classified** | 97.7 | | | | | |
| $X^2$ | 16.2 | | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | 1.90 | 1.39 | | |
| Support specialists | | | .32 | .06 | | |
| CEO General mgt | | | -.07 | .32 | | |
| CEO Industry experience | | | .33 | 4.80* | | |
| **% Correctly classified** | | | | 97.7 | | |
| $\Delta X^2$ | | | | 10.8* | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | | |
| SS * CEO General Mgt | | | | | | |
| BE * CEO Industry Exp | | | | | | |
| SS * CEO Industry Exp | | | | | | |
| **% Correctly classified** | | | | | NA | |
| $\Delta X^2$ | | | | | NA | |
| **N** | | | | | | |

*p < .05
**p < .01
NA = Solution not found after 20 iterations

Table 4.5 (cont'd)

| Variables | Specialization | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Step 1 | | Step 2 | | Step 3 | |
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | -.12 | -1.09 | -.11 | -.93 | -.09 | -.75 |
| Knowledge | -.11 | -1.08 | -.09 | -.79 | -.08 | -.76 |
| Employees 96 | .20 | 1.86 | .19 | 1.68 | .19 | 1.61 |
| Revenues 96 | -.02 | -.25 | -.01 | -.11 | -.01 | -.12 |
| CEO stock % | .10 | 1.15 | .11 | 1.18 | .10 | 1.06 |
| Board tenure | .15 | 1.77 | .17 | 1.90 | .16 | 1.78 |
| Board size | .16 | 1.79 | .13 | 1.16 | .11 | 1.00 |
| Annual report 97 | -.17 | -1.70 | -.16 | -1.63 | -.18 | -1.73 |
| Annual report 98 | .10 | 1.04 | .09 | .88 | .11 | 1.00 |
| Specialization 96 | .38 | 4.50** | .38 | 4.41** | .38 | 4.34** |
| | | | | | | |
| $R^2$ | | .30 | | | | |
| F | | 4.69** | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | .01 | .06 | .00 | -.04 |
| Support specialists | | | .05 | .43 | .03 | .30 |
| CEO General mgt | | | .12 | 1.39 | .10 | .40 |
| CEO Industry experience | | | -.05 | -.60 | -.04 | -.45 |
| $\Delta R^2$ | | | | .02 | | |
| $\Delta F$ | | | | .61 | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | -.09 | -.52 |
| SS * CEO General Mgt | | | | | .06 | .27 |
| BE * CEO Industry Exp | | | | | .08 | .61 |
| SS * CEO Industry Exp | | | | | -.09 | -.94 |
| $\Delta R^2$ | | | | | | .01 |
| $\Delta F$ | | | | | | .50 |
| N | | | | | | .33 |

*p < .05
**p < .01

**Table 4.5 (cont'd)**

| Variables | Professionalization | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | | Step 2 | | Step 3 | |
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | .01 | .09 | .02 | .20 | .02 | .26 |
| Knowledge | -.04 | -.53 | -.04 | -.49 | -.04 | -.58 |
| Employees 96 | -.05 | -.58 | -.06 | -.72 | -.06 | -.75 |
| Revenues 96 | .09 | 1.17 | .08 | 1.08 | .07 | .92 |
| CEO stock % | -.07 | -1.09 | -.09 | -1.37 | -.09 | -1.49 |
| Board tenure | -.03 | -.49 | -.03 | -.53 | -.04 | -.71 |
| Board size | -.08 | -1.27 | -.03 | -.43 | -.03 | -.36 |
| Annual report 97 | .02 | .33 | .03 | .41 | .05 | .68 |
| Annual report 98 | -.01 | -.18 | -.02 | -.25 | -.05 | -.75 |
| Professionalization 96 | .58 | 9.74** | .58 | 9.53** | .60 | 10.06** |
| | | | | | | |
| $R^2$ | | **.35** | | | | |
| F | | **10.75**\*\* | | | | |
| | | | | | | |
| **Step 2: IVs** | | | | | | |
| Business experts | | | -.02 | -.29 | -.03 | -.38 |
| Support specialists | | | -.10 | -1.23 | -.10 | -1.27 |
| CEO General mgt | | | .02 | .24 | -.56 | -3.13** |
| CEO Industry experience | | | -.02 | -.31 | -.02 | -.27 |
| $\Delta R^2$ | | | **.01** | | | |
| $\Delta F$ | | | **.49** | | | |
| | | | | | | |
| **Step 3: Interactions** | | | | | | |
| BE * CEO General Mgt | | | | | .40 | 3.42** |
| SS * CEO General Mgt | | | | | .35 | 2.61** |
| BE * CEO Industry Exp | | | | | -.19 | -2.40** |
| SS * CEO Industry Exp | | | | | -.05 | -.79 |
| $\Delta R^2$ | | | | | | **.05** |
| $\Delta F$ | | | | | | **3.59**\*\* |
| N | | | | | | **.41** |

*$p < .05$
**$p < .01$

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## Table 4.6 Regression of Firm Performance on High Growth Transition Infrastructure Changes Moderated by Change in Firm Size

| Variables | Return on Assets | | | | | |
|---|---|---|---|---|---|---|
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | .23 | 2.21* | .26 | 2.52** | .34 | 3.14** |
| Knowledge | .04 | .38 | .08 | .76 | .07 | .67 |
| CEO stock % | .05 | .65 | .03 | .37 | .07 | .77 |
| Policies 96 | -.17 | -2.13* | -.14 | -1.69 | -.11 | -1.24 |
| Mission 96 | -.02 | -.31 | -.06 | -.83 | -.03 | -.41 |
| Stock purchase 96 | -.01 | -.10 | .03 | .31 | .00 | .03 |
| Specialization 96 | .01 | .10 | -.11 | -1.32 | -.17 | -1.84 |
| Management develop. 96 | .01 | .12 | .05 | .59 | -.02 | -.19 |
| Professionalization 96 | -.06 | -.79 | -.01 | -.06 | -.07 | -.63 |
| Employees 96 | .21 | 2.04* | .27 | 2.25 | .29 | 2.21* |
| Revenues 96 | .09 | 1.08 | -.14 | -.77 | -.23 | -1.09 |
| Annual report 97 | -.09 | -1.13 | -.04 | -.51 | -.05 | -.63 |
| Annual report 98 | .28 | 3.53** | .26 | 3.40** | .25 | 3.07** |
| Industry average ROA | .12 | 1.57 | .16 | 2.02* | .18 | 2.27* |
| **$R^2$ and F** | **.27** | **3.64**\*\* | | | | |
| **Step 2: IVs** | | | | | | |
| Policies $\Delta$s | | | -.02 | -.19 | .07 | .76 |
| Mission $\Delta$s | | | -.07 | -.90 | -.05 | -.63 |
| Stock purchase $\Delta$s | | | .16 | 1.97 | .13 | 1.24 |
| Specialization 98 | | | .26 | 3.01** | .29 | 3.18** |
| Management develop. $\Delta$s | | | .05 | .70 | .09 | .98 |
| Professionalization 98 | | | -.10 | -1.03 | -.05 | -.46 |
| Employees 98 | | | -.16 | -1.38 | -.27 | -1.23 |
| Revenues 98 | | | .31 | 1.67 | .45 | 1.85 |
| **$\Delta R^2$ and $\Delta F$** | | | **.10** | **2.58**\*\* | | |
| **Step 3: Interactions** | | | | | | |
| Policies*Employees | | | | | .21 | 1.60 |
| Mission*Employees | | | | | .14 | 1.27 |
| Stock purchase*Emp. | | | | | -.12 | -.51 |
| Specialization*Employees | | | | | .14 | .79 |
| Mgt develop*Employees | | | | | -.02 | -.25 |
| Professionalization*Emp. | | | | | -.05 | -.34 |
| Policies*Revenues | | | | | -.26 | -1.97* |
| Mission*Revenues | | | | | .16 | 1.22 |
| Stock purchase*Rev. | | | | | .04 | .21 |
| Specialization*Revenues | | | | | -.10 | -1.01 |
| Mgt develop*Revenues | | | | | .04 | .51 |
| Professionalization*Rev. | | | | | .19 | 1.64 |
| **$\Delta R^2$ and $\Delta F$** | | | | | **.05** | **.90** |
| **Total $R^2$** | | | | | **.42** | |
| **Adjusted $R^2$** | | | | | **.26** | |
| **N** | | | | | **152** | |

