

Experience-Based Top Management Team Competence and Sustained Growth

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Abstract

This paper develops and tests a model of multilevel experience-based top management team competence and its effects on a firm's capacity of entrepreneurial growth. The model incorporates the individual and additive effects of firm, team, and industry levels of managerial experience and the conflict effects of combining multiple levels of experience. Theoretical arguments are tested in a longitudinal sample of entrepreneurial firms from the medical and surgical instruments industry. The results indicate that founders' participation in the top management team and managers' past experience in the industry contribute to the competence of the team in seizing new growth opportunities. The results also show that, because of conflict effects, the positive effect of founders' participation in the management team on the rate of growth weakens as either the shared team-specific experience or industry-specific managerial experience in the team increases. For practitioners, the most important implication is that for sustained growth, entrepreneurial firms should learn to balance different levels of managerial experience in the top management team. One way to achieve this balance is to retain valuable founder resources in the team while avoiding high levels of shared team-specific experience and industry-specific managerial experience.

(Management Experience; Top Management Team; Competence; Founders; Growth; Entrepreneurial Firms; Resource-Based View)

Introduction

The central roles played by managers and management teams in determining strategic choice and firm success have been intriguing research topics in the strategic management literature (e.g., Barnard 1938, Castanias and Helfat 2001, Finkelstein and Hambrick 1996). Both Penrose's (1959) growth theory of the firm and the resource-based view highlighted the role of managers and entrepreneurial talent in building a theory of firm capabilities and competitive advantage. Penrose (1959) has argued that a firm's resources can become unique and valuable over time when they are interactively

deployed through the processes and routines that the managers, operating as a team, envision, implement, and readjust. Managers play the leading role in choosing a firm's path, the combination of resources it will deploy and nurture, and the markets it will participate in (Castanias and Helfat 1991, Kor and Mahoney 2000, Mahoney and Pandian 1992, Penrose 1959). An important insight the resource-based view provides is that firms can earn superior returns not just because of the resources they possess but also because of their effective and innovative management of those resources (Mahoney 1995).

In particular, the bundle of managerial experiences executives possess can mirror their skills and knowledge as well as the competence of the top management team (Carpenter et al. 2001, Harris and Helfat 1997, Castanias and Helfat 2001). Because professional management experience shapes the knowledge, confidence, and imagination of managers, assessing managerial competence at the upper ranks requires an examination of the bundle of managerial experiences in the top management team (Penrose 1959, 1995; Van de Ven et al. 1984).

Despite the recognition of the value of managers and their experience in converting firms' resources into rent-generating capabilities, little effort and attention have been devoted to developing a formal theory of multilevel experience-based top management competence. A theory of multilevel managerial experience is necessary to map out the fundamental differences in the knowledge bases represented by different levels of managerial experience. This paper develops a model of top management team competence that explains how management experience at firm, team (group), and industry levels adds value to entrepreneurial growth. In this study, firms that are engaged in new product and capability development are considered entrepreneurial. The model also incorporates the conflict effects of combining multiple levels of experience. A joint exploration of direct and conflict effects enables us to identify the bundle of managerial experience appropriate to achieve entrepreneurial growth.

This paper draws on multiple theoretical perspectives in building a model of experience-based top management team competence. It makes a theoretical contribution to the literature by synthesizing specific theoretical insights from Penrose's (1959) growth theory, resource-based view, and psychology-based group process research. Because of this synthesis, the model not only identifies the specific managerial experiences that add value to the top management team competence but also explains the processes and outcomes caused by combining these experiences in a bundle at the upper-management ranks.

Specifically, the model proposes that firm-specific, shared team-specific, and industry-specific experiences of managers have independent and additive effects on the collective competence of the top management team. First, the foundation level of the experience bundle of a top management team involves firm-specific managerial experience, which entails the tacit knowledge of the firm's physical and human resources and capabilities. Because development and renewal of firm capabilities often involve a path-dependent process, managers' knowledge of the firm's resources and capabilities guides them in choosing a firm's direction. Second, shared team-specific management experience provides managers with the tacit knowledge of the skills and idiosyncratic habits of the team members (Eisenhardt and Schoonhoven 1990, Penrose 1959). Because shared team-specific experience among managers can only be built over time and cannot be acquired externally, a firm's repository of collective knowledge at the upper management ranks can be a significant factor in determining the rate at which a firm can seize new growth opportunities. Third, industry-specific managerial experience involves the knowledge of competitive conditions and specific technologies in the industry. Industry-specific experience allows managers to identify emerging opportunities and position new products and services (Castanias and Helfat 2001). To the extent there is limited availability of top management teams with experience-based industry knowledge (Castanias and Helfat 1991), firms are likely to differ in their choices of investments and capability development efforts, which in turn determines their capacity for entrepreneurial growth.