\* $p < .05$   \*\*$p < .01$

Table 4.6 (cont'd)

| Variables | Net Income (Return on Equity) | | | | | |
|---|---|---|---|---|---|---|
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | -.06 | -.64 | -.02 | -.23 | .01 | .11 |
| Knowledge | .00 | .02 | .01 | .06 | .00 | .01 |
| CEO stock % | .10 | 1.28 | .11 | 1.39 | .19 | 2.18* |
| Policies 96 | -.06 | -.85 | -.12 | -1.50 | -.10 | -1.11 |
| Mission 96 | .05 | .63 | .03 | .34 | .01 | .14 |
| Stock purchase 96 | .03 | .36 | .04 | .42 | .11 | 1.19 |
| Specialization 96 | -.09 | -1.13 | -.09 | -1.05 | -.17 | -1.84 |
| Management develop. 96 | .05 | .57 | .07 | .81 | -.01 | -.06 |
| Professionalization 96 | -.12 | -1.55 | -.19 | -1.86 | -.18 | -1.63 |
| Employees 96 | .14 | 1.35 | .22 | 1.81 | .35 | 2.65** |
| Revenues 96 | .01 | .13 | -.16 | -.84 | -.49 | -2.15* |
| Annual report 97 | .07 | .91 | .08 | 1.06 | .06 | .82 |
| Annual report 98 | .06 | .75 | .04 | .56 | .02 | .21 |
| Shareholders' equity | .14 | 1.71 | .16 | 1.71 | .15 | 1.47 |
| Industry average ROE | .44 | 5.90** | .43 | 5.70** | .44 | 5.80** |
| $R^2$ **and F** | .30 | 3.89** | | | | |
| **Step 2: IVs** | | | | | | |
| Policies $\Delta$s | | | -.19 | -2.34* | -.24 | -2.56** |
| Mission $\Delta$s | | | .05 | .59 | .04 | .52 |
| Stock purchase $\Delta$s | | | .07 | .91 | .03 | .25 |
| Specialization 98 | | | .02 | .21 | .05 | .54 |
| Management develop. $\Delta$s | | | .01 | .19 | .06 | .71 |
| Professionalization 98 | | | .09 | .94 | .11 | .97 |
| Employees 98 | | | -.23 | -2.01* | -.63 | -2.84** |
| Revenues 98 | | | .20 | .98 | .47 | 1.73 |
| $\Delta R^2$ **and** $\Delta F$ | | | .06 | 1.45 | | |
| **Step 3: Interactions** | | | | | | |
| Policies*Employees | | | | | -.08 | -.60 |
| Mission*Employees | | | | | .10 | .85 |
| Stock purchase*Emp. | | | | | .12 | .51 |
| Specialization*Employees | | | | | .27 | 1.55 |
| Mgt develop*Employees | | | | | .02 | .18 |
| Professionalization*Emp. | | | | | -.15 | -.93 |
| Policies*Revenues | | | | | -.14 | -1.04 |
| Mission*Revenues | | | | | .23 | 1.72 |
| Stock purchase*Rev. | | | | | -.17 | -.86 |
| Specialization*Revenues | | | | | .02 | .16 |
| Mgt develop*Revenues | | | | | .04 | .51 |
| Professionalization*Rev. | | | | | .17 | 1.45 |
| $\Delta R^2$ **and** $\Delta F$ | | | | | .07 | 1.13 |
| **Total** $R^2$ | | | | | .42 | |
| **Adjusted** $R^2$ | | | | | .25 | |
| **N** | | | | | 153 | |

* $p < .05$   ** $p < .01$

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Table 4.6 (cont'd)

| Variables | Market Value (P/E) | | | | | |
|---|---|---|---|---|---|---|
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | -.11 | -.97 | -.23 | -2.06* | -.16 | -1.40 |
| Knowledge | .16 | 1.42 | .13 | 1.13 | .13 | 1.13 |
| CEO stock % | .13 | 1.49 | .09 | 1.10 | .09 | .90 |
| Policies 96 | -.11 | -1.32 | -.09 | -1.00 | -.04 | -.40 |
| Mission 96 | .12 | 1.55 | .09 | 1.12 | .10 | 1.14 |
| Stock purchase 96 | .23 | 2.60** | .20 | 2.19* | .16 | 1.75 |
| Specialization 96 | .10 | 1.17 | .08 | .81 | .04 | .37 |
| Management develop. 96 | .01 | .09 | .02 | .24 | .00 | .04 |
| Professionalization 96 | -.01 | -.10 | .05 | .46 | .00 | .00 |
| Employees 96 | .19 | 1.80 | .31 | 2.31* | .32 | 2.24* |
| Revenues 96 | .16 | 1.70 | -.44 | -2.12* | -.64 | -2.61** |
| Annual report 97 | -.18 | -2.19* | -.17 | -2.15* | -.17 | -2.11* |
| Annual report 98 | .12 | 1.41 | .11 | 1.33 | .12 | 1.45 |
| Net income | .22 | 2.73** | .19 | 2.35* | .14 | 1.52 |
| Industry average P/E | .10 | 1.19 | .14 | 1.52 | .15 | 1.76 |
| $R^2$ and F | .34 | 3.83** | | | | |
| **Step 2: IVs** | | | | | | |
| Policies $\Delta$s | | | .08 | .96 | .33 | 2.18* |
| Mission $\Delta$s | | | -.01 | -.17 | .00 | -.02 |
| Stock purchase $\Delta$s | | | -.07 | -.83 | .02 | .14 |
| Specialization 98 | | | .02 | .18 | .07 | .79 |
| Management develop. $\Delta$s | | | .00 | -.01 | -.29 | -1.41 |
| Professionalization 98 | | | -.03 | -.26 | .03 | .22 |
| Employees 98 | | | -.06 | -.47 | -.06 | -.21 |
| Revenues 98 | | | .66 | 3.16** | 1.29 | 4.10** |
| $\Delta R^2$ and $\Delta F$ | | | .08 | .96 | .33 | 2.18* |
| **Step 3: Interactions** | | | .09 | 2.03* | | |
| Policies*Employees | | | | | .41 | 1.84 |
| Mission*Employees | | | | | -.13 | -.78 |
| Stock purchase*Emp. | | | | | -.34 | -1.31 |
| Specialization*Employees | | | | | .18 | .95 |
| Mgt develop*Employees | | | | | .36 | 1.55 |
| Professionalization*Emp. | | | | | .30 | 1.62 |
| Policies*Revenues | | | | | -.38 | -2.35* |
| Mission*Revenues | | | | | .25 | 1.57 |
| Stock purchase*Rev. | | | | | .30 | 1.47 |
| Specialization*Revenues | | | | | -.04 | -.37 |
| Mgt develop*Revenues | | | | | .39 | 1.61 |
| Professionalization*Rev. | | | | | .08 | .67 |
| $\Delta R^2$ and $\Delta F$ | | | | | .09 | 1.50 |
| Total $R^2$ | | | | | .52 | |
| Adjusted $R^2$ | | | | | .34 | |
| N | | | | | 128 | |

* $p < .05$   ** $p < .01$

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## Table 4.6 (cont'd)

| Variables | Market Value (MV/RV) | | | | | |
|---|---|---|---|---|---|---|
| | B | t | B | t | B | t |
| **Step 1: Controls** | | | | | | |
| Service | -.07 | -.88 | -.10 | -1.14 | -.03 | -.31 |
| Knowledge | .16 | 1.94* | .14 | 1.65 | .16 | 1.81 |
| CEO stock % | .03 | .56 | .02 | .32 | .01 | .08 |
| Policies 96 | .14 | 1.70 | .27 | 2.74** | .25 | 2.33* |
| Mission 96 | .02 | .34 | -.16 | -1.03 | -.23 | -1.24 |
| Stock purchase 96 | -.11 | -1.77 | -.04 | -.64 | -.04 | -.51 |
| Specialization 96 | .09 | 1.57 | .07 | 1.10 | .09 | 1.40 |
| Management develop. 96 | .14 | 2.23* | .12 | 1.73 | .10 | 1.39 |
| Professionalization 96 | .03 | .51 | .07 | 1.05 | .03 | .37 |
| Employees 96 | -.02 | -.27 | -.02 | -.31 | -.02 | -.31 |
| Revenues 96 | -.05 | -.77 | -.01 | -.15 | -.04 | -.44 |
| Annual report 97 | -.06 | -1.05 | -.08 | -1.36 | -.09 | -1.48 |
| Annual report 98 | .12 | 1.90 | .11 | 1.81 | .13 | 2.03* |
| Shareholders' equity | .60 | 9.63** | .60 | 8.06** | .56 | 6.75** |
| Industry average MV/RV | .00 | -.04 | -.01 | -.16 | .00 | .02 |
| **$R^2$ and F** | **.57** | **11.75**** | | | | |
| **Step 2: IVs** | | | | | | |
| Policies $\Delta$s | | | .12 | 1.86 | .17 | 1.88 |
| Mission $\Delta$s | | | -.02 | -.26 | -.01 | -.19 |
| Stock purchase $\Delta$s | | | -.02 | -.27 | -.04 | -.45 |
| Specialization 98 | | | -.07 | -1.03 | -.05 | -.64 |
| Management develop. $\Delta$s | | | -.03 | -.53 | .00 | .02 |
| Professionalization 98 | | | -.04 | -.52 | -.03 | -.31 |
| Employees 98 | | | -.16 | -1.69 | -.18 | -.95 |
| Revenues 98 | | | .19 | 1.11 | .36 | 1.55 |
| **$\Delta R^2$ and $\Delta F$** | | | **.03** | **1.12** | | |
| **Step 3: Interactions** | | | | | | |
| Policies*Employees | | | | | .11 | .88 |
| Mission*Employees | | | | | .11 | 1.16 |
| Stock purchase*Emp. | | | | | -.23 | -1.19 |
| Specialization*Employees | | | | | -.05 · | -.33 |
| Mgt develop*Employees | | | | | -.04 | -.59 |
| Professionalization*Emp. | | | | | .16 | 1.20 |
| Policies*Revenues | | | | | -.15 | -1.41 |
| Mission*Revenues | | | | | .10 | .94 |
| Stock purchase*Rev. | | | | | .14 | .83 |
| Specialization*Revenues | | | | | .01 | .11 |
| Mgt develop*Revenues | | | | | .09 | 1.28 |
| Professionalization*Rev. | | | | | .06 | .66 |
| **$\Delta R^2$ and $\Delta F$** | | | | | **.04** | **1.14** |
| **Total $R^2$** | | | | | **.64** | |
| **Adjusted $R^2$** | | | | | **.53** | |
| **N** | | | | | **150** | |

* p < .05   ** p < .01

**Table 4.7  Outlier Values Deleted**

| Hypothesis | Dependent Variable | Values Deleted |
|:---:|:---:|:---:|
| 2 | ROA | 75, 128, 193 |
|  | Net Income (ROE) | 162 |
| 3 | ROA | Same as H2 |
|  | Net Income (ROE) | Same as H2 |
| 6 | ROA | Same as H2 |
|  | Net Income (ROE) | Same as H2 |

**Table 5.1 Summary of Results by Hypothesis**

| H | Independent Variables | Dependent Variables | Final step |
|---|---|---|---|
| 1 | Board Resources (Table 4.2) | Policies and procedures | NS |
| | | Strategic planning | NA |
| | | Mission statement | NS |
| | | Stock purchase plan | NS |
| | | Management development | NS |
| | | Specialization | NS |
| | | Professionalization | NS |
| | | | |
| 2 | High Growth Transition Variables (Table 4.3) | **ROA** | **SS (p <. 05)** |
| | | **Specialization p < .05** | **Supports H** |
| | | NI (ROE) | NS |
| | | MV (P/E) | NS |
| | | MV (MV/BV) | NS |
| | | | |
| 3 | Board Resources (Table 4.4) | ROA | NS |
| | | **NI (ROE)** | **SS (p < .05)** |
| | | **Business Experts p < .05** | **Supports H** |
| | | MV (P/E) | |
| | | MV (MV/BV) | |
| | | | |
| 4 | Board Resources and High Growth Transition Variables | Firm Performance | NA |
| | | | |

**Table 5.1 (cont'd)**

| H | Independent Variables | Dependent Variables | Final step |
|---|---|---|---|
| **5** | Interaction of Board Resources and CEO Qualifications (Table 4.5) | Policies and procedures | NS |
|  |  | Strategic planning | NA |
|  |  | Mission statement | NS |
|  |  | Stock purchase plan | NS |
|  |  | Management development | NA |
|  |  | Specialization | NS |
|  |  | **Professionalization** | **SS (p < .01)** |
|  |  | BE*CEO Gen Mgt Exp p < .01 | No Support |
|  |  | SS*CEO Gen Mgt Exp p < .01 | No Support |
|  |  | **BE*CEO Industry Exp p < .01** | **Supports H** |
|  |  |  |  |
| **6** | Interaction of High Growth Transition Variables and Firm Size (Table 4.6) | ROA | NS |
|  |  | NI (ROE) | NS |
|  |  | MV (P/E) | NS |
|  |  | MV (MV/BV) | NS |
|  |  |  |  |