In addition, defining the appropriate bundle of managerial experience requires considering and assessing the presence of conflict effects. Conflict effects indicate that combining specific managerial experiences in a specific bundle or configuration (Meyer et al. 1993) may produce a negative effect on top management competence and dilute the positive individual effects. For example, the

contribution of founder-sourced firm-specific experience to top management competence may decrease when the team suffers from groupthink tendencies caused by excessive shared team-specific experience. Thus, this paper provides a model of experience-based top management team competence, which incorporates both the individual and additive effects of firm, team, and industry levels of managerial experience and conflict effects of multiple levels of managerial experience on entrepreneurial growth.

This paper also provides an empirical test of this model with a longitudinal sample of entrepreneurial firms that completed an initial public offering (IPO). High-technology IPO firms are considered entrepreneurial because of their engagement in new product and capability development and their effort to have access to public capital markets for growth and further economic investment (Dowling and McGee 1994, Mosakowski 1993). An IPO offers an opportunity to identify entrepreneurial firms that are building new capabilities, products, and services. The dynamic nature of the post-IPO period allows us to trace the effects of the changing experience bundle of top management teams on the entrepreneurial growth capacity of the firms.

Theory and Hypotheses

Firm-Specific Managerial Experience of Founders

Path dependency is critical to the development of a firm's resource bundle. Through the path-dependent process of capability development, firms benefit from managers with tacit knowledge of the firm's material, human, and intangible resources. Penrose notes, "It is shown not only that the resources with which a particular firm is accustomed to working will shape the productive services its management is capable of rendering (where management is defined in the broadest sense), but also the experience of management will affect the productive services that all its other resources are capable of rendering" (1959, p. 5). When a firm is building on its existing capabilities, managers' historic and tacit knowledge of the firm promotes proper matching of resources and capabilities with opportunities (Kor and Mahoney 2000). Compared to managers who are relatively new to a firm, managers with tacit knowledge of the firm's capabilities and organizational routines may envision a superior "subjective productive opportunity" set for the firm (Penrose 1959, p. 42). Penrose's growth theory proposes that the lack of or limited availability of managers with tacit knowledge of the firm is a binding constraint to the *rate* at which a firm can take advantage of the new growth opportunities. Building

on this argument, this paper elaborates on how the founder-sourced firm-specific experience may influence the rate of entrepreneurial growth.

In entrepreneurial firms, tacit knowledge of a firm's original purpose and initial capabilities is retained through founders. Founders can be the major source of firm-specific knowledge because of their personal knowledge of the original purpose and the resources of the firm. This knowledge can be a crucial asset in the path-dependent development of the capabilities leading to new growth opportunities for the firm. In particular, founders' intimate knowledge of the firm's resource bases can be critical in the proper allocation of limited financial and human resources among competing projects. With tacit understanding of the firm's technological knowledge bases, founders can effectively assess the performance potential of different research and development paths and deploy the financial funds to projects in which the firm is more likely to become competitive. In addition, with experiential knowledge of the firm's employees, founders can also match employee skills to projects and employees to each other in team settings (Prescott and Visscher 1980). Identifying the appropriate productive opportunities unique to a firm and effectively allocating financial and human resources to seize these opportunities can create sustained entrepreneurial growth and competitive advantage.

In addition to possessing experiential knowledge of the firm's resource bases, founders can be highly influential in the firm because of their ownership rights and their reputation for past achievements. Neither founders' unique knowledge of the employees and other resources nor their status-driven power can be readily transferred to another firm. Because of historical knowledge and power, founder-based firm-specific managerial experience constitutes the foundation of a top management team's experience-based competence and provides a difficult-to-imitate source of sustained entrepreneurial growth.