**FIGURES**

Figure 4.1 Regression of Executive Officer Management Experience on the Interaction of Business Experts and CEO General Management Experience
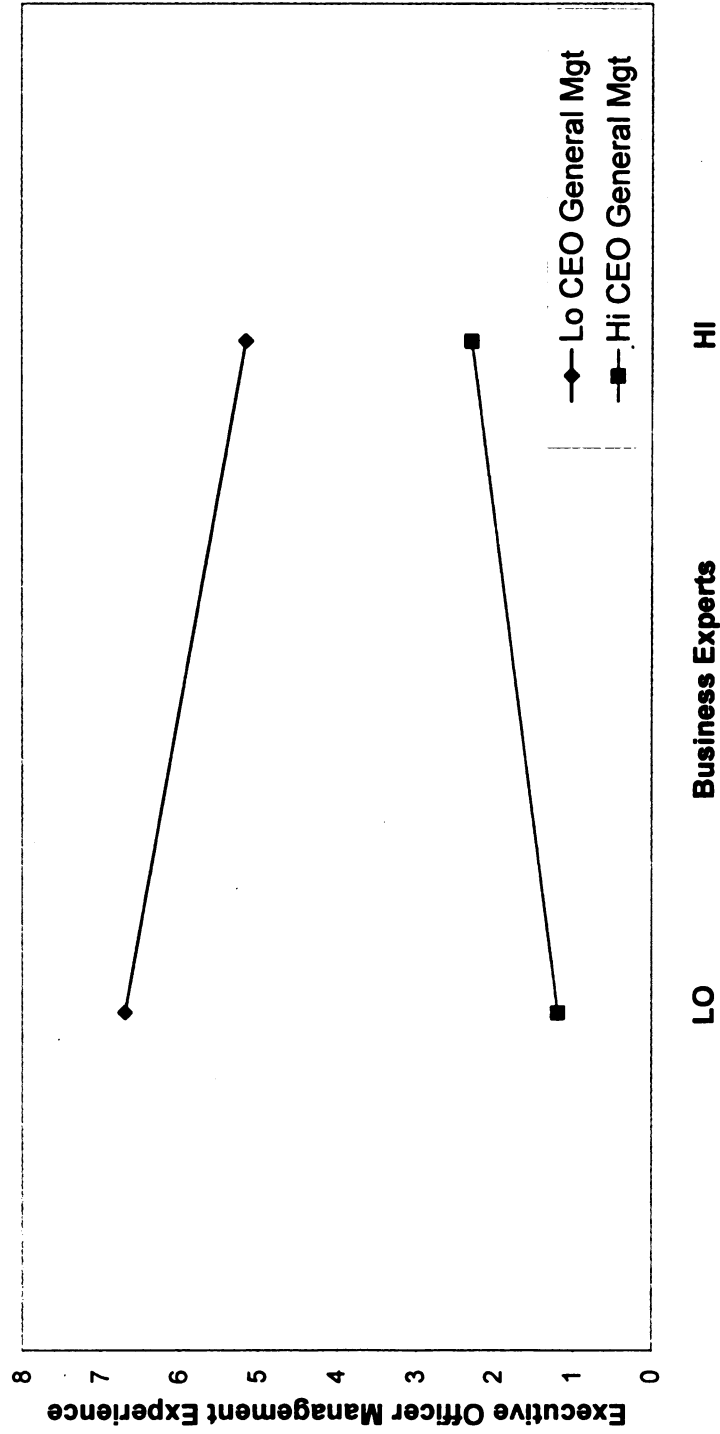
Figure 4.2 Regression of Executive Officer Management Experience on the Interaction of Support Specialists and CEO General Managment Experience
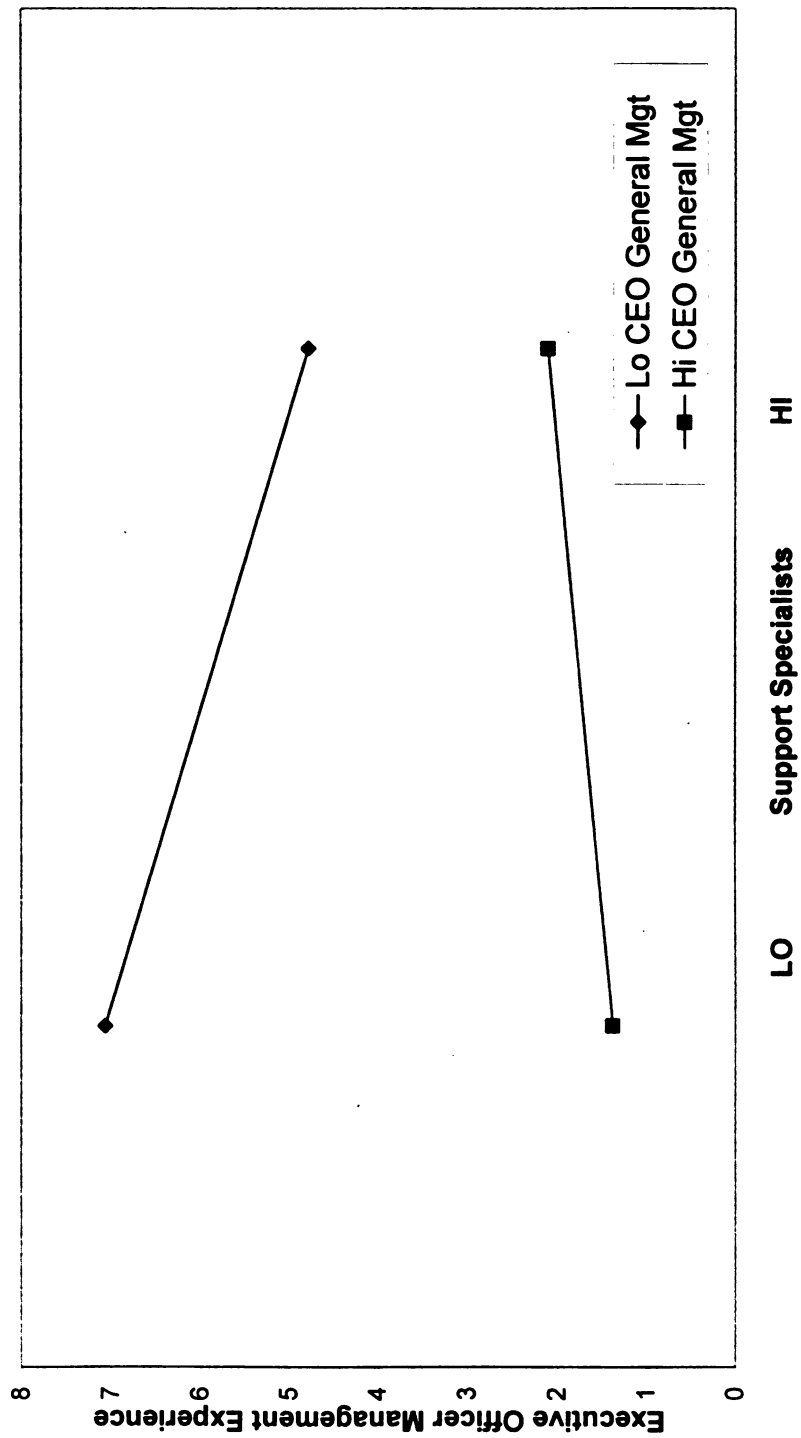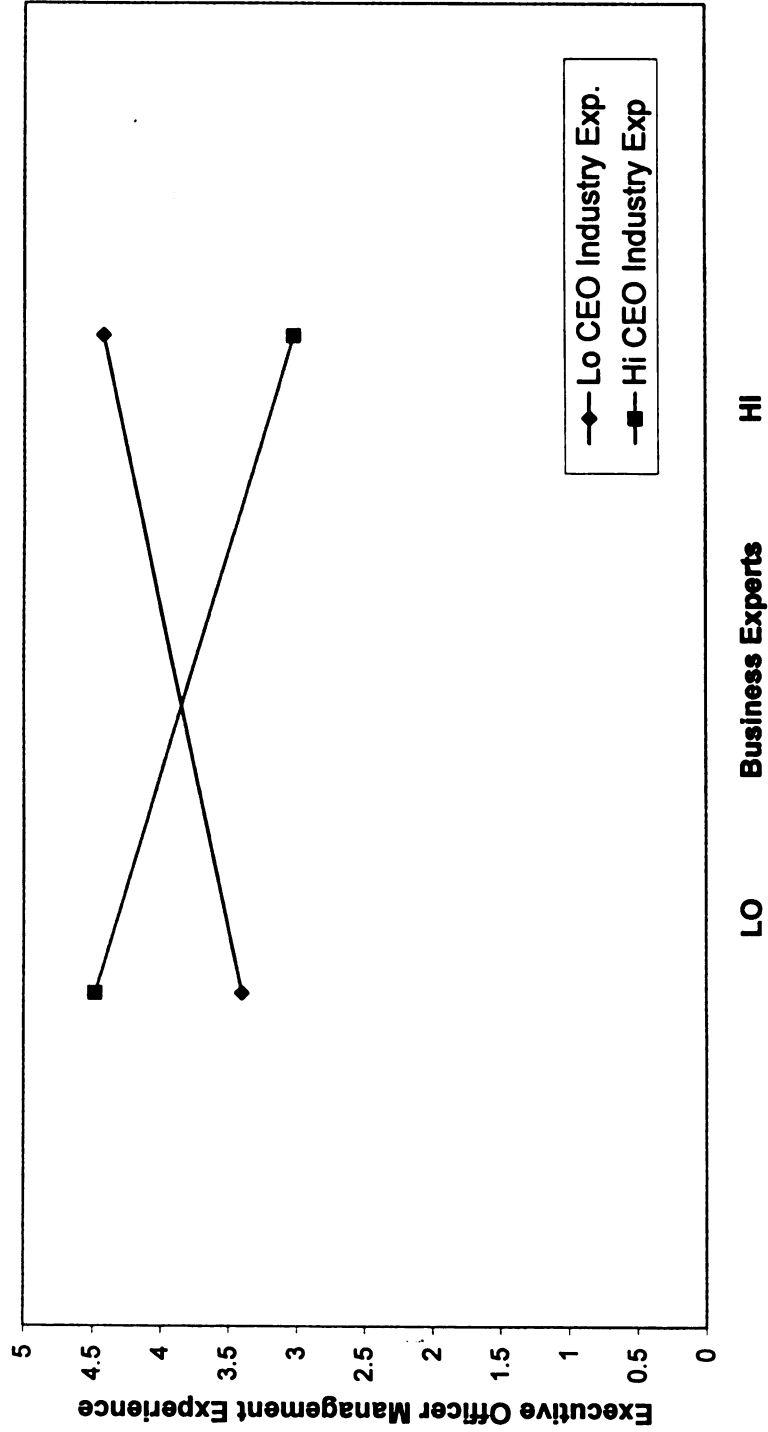
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Figure 4.3 Regression of Executive Officer Management Experience on the Interaction of Business Experts and CEO Industry Experience

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# APPENDICES

## Appendix A
## Variable List with Data Sources and Time of Collection

| VARIABLES | DATA SOURCE | COLLECTION DATE |
|---|---|---|
| **Independent Variables** | | |
| **Board Composition** <br> • Business Experts <br> • Support Specialists | Prospectus (control) <br><br> Proxy statement | 1996 <br><br> 1997 |
| **CEO Managerial Qualifications** <br> • Education level <br> • General Mgt. Exp. <br> • Functional Exp. <br> • Industry Exp. | Prospectus | 1996 |
| **Growth Rate** <br> • No. of Employees <br> • Revenues | 10K | 1998 |
| **Dependent Variables** | | |
| **Professionalization of Management** <br> • Prior management experience of the Executive Officers <br> • Management development program | Prospectus (control) <br><br> 10K, Proxy <br><br><br> 10K, AR | 1996 <br><br> 1998 <br><br><br> 1998 |
| **Specialization** <br> • Areas of responsibility of the TMT | Prospectus or AR (control) <br><br> 10Ks and ARs | 1996 <br><br><br> 1998 |
| **Shared Goals** <br> • Mission statement <br> • Communication <br> • Employee bonus <br> • Employee stock option plan <br> • Employee stock purchase plan | Prospectus (control) <br><br> 10Ks and ARs | 1996 <br><br> 1997, 1998 |

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| Standardization and Formalization | Prospectus (control) | 1996 |
|---|---|---|
| • Policies and procedures<br>• Employee training<br>• Performance measurement & compensation plans (Management and Employee)<br>• Financial reporting & budgetary controls<br>• Strategic planning | 10Ks and Ars | 1997,1998 |
| **Firm Performance**<br>• ROA<br>• ROE<br>• P/E ratio<br>• MV/RV | 10K<br>Compustat<br>Primark | 1999 |
| **Control Variables** | | |
| **Industry Type** | Prospectus | 1996 |
| **Firm Size**<br>• No. of employees<br>• Revenues | Prospectus<br>10K | 1996<br>1996 |
| **Average Industry Performance**<br>• ROA<br>• ROE<br>• P/E Ratio<br>• MV/RV | Ibbotson's | 1999 |
| **Board Controls**<br>• Size<br>• Tenure | Prospectus<br>Proxy statement | 1996<br>1997 |
| **CEO Stock Ownership**<br>• % of shares owned by CEO following IPO | Prospectus | 1996 |

## Appendix B
## Data Collection and Coding Sheet

**Firm No.**_____ **Data Recorder Name**_____ **Date**_____

**96 Prosp**___ **97 10k**___ **97 AR**___ **98 Proxy**___ **98 10k**___ **98 AR**___ **99 Proxy**___

<u>**Section I**</u>     <u>**Firm Information**</u>

**96 Prosp**      **Firm Name**_____

| Ind. Code |
|---|
| |

**Ticker**_____ **Prosp Date**_____ **SIC**_____

**Business**_____

**96 Prosp**      **Use of Proceeds: Growth?**_____ **Incorp Date**_____

**96 Prosp, 10ks**    **Size: No. Ees, Annual Revenues**      **KW: employee, revenues**

| 96 Ees _____ | 97 Ees _____ | 98 Ees _____ | 99 Ees _____ |
|---|---|---|---|
| FT_____ PT_____ Rev_____ | FT_____ PT_____ Rev_____ | FT_____ PT_____ Rev_____ | FT_____ PT_____ Rev_____ |