The influence of founders on the development of capabilities is a significant source of firm heterogeneity among entrepreneurial firms, as not all firms have active founders in their top management teams (Holbrook et al. 2000, Nelson 1991). The education and experience of founders are related to goal attainment (Sapienza and Grimm 1997), effectiveness in deploying firm's resources (Chandler and Hanks 1994), and growth (Feeser and Willard 1990). Because founders typically use financial resources more efficiently, a new venture where founders are active in the firm performs well even in the absence of abundant

financial resources (Chandler and Hanks 1998). Based on theoretical arguments and preliminary empirical evidence, I submit that founder-based firm-specific experience positively contributes to a firm's capacity to sustain entrepreneurial growth.

HYPOTHESIS 1. Founder-based firm-specific experience in the top management team is related positively to the rate of entrepreneurial growth.

Shared Team-Specific Management Experience

Shared team-specific experience refers to managers' decision-making and implementation experience. A team's output is created collectively rather than as the sum of individual contributions (Alchian and Demsetz 1972). The managers' shared experience in functioning together as a team includes discussions and debates on strategic decisions, during which managers accumulate the knowledge of each other's skills, limitations, and idiosyncratic habits (Barnard 1938, Penrose 1959). Shared team-specific experiences also include taking risks on behalf of the firm, committing to certain strategic actions under uncertainty, and jointly winning or losing as the top management team (Kor and Mahoney 2000). Because each team is likely to be unique in its functioning, generic experience in teamwork cannot substitute for the experience of working with specific managers in a particular firm. Positive team dynamics result from managers spending team time with the *same* members.

An administrative group [management team] is something more than a collection of individuals; it is a collection of individuals who have had experience in working together, for only in this way can "teamwork" be developed. Existing managerial personnel provide services that cannot be provided by personnel newly hired from outside the firm, not only because they make up the administrative organization which cannot be expanded except by their own actions, but also because the experience they gain from working within the firm and with each other enables them to provide services that are uniquely valuable for the operations of the particular group with which they are associated. . . . Extensive planning requires the cooperation of many individuals and this requires *knowledge of each other* (Penrose 1959, pp. 46–47, emphasis added).

The shared experience of managers in the top management team contributes to managerial competence in several important ways. For example, the experiential knowledge of the skills and habits of team members prepares the team for taking risks and saves time in coordination (Kor and Mahoney 2000). In particular, in the context of dynamic environmental conditions, teams with shared experience can make decisions more efficiently and implement them more successfully

because the team can focus on the business challenges rather than on group process issues such as interpersonal conflicts (Eisenhardt and Schoonhoven 1990, Jackson 1992, Robinson and Pearce 1976, Roure and Maidique 1986). The availability of managers in the upper ranks with experience with each other is a binding constraint that limits the rate of growth for an entrepreneurial firm (Penrose 1959). The shared experience of managers can be a hard-to-imitate source of entrepreneurial growth because such experience involves tacit knowledge that can be produced by only human interaction (Berman et al. 2002). Shared team-level managerial experience also provides a firm with a shield against imitation because, due to time-compression diseconomies (Dierickx and Cool 1989), it takes considerable time and commitment of multiple managers to build this experience from scratch.

In addition, group process researchers have argued that, without familiarity among team members, managers may not be able to communicate effectively or function productively (Eisenhardt et al. 1998, Pelled et al. 1999). Shared experience diminishes problems in group process because of increased communication, enhanced socialization, and reduced goal conflict among managers (Eisenhardt 1989, Smith et al. 1994, Zenger and Lawrence 1989). Intimate knowledge of the team members enhances work group cohesion (Harrison et al. 1998), and positive top management team dynamics is associated with lower turnover in teams (O'Reilly et al. 1993). Finally, there is also evidence that past shared work experience of the founders increases revenues of entrepreneurial firms (Eisenhardt and Schoonhoven 1990).

Founder-based, firm-specific experience provides the base of top management team competence. Founders possess the tacit knowledge of each other that comes from their shared founding experience. The second-level, team-based managerial experience component of the theoretical model, however, captures the effects of team dynamics among *all* executives, because it is the collective shared experience in the entire top management team that sets the rate of entrepreneurial growth. The availability of managers with direct knowledge of each other's abilities and habits determines the rate at which a firm can seize new growth opportunities, because expanding the firm under conditions of environmental uncertainty requires shared experience in the upper management ranks.

HYPOTHESIS 2. Shared team-specific experience of the top managers is related positively to the rate of entrepreneurial growth.