<u>**Section II**</u>     <u>**CEO Managerial Qualifications**</u>          **96 Prosp**

**Name**_____ **Dates: Joined Co.**_____ **In Position**_____

**a) Highest Education Level** _____

| Code_____ |
|---|
| Code_____ |

**b) Functional Exp. (list areas)** _____

_____

**c) Industry Exp. (no. of yrs in same industry)**_____

**d) General Management Exp:**

| Code |
|---|

**Position**_____ **Company**_____ **Yrs.**_____

**Position**_____ **Company**_____ **Yrs.**_____

**Position**_____ **Company**_____ **Yrs.**_____

p. 2        Recorder_____        Firm_____

<u>Section III</u>     <u>Professional Management</u>   KW: Officer

| Code |
|------|
|      |

96 Prosp       a) 1996 Corporate Experience of Executive Officers (excl. CEO)

| Name | Title | Yr Co. | Yr Pos. | Yrs Exp. |
|------|-------|--------|---------|----------|
| 1.   |       |        |         |          |
| 2.   |       |        |         |          |
| 3.   |       |        |         |          |
| 4.   |       |        |         |          |
| 5.   |       |        |         |          |
| 6.   |       |        |         |          |
| 7.   |       |        |         |          |
| 8.   |       |        |         |          |

| Code |
|------|
|      |

b) 1996 Management Development: Yes_____ No_____

KW: management development, train, seminar, recruit

| Code |
|------|
|      |

98 10k       c) 1998 Corp Exp of Executive Officers (excl. CEO)
or 99 Proxy

| Name | Title | Yr Co. | Yr Pos. | Yrs  Exp |
|------|-------|--------|---------|----------|
| Same as above (list nos.): |  |  |  |  |
| 1.   |       |        |         |          |
| 2.   |       |        |         |          |
| 3.   |       |        |         |          |
| 4.   |       |        |         |          |
| 5.   |       |        |         |          |
| 6.   |       |        |         |          |
| 7.   |       |        |         |          |

| Code |
|------|
|      |

d) Additional Management Development: Yes_____ No_____

97 10k_____ 97 AR_____ 98 10k_____ 98 AR_____(note source)

p. 3      Recorder_____      Firm_____

<u>Section IV</u>     <u>**Standardization and Formalization**</u>

**96 Prosp**     **KW: infrastructure**

```
┌────────┐
│  Code  │       a) 1996 Formal Policies and Procedures
│        │       KW: polic, procedure, standard, manual, train
│        │
└────────┘
```

a) <u>**1996 Formal Policies and Procedures**</u>
**KW: polic, procedure, standard, manual, train**

```
┌────────┐
│  Code  │
│        │
│        │
└────────┘
```

b) <u>**1996 Performance Measurement/Compensation Plans**</u>
**KW: performance, appraisal, review, personnel, compensation**

```
┌────────┐
│  Code  │
│        │
│        │
└────────┘
```

c) <u>**1996 Financial Reporting/Budget/Controls**</u>
**KW: (information) system, budget, control**

```
┌────────┐
│  Code  │
│        │
│        │
└────────┘
```

d)  <u>**1996 Strategic Plan**</u>
**KW: strateg**

p. 4          Recorder_____          Firm_____

**Section IV     Standardization and Formalization cont'd**

KW: infrastructure     97 10K_____ 97 AR_____ 98 10K_____ 98 AR____(note source)

**a) Additional Formal Policies and Procedures**
**KW: polic, procedure, standard, manual, train**

```
┌──────────┐
│ Code     │
│          │
│          │
│          │
└──────────┘
```

**b) Additional Performance Measurement/Compensation Plans**

**KW: performance, appraisal, review, personnel, compensation**

```
┌──────────┐
│ Code     │
│          │
│          │
│          │
└──────────┘
```

**c) Additional Financial Reporting/Budget/Controls**
**KW: (information) system, budget, control**

```
┌──────────┐
│ Code     │
│          │
│          │
│          │
└──────────┘
```

**d)  Additional Strategic Plan**
**KW: strateg**

```
┌──────────┐
│ Code     │
│          │
│          │
│          │
└──────────┘
```

p. 5          Recorder_____          Firm_____

<u>Section V</u>     <u>Shared Goals</u>

96 Prosp     a) 1996 Mission Statement
┌─────────┐   KW: mission, vision (check "whole word only" on search)
│ Code    │
│         │
│         │
│         │
└─────────┘

┌─────────┐   b) 1996 Communication Tools
│ Code    │   KW: newsletter, e-mail, intranet, communication
│         │
│         │
│         │
└─────────┘

┌─────────┐   c)  1996 Risk Sharing Plans (Not incl. officers/directors)
│ Code    │   KW: 401, stock option, stock purchase, incentive,
│         │            commissions, bonus
│         │
│         │
└─────────┘

              97 10k____ 97 AR____ 98 10k____ 98 AR ____ (Note source)

┌─────────┐   a) Additional Mission Statement
│ Code    │
│         │
│         │
└─────────┘

┌─────────┐   b) Additional Communication Tools
│ Code    │
│         │
│         │
└─────────┘

┌─────────┐   c)  Additional Risk Sharing Plans
│ Code    │
│         │
│         │
└─────────┘

p. 6          Recorder_____          Firm_____

**Section VI    Specialization    KW: team, management, staff**

**96 AR**          **a) 1996 TMT Functional Areas (Not incl. CEO, COO, Pres.)**

| Code |

| | Name | Title |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

| Code Total |

| Code |

**b) 1996 Staff Specialists**

| | Name | Title |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |

**98 AR**

| Code |

**c) 1998 TMT Functional Areas  (Not incl. CEO, COO, Pres.)**

| | Name | Title |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

| Code Total |

| Code |

**d)  1998 Staff Specialists**

| | Name | Title |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |

## Appendix B (cont'd)

p. 7          Recorder_____ Firm_____

### Section VII    1999 Firm Performance

| 99 10k |
|---|
| S&P Repts |
| R. Morris |

| Performance | Firm | Industry Avg |
|---|---|---|
| ROA | | |
| ROE | | |
| P/E Ratio | | |
| MV/BV | | |

### Section VIII    Board of Directors      96 Prosp_____     97 Proxy_____

| Name | Background | Apptd | Code |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |

Totals: BE_____SS_____ IN_____ COM_____OTH_____

Act Capital Exp: 96_____ 97_____ 98_____ 99_____

CEO Stock Ownership Post IPO: CEO #1_____ CEO #2_____

**Appendix C   Data Collection of High Growth Transition Infrastructure Variables**

| Variable | Documents | Years | Method of Identification | Measurement Criteria | Example |
|---|---|---|---|---|---|
| **Professionalization** | | | | | |
| Years of prior management experience of the executive officers | Control Prospectus IV/DV 10K or Proxy | 96 98 99 | Biographical information on the executive officers | The avg no. of years the executive officers worked in managerial positions prior to joining the IPO firm. | "From Mar 1989 to Feb 1991, Mr. X served as Director of Operations of Company Y" Mg experience = 2 yrs |
| Management development programs | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: management development, train, seminar, recruit | Present = 1 Absent = 0 (counted evidence of the existence of an ongoing management development program) | "Ongoing training is provided to management and supervisory personnel on coaching, counseling, and quality management" |
| **Specialization** | | | | | |
| Areas of responsibility of the top management team | Control Prospectus IV/DV 10K Annual Report | 96 98 | List of top management team members | Total number of reporting relationships represented on the top management team, excluding the CEO and COO | "Chief Financial Officer SVP, International Sales VP, Product Develop. VP, Operations VP, U.S. Sales Director of Marketing" Specialization = 6 |
| **Standardization and Formalization** | | | | | |
| Policies and procedures | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: polic, procedure, standard, manual, control | Present = 1 Absent = 0 | "Membership service representatives are required to complete a 2-week training course" or "A comprehensive quality control program is maintained" |

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Appendix C (cont'd)

| Variable | Documents | Years | Method of Identification | Measurement Criteria | Example |
|---|---|---|---|---|---|
| **Standardization and Formalization cont'd** | | | | | |
| Employee training | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: train | Present = 1 Absent = 0 | "Internet sales staff receive customized training" or "Consistent training is conducted to expand knowledge base of employees in key technological areas" |
| Employee and Management performance and compensation programs (2 separate measures) | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: performance, appraisal, review, personnel, compensation, commissions | Present = 1 Absent = 0 (programs had to apply to employees below senior management level to be counted) | "Cash bonuses paid to employees based on individual and company performance" and "Performance-based incentives exist for senior management" |
| Financial Reporting and Budgets | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: (information) system, budget, control | Present = 1 Absent = 0 (reporting systems had to apply to internal decision making to be counted) | "Operational, financial, and management systems exist" or "Centralized accounting and MIS tracks store by store performance, produces reports" |
| Strategic Planning | Control Prospectus IV/DV 10K Annual Report | 96 97,98 | Key word search using: strateg | Present = 1 Absent = 0 (strategic plan had to be broad to be counted; not simply a "growth plan") | Strategic plan includes areas such as "maintain technology leadership; expand OEM and ISV distribution; extend technology to new markets" with details |

Appendix C (cont'd)

| Variable | Documents | Years | Method of Identification | Measurement Criteria | Example |
|---|---|---|---|---|---|
| **Shared Goals** | | | | | |
| Mission Statement | Control<br>Prospectus<br>IV/DV<br>10K<br>Annual<br>Report | 96<br><br>97,98 | Key word search using: mission, vision | Present = 1<br>Absent = 0 | "Vision. Leadership of the lithography marketplace by providing a product and service so compelling that the customer's only viable option to maintain their competitiveness is to choose (our company)" |
| Communication | Control<br>Prospectus<br>IV/DV<br>10K<br>Annual<br>Report | 96<br><br>97,98 | Key word search using: communication, newsletter, e-mail, intranet | Present = 1<br>Absent = 0<br>(communication had to be within the company, not with external stakeholders) | "All the company's international and domestic operations are networked, including e-mail capabilities" |
| Employee bonus plan<br><br>Employee stock option plan<br><br>Employee stock purchase plan<br><br>(3 separate measures) | Control<br>Prospectus<br>IV/DV<br>10K<br>Annual<br>report | 96<br><br>97,98 | Key word search using: stock option, stock purchase, incentive, bonus | Present = 1<br>Absent = 0<br><br>(programs had to apply to employees below senior management level to be counted) | "Incentive compensation pay plan for store employees" or "1996 Stock Option Plan includes all employees" or "1996 Stock Purchase Plan includes employees who work at least 20 hours per week and who have been with the company at least 3 months" |

## Appendix D
## Executive Survey

Date
Inside address


Dear:

I am a professor performing research in the area of Strategic
Management in the Neeley School of Business at Texas Christian University.
Over the last few years, I have been examining the organizational structure in
companies that have recently had their initial public offerings of stock. [Name of
company] is one of the companies included in my research.

I have a **very brief questionnaire (11 questions)** regarding the
infrastructure your firm had in place at the time of your company's IPO in 1996
and then again at the end of 1998.

Since you have been with [Name of company] during that time, I would
greatly appreciate your taking **5 minutes** to complete the [attached or enclosed]
questionnaire and return it to me. Your name and your company's identity will
not be revealed in anyway – I am only interested in generalized findings across a
large group of companies.

If there is someone in top or middle management who has been with your
company since its IPO and could respond to the questions accurately, I would
appreciate your forwarding the questionnaire to that individual. It will only take
about **5 minutes** of his/her time to complete. Neither the name of the person
responding nor the name of your company will be revealed in my results – I am
only interested in generalized findings across a large group of companies.

Your company's responses to my questionnaire are a critical part of my
research findings. I greatly appreciate your assistance.

Very truly yours,


Rebecca A. Luce
Assistant Professor of Management
M.J. Neeley School of Business
Texas Christian University

## Appendix D (cont'd)

**Your position/title:**

**Date you started with the company:**

**Instructions:** For each of the areas of **infrastructure** below, please indicate to what degree it was in place at **two different points in time**: when your company had its **IPO in 1996** and at **the end of 1998**. Use the following scale to rate the level of implementation for each infrastructure area:

| Present = 1 | Absent = 0 |
|---|---|

| AREA OF INFRASTRUCTURE | IPO IN 1996 | END OF 1998 |
|---|---|---|
| 1. Written policies and procedures | | |
| 2. Training programs for employees | | |
| 3. Guidelines to set performance objectives, evaluate performance, and assign compensation for <u>executives</u> | | |
| 4. Guidelines to set performance objectives, evaluate performance, and assign compensation for <u>employees</u> | | |
| 5. Information systems to produce financial reports used for managerial decision making | | |
| 6. Strategic planning process | | |
| 7. Written mission statement | | |
| 8. Communication programs for getting information about the company to employees | | |
| 9. Stock option program that includes employees below the executive level | | |
| 10. Cash bonus program based that includes employees below the executive level | | |
| 11. Stock purchase plan that includes employees below the executive level | | |

Please **FORWARD** your completed on-line survey via e-mail to: **r.luce@tcu.edu.** (The document will not be sent if you use the Reply button). Thanks so much for your participation. It will be very helpful for my research.

# MICHIGAN STATE
## U N I V E R S I T Y

July 13, 2000

TO:     Gerry MCNAMARA
        N 475 N. Business Complex


RE:     **IRB# 00-206   CATEGORY:1-C**

**APPROVAL DATE: July 13, 2000**

TITLE:  INFLUENCE OF THE BOARD OF DIRECTORS ON HIGH GROWTH FIRMS
        AT A STRATEGIC DECISION POINT

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project.


**RENEWALS:** UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

**REVISIONS:** UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

**PROBLEMS/CHANGES:** Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/user/UCRIHS/

Sincerely,

Ashir Kumar, M.D.

AK: br

cc: Rebecca Luce
    N475 North Business Complex

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# Appendix E (cont'd)

## APPLICATION FOR INITIAL REVIEW
### (and 5 yr. renewal)

————

## APPROVAL OF A PROJECT
## INVOLVING HUMAN SUBJECTS

University Committee on Research Involving Human Subjects (UCRIHS)
David E. Wright, Ph.D., Chair
246 Administration Building, Michigan State University
East Lansing, MI 48824-1046
PHONE (517) 355-2180    FAX (517) 353-2976
E-Mail - UCRIHS@msu.edu
WEB SITE - http://www.msu.edu/user/ucrihs/

Office Hours:  M-F (8:00 A.M.-Noon & 1:00-5:00 P.M.)