Industry-Specific Management Experience

Industry-specific managerial experience is the third level of top management team competence. This experience involves knowledge of the opportunities, threats, competitive conditions, and regulations specific to an industry, as well as goodwill with particular suppliers and customers. Similar to the path dependencies in resource accumulation and capability developments in firms, new developments in technology, competition, regulations, and other industry conditions are also typically connected to the prior industry conditions (Oster 1999). Experiential knowledge of the industry helps managers identify and assess emerging opportunities (e.g., new technologies), design proper strategies, and position new products and services strategically (Castanias and Helfat 2001, Schefczyk and Gerpott 2001). In entrepreneurial firms, previous industry-specific managerial experience can be especially valuable because knowledge of the industry conditions and relationships may significantly reduce the liability of newness (Cooper et al. 1994). Liability of newness occurs when startup firms lack the legitimacy of well-established firms and struggle to develop connections with the suppliers and customers in the industry (Stinchcombe 1965).

Industry-specific managerial experience is difficult for competitors to imitate. In a perfectly efficient labor market with no human capital scarcities, it would be easy for a firm to recruit an executive with the desired kind of experience. However, in a setting where labor markets are not perfectly efficient (e.g., industry-specific managerial experience is in short supply), firms can run into difficulties in recruiting executives with industry-specific managerial experience (Castanias and Helfat 1991). Entrepreneurial firms operating under uncertainty and making irreversible investments experience labor market imperfections because experienced executives may be unwilling to join risky enterprises without attractive incentives. Given the limited financial resources of entrepreneurial firms and the risky nature of the compensation they can provide (e.g., stock options and ownership), it may be challenging to attract and retain such executives from other established firms. A management team already endowed with industry-specific managerial experience may better identify and seize new growth opportunities.

Past empirical research indicates that starting a business without industry-specific experience increases the mortality rate (Brüderl et al. 1992, Cooper et al. 1994). Startup firms achieve overall superior performance and develop more successful cooperative research and development activities when founders have prior industry experience (Cooper and Bruno 1977, McGee and

Dowling 1994, Roure and Maidique 1986). This paper theorizes that industry-specific managerial experience of all managers collectively contributes to the competence of the top management team. Unlike previous research, the model in this paper incorporates the value of industry knowledge base among managers while separately capturing the effects of founder-based firm-specific experience and team-specific shared managerial experience on entrepreneurial growth.

HYPOTHESIS 3. Industry-specific managerial experience of the top managers is related positively to the rate of entrepreneurial growth.

Conflict Effects of Managerial Experience on Entrepreneurial Growth

A model of experience-based top management team competence must address what the appropriate *bundle* of managerial experience should be at these upper ranks. To define the appropriate bundle of managerial experience requires considering and assessing the presence of conflict effects. Conflict effects occur when specific bundles of managerial experiences produce a negative effect on top management competence and dilute positive individual effects on growth. In developing a theory of these conflict effects, this paper synthesizes the theoretical insights from Penrose (1959), the resource-based view, and the group process research.

The first conflict effect may occur from combinations of high levels of founders and shared team-specific experience among managers. It has been argued that team-specific experience mitigates group process-related issues such as goal conflicts because, with shared managerial experience and socialization, managers communicate more effectively with each other (Eisenhardt 1989, Penrose 1959, Smith et al. 1994, Zenger and Lawrence 1989). Research, however, also suggests that high levels of shared experience in a team may result in less communication with *outside* information sources (Katz 1982, Pelz and Andrews 1966). For example, managers with more experience in the team may not welcome advice and operational assistance from their venture capitalists (Barney et al. 1996). In addition to reducing communication with outside sources, managers are also more likely to develop a groupthink behavior when they have known each other closely for a long time (Allison 1971, Janis 1972). Such groupthink behavior may result in a less competent team, where managers avoid questioning and debating each other in identifying new growth opportunities and allocating resources among projects (Hambrick 1995).

Groupthink tendencies among managers can take away from the positive contribution of founders to overall team competence. This may happen because groupthink amplifies the intensity and power of founders' vision and guidance for future growth opportunities, where this vision and guidance are heavily informed by the original goal, past achievements, and path-dependent capability development efforts. While founders' knowledge of the firm's past capabilities is useful in deciding a firm's path, entrepreneurial growth opportunities may be curtailed when the founders' vision becomes the *dominant* and *unquestioned* direction for the firm.