> **DIRECTIONS:** Please complete the questions on this application using the instructions and definitions found on the attached sheets.

| REQUIRED | IF APPLICABLE |
|---|---|
| **1.  Responsible Project Investigator:**<br>(MSU Faculty or staff supervisor)<br>Name:  Gerry McNamara<br>Social Security #:<br>Department:  Management<br>College:  Business<br><br>Mailing  N475 North Business Complex<br>Address:  East Lansing, MI 48824<br>Phone  517-353-4322<br>Fax:  517-432-1111<br>Email:  mcnama39@msu.edu | **2.  Secondary Investigator:**<br>(**Students Must Provide Student ID#**)<br>Name:  Rebecca Luce<br>Student ID#: or SS#  A256-231-37<br>Department:  Management<br>College:  Business<br><br>Mailing  N475 North Business Complex<br>Address:  East Lansing, MI 48824<br>Phone:  517-353-3046<br>Fax:  517-432-1111<br>Email:  lucerebe@msu.edu |
| I accept responsibility for conducting the proposed research in accordance with the protections of human subjects as specified by UCRIHS, including the supervision of faculty and student co-investigators.<br><br>SIGN HERE: _____<br><br>Note: Without signature, application can not be processed | **Additional Investigator Information**<br>3. Name: _____<br>Student ID#: or SS# _____<br>4. Name: _____<br>Student ID#: or SS# _____<br>5. Name: _____<br>Student ID#: or SS# |

UCRIHS Correspondence: Copies of correspondence will be sent to the primary and secondary investigators only. If you would like additional investigators to receive correspondence, please provide further address information on a separate page.

6. Title of Project:    Influence of the Board of Directors on High Growth Firms  at a Strategic
                        Decision Point

Form Revised 1/2000 (1)

| FOR OFFICE USE ONLY | |
|---|---|
| Subcommittee _____ | Agenda _____ |

7. Have you ever received Preliminary Approval for this project?
No [ x ] Yes [ ]
If yes, what IRB # was assigned to it?  _____

8. Funding (if any)  _____
if applicable, MSU Contracts and Grants app. and / or acct. #  _____

9. Has this protocol been submitted to the FDA or are there plans to submit it to the FDA?
No [ x ]   Yes [ ]
If yes, is there an IND #?  No    [ ]    Yes [ ]    IND #  _____

10. Does this project involve the use of Materials of Human Origin (e.g., human blood or tissue)?    No [ x ]    Yes [ ]

11. When would you prefer to begin data collection?   asap _____
Please remember you <u>may not</u> begin data collection without UCRIHS approval.

12. Category (Circle a,b, or c below and specify category for a and b.  See instructions pp. 4-7)

   a. This proposal is submitted as EXEMPT from full review.
        Specify category or categories:   1C _____
   b. This proposal is submitted for EXPEDITED review.
        Specify category or categories:  _____
   c. This proposal is submitted for FULL sub-committee review.  _____

13. Is this a Public Health Service funded, full review, multi-site project for which MSU is the lead institution?        No [x ] Yes [ ]
If yes, do the other sites have a Multiple Project Assurance IRB that will also review this project?
        [ ] No.  Please contact the UCRIHS office for further information about meeting the PHS/NIH/OPRR regulations.
        [ ] Yes.  Please supply a copy of that approval letter when obtained.

14.    Project Description (Abstract):  Please limit your response to 200 words.
I am collecting information in a questionnaire format from a company representative regarding the degree to which programs, policies, and procedures were in place within their organizations at two different times: (1) when the firm went public and (2) at the end of the firm's 1978 fiscal year.  The questionnaire consists of a total of eight questions.

15. Procedures: Please describe all project activities to be used in collecting data from human subjects. This also includes procedures for collecting materials of human origin and analysis of existing data originally collected from human subjects

Respondents will be asked eight general questions requiring either a "yes" or "no" response (3 questions) or a rating on a scale of 1 to 5 (from "Not at all" to "To a large extent"). Questions cover topics ranging from the existence of management development programs and a mission statement to standardization of financial reporting. Questions may be asked by the investigator over the phone or a questionnaire may be mailed to the respondent for completion.

16. Subject Population: Describe your subject population. (e.g., high school athletes, women over 50 w/breast cancer, small business owners )

An employee of a company that went public in 1996.

a. The study population may include (check all categories where subjects may be included **by design or incidentally**):

| Minors | [ ] |
|---|---|
| Pregnant Women | [ x ] |
| Women of Childbearing Age | [ x ] |
| Institutionalized Persons | [ ] |
| Students | [ ] |
| Low Income Persons | [ x ] |
| Minorities | [ x ] |
| Incompetent Persons (or those with diminished capacity) | [ ] |

b. Number of subjects (including controls)     30

c. How will the subjects be recruited? (Attach appropriate number of copies of recruiting advertisement, if any. See p. 13 of UCRIHS instructions)

Firms will be contacted and an appropriate respondent identified based on the information requested by the investigator.

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d.     If you are associated with the subjects (e.g., they are your students, employees, patients), please explain the nature of the association.

No association

e.     If someone will receive payment for recruiting the subjects please explain the amount of payment, who pays it and who receives it.

No payments will be made.

f.     Will the research subjects be compensated? [ x ] No [ ] Yes.
If yes, details concerning payment, including the amount and schedule of payments, must be explained in the informed consent.

g.     Will the subjects incur additional financial costs as a result of their participation in this study? [ x ] No     [ ] Yes. **If yes**, please include an explanation in the informed consent.

h.     Will this research be conducted with subjects who reside in another country or live in a cultural context different from mainstream US society? [x ] No     [ ] Yes.

     (1)     If yes, will there be any corresponding complications in your ability to minimize risks to subjects, maintain their confidentiality and/or assure their right to voluntary informed consent as individuals?
     [ ] No     [ ] Yes.

     (2)     If your answer to h-1 is yes, what are these complications and how will you resolve them?

17.     How will the subjects' privacy be protected? (See Instructions p. 8-9.)
Only three items of information will be recorded about respondents:

1. the name of the employing company;
2. the title of the position of the respondent;
3. the respondent's hire date with the company.

18. Risks and Benefits for subjects: (See Instructions p. 9.)
A summary of the results of my study (dissertation) will be sent to the responding companies. This information may be valuable to the management group of the company. There are no risks for respondents.

19. Consent Procedures (See Instructions pp. 9-13.)
Consent will be incorporated into the introductory message for the questionnaire. If the respondent chooses to complete a mailed questionnaire, s/he will be indicating consent by completing and returning the questionnaire. Where the respondent agrees to answer the survey questions orally (by phone), s/he will be read an introductory message, including the statement that answering the questions asked indicates consent.

CHECKLIST: Check off that you have included each of these items. If not applicable, state N/A:

[ ]   Completed and signed application

[ ]   The correct number of copies of the application and **instruments** (e.g., surveys, interview questions, questionnaires, etc.) according to the category of review (See instructions pp. 14)

[ ]   Consent form (or script for verbal consent), if applicable

[ na ] Advertisement, if applicable

[ ]   One complete copy of the methods chapter of the research proposal (if available)

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