Technologically intensive entrepreneurial firms often operate in high-velocity environments characterized by scarcity of information and frequent changes in demand, competition, and technology (Bourgeois and Eisenhardt 1988, West and Meyer 1998). Under such conditions, strictly committing to a single approach to business development can jeopardize the firm's adaptive capability (Finkelstein and Hambrick 1996). When the top management team deals with complex decision-making problems such as evaluation of alternative technologies and investment options under uncertainty, free exchange of different views among managers is preferred to cohesive thinking (Jackson 1992). This is the situation when the knowledge and perspective possessed by employees (in this case, managers) simultaneously enhance and inhibit development and growth (Leonard 1992). Even though the founder-based firm-specific experience forms the base of the top management team competence, its positive effects on new capability development and firm growth are undermined by groupthink tendencies resulting from excessive shared team-specific experience. Therefore, in sustaining entrepreneurial growth, a high founder presence and a high level of shared team experience among managers may not be a desirable combination.

HYPOTHESIS 4. The positive relationship between founder-based firm-specific experience and the rate of entrepreneurial growth will become weaker as the level of shared team-specific experience of the top managers increases.

A second conflict effect may occur when the top management team possesses high levels of founders and industry-specific experience. Despite the potential value that industry-specific managerial experience adds to the competence of the top management team, managers with high levels of industry-specific experience can be entrenched by industry norms and practices (Geletkanycz and Black 2001, Hambrick et al. 1993). With experiential knowledge of the prior industry

conditions, managers may become overconfident about the correctness of their view of the business and seek less advice from outside expert sources (Barney et al. 1996).

This potential tendency to overly commit to past industry practices may become a salient problem as the ratio of founders and the level of industry experience *rise together* to high levels. At higher levels of founder-based firm experience and industry-specific managerial experience, the tendencies of choosing future growth opportunities based on path-dependent capability development and historical industry conditions are combined and highly intensified. While firm and industry-specific knowledge bases are valuable individually, in the absence of an adaptive approach to decision making, they can generate a biased view of the new productive opportunities a firm should pursue. In high-velocity environments, lack of timely adaptations to changes in technology and competition can limit a firm's entrepreneurial growth potential (Bourgeois and Eisenhardt 1988). When the top management team is highly entrenched with historical models of growth that does not allow for adaptive changes in firm's strategy, the firm's capability to capitalize on the emerging growth opportunities will be undermined. Therefore, it is posited that the positive effects of founder-based firm-specific experience is diminished as the industry-specific managerial experience in the team increases.

HYPOTHESIS 5. The positive relationship between the founder-based firm-specific experience and the rate of entrepreneurial growth will become weaker as the level of industry-specific management experience in the team increases.

Data and Methods

Sample

Key theoretical arguments influence the choice of the appropriate empirical context. An entrepreneurial firm context, which involves innovation-based growth and frequent changes in the experience bundle of the top management team, is necessary to test additive and conflict effects of managerial experience on the rate of growth. In addition, theory stresses the role of managerial experience under conditions of demand and technological uncertainty and frequent changes. Therefore, an empirical test of the hypotheses presented here requires a technologically intensive industry context where firms are under pressure to generate new products with limited information about demand and technology. Accordingly, the sample in this study consists of technology-based

entrepreneurial firms that completed an initial public offering in the medical, surgical, and dental instruments industry (SIC = 384; 3841–3845) in the United States. The firms in the sample are engaged in development and production of high-technology medical and surgical instruments such as cardiac pacemakers, defibrillators, angioplasty catheters, ultrasound imaging, and *in vitro* diagnostics products. The choice of the medical, surgical, and dental instruments industry augments the limited variety of high-velocity, high-technology industries studied in the management literature (e.g., computer and software industries). Moreover, because of the worldwide aging population, health-related research, including research about management and performance of these technology-intensive firms, will be useful and timely.

The sample includes 73 firms that went public between 1990 and 1995. These firms were founded between 1960 and 1995. I collected data on these firms from their initial public offering year through 1999. Since these firms went public in different years and not all of them continued to operate through 1999, the sample does not include an equal number of observations for each firm. The final sample includes a total of 340 observations from 73 firms. The longitudinal data on management experience are gathered from both initial registration statements (i.e., the prospectus) and proxy statements that are issued annually following the initial public offering. Data on firm performance and firm size are compiled from Compustat files.

Variables

The top management team is defined as all inside top-level executives including the chief executive officer, chief operating officer, business unit heads, and vice presidents (Finkelstein and Hambrick 1996). As a general rule, I consider all inside executives listed in the management section of the prospectus as key management personnel. I explain measures of the three levels of managerial experience below, followed by the dependent variable and control variables.

Founder-Based Firm-Specific Experience in the Top Management Team. This variable's measure is the ratio of the number of founders who are active in the top management team to the size of the team. This variable serves as a proxy for the level at which experiential knowledge of the original business model and the firm's capabilities are still preserved at the top management level. I conjecture that the higher the ratio of founders in the top management team, the stronger the influence of historical business premises and emphasis on new business development decisions.

Shared Team-Specific Management Experience. This level of experience involves managers' collective knowledge of the skills, limitations, and idiosyncratic habits of team members. Rather than generic team experience, this paper is concerned with top management team members' shared managerial experience in making and implementing strategic decisions. Accordingly, I measure this variable as the number of years of shared experience for the *four* managers with the longest tenure in the top management team. Given the mean team size in this sample (approximately six managers), shared managerial experience of four managers is an appropriate proxy because practically in all cases in the sample this proxy incorporates the shared experience of the majority of managers on the team. For example, in a team where managers have served four, five, five, six, and seven years at the upper management ranks, four longest tenured members of the team worked together for five years. Measuring this variable as the number of years of shared experience of five or six managers would not be appropriate because it is almost certain that one or more new executives joined the team at some point in this post-IPO phase. Using the same example (i.e., six managers who spent zero, four, five, five, six, and seven years on the team), when a new manager joins the management team, the number of years of shared experience of all six managers becomes zero even though five of the managers had significant experience with each other. When I use four managers as the cutoff point to calculate this variable, I am able to capture the shared experience of the majority of the managers in this team. In addition, it is plausible to assume that the shared experience of the half the team (i.e., three managers on average) may also create sufficient influence on the dynamics of the top management team. Therefore, I also calculate this variable as the years of shared team experience of the longest tenured three managers on the team.

Industry-Specific Management Experience. This level of experience includes the managerial knowledge of the opportunities, threats, competition, and technologies specific to an industry. I measure this variable as the average number of managerial positions the managers previously held in the same industry. This measure captures the breadth of industry-specific experience managers possess because, with every position in a specific firm in this industry, managers become familiar with the resources and strategies of an industry player and as well as with the suppliers and buyers in the industry. It would have been useful to know the number of years spent in each position or in total in this industry as well; however, prospectus documents and proxy statements do not provide that information.¹

Rate of Entrepreneurial Growth. The choice of the dependent variable was based on the theory developed in this paper. This paper's theory builds on Penrose's (1959) theory of firm growth and its central argument that the availability of managerial experience is a binding constraint to the *rate* of entrepreneurial growth. I measure this variable as the annual rate of sales growth (Biggadike 1979), which is a critical indicator of performance for entrepreneurial firms that are in a stage of product commercialization and growth (Chandler and Hanks 1994, Eisenhardt and Schoonhoven 1990, Kazanjian 1988, Zahra 1996). This indicator reflects a firm's ability to increase its sales relative to its previous sales through innovative medical technology products.

Control Variables. The six control variables in this study include management age, management team size, heterogeneity of firm tenure in the top management team, firm age, firm size, and the number of years since the initial public offering. Management age is a control variable because age and cognitive abilities can be correlated (Hambrick and Mason 1984, Hitt and Tyler 1991). Top management team competence could also be linked to the number of managers serving on the team; thus, team size is included as a control variable. Further, heterogeneity of firm tenure in the top management team may contribute to cognitive heterogeneity in the team (Finkelstein and Hambrick 1996), which in turn may influence a management team's approach to seizing new growth opportunities. I measure this variable as the standard deviation of firm tenure divided by the average level of firm tenure in the team (Hambrick et al. 1996). In addition, I control for firm age, that is, the number of years since incorporation, because startup firms may perform differently at various stages of development (Mosakowski 1993). Firm size, measured as the dollar value of total assets, is also a control variable because larger firms may be in a better position to attract new customers because of scale-related cost advantages and perceptions of higher credibility. Finally, the number of years since the IPO is a control variable, because it may influence the resource bases and growth potential of firms. Table 1 presents the descriptive statistics and correlations among all of the variables in this study.

Methodology

The hypotheses presented in this paper are tested using repeated observations (i.e., panel data) on the same set of cross-sectional units (Greene 2000, Hsiao 1996, Johnston and DiNardo 1997). A random effects model is preferable to analyze the panel data because the alternative dummy approach is costly in terms of degrees of

Table 1 Means, Standard Deviations, and Correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Founder-based firm-specific experience	0.15	0.20									
2. Team-specific management experience	4.48	3.33	-0.05								
3. Industry-specific management experience	1.37	0.68	0.18**	-0.04							
4. Management age	46.69	4.63	0.04	0.29***	0.03						
5. Team size	6.21	2.06	-0.45***	0.36***	-0.06	0.19***					
6. Firm tenure heterogeneity	0.58	0.24	-0.25***	-0.23***	-0.28***	0.11***	0.24***				
7. Firm age	10.69	6.54	-0.16**	0.37***	-0.24***	0.22***	0.11*	0.30***			
8. Total assets	0.09	0.21	-0.07	0.23***	-0.01	0.18**	0.25***	0.06	0.07		
9. Years since IPO	2.35	1.49	-0.11	-0.19***	0.17**	-0.01	-0.01	-0.15**	-0.27***	0.02	
10. Rate of sales growth	0.83	2.64	0.05	-0.09	0.04	-0.07	0.01	0.03	-0.15**	-0.04	0.06

Note. *n* = 340. Total assets are in millions of U.S. dollars.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

freedom lost. However, it is crucial to do a Hausman test for orthogonality of the random effects before the individual effects can be treated as random. This test assesses the consistency of estimation results with dummy (fixed-effects) and random effects models. In the event that two estimates do not differ systematically, random effects generalized least squares (GLS) regression is always preferable because it is a significantly more efficient estimation technique (Greene 2000, p. 576). In this sample, the Hausman test has indicated that estimation results of dummy and random effects are consistent, and individual effects are uncorrelated with the other variables in the model. Therefore, I have proceeded with the more efficient random effects GLS estimation technique. In addition, analysis

of the error terms with Glesjer’s test did not indicate any heteroscedasticity problem (Greene 2000, p. 511), and the Durbin Watson statistic suggested that there is no autocorrelation problem.

Results

Table 2 presents the coefficient estimates for the effects of different levels of management experience on the rate of sales growth. As the base model, the first model has all the control variables. The second model includes both control and main variables. Interaction variables enter the regressions one at a time in the third and fourth models. The fifth model is the full model with control, main, and all interaction variables. The first Chi-square

Table 2 Results of Random Effects GLS Regression Analysis of the Rate of Sales Growth

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	SE	β	SE	β	SE	β	SE	β	SE
Founder-based firm-specific experience			3.47**	1.32	5.91**	1.86	12.85***	2.95	15.40***	3.22
Team-specific management experience			-0.04	0.09	0.05	0.10	-0.10	0.09	-0.01	0.10
Industry-specific management experience			0.10	0.38	0.14	0.38	1.05*	0.46	1.10*	0.46
Founders' * team-specific experience				-0.59+	0.32				-0.60+	0.32
Founders' * industry-specific experience							-5.45***	1.55	-5.49***	1.55
Management age	-0.06	0.05	-0.06	0.05	-0.06	0.05	-0.06	0.05	-0.06	0.05
Team size	0.07	0.12	0.20	0.13	0.19	0.13	0.29*	0.13	0.28*	0.13
Firm tenure heterogeneity	0.47	0.77	0.69	0.92	0.40	0.93	-0.32	0.95	-0.62	0.96
Firm age	-0.08+	0.04	-0.05	0.05	-0.05	0.05	-0.04	0.05	-0.04	0.05
Total assets	0.12	1.02	0.06	1.02	-0.08	1.02	0.36	1.01	0.21	1.01
Years since IPO	-0.02	0.21	0.03	0.22	0.02	0.22	-0.01	0.22	-0.02	0.22
Constant	3.81+	2.25	2.147	2.38	2.10	2.37	0.82	2.39	0.73	2.34
Wald Chi-square	7.68		15.14+		18.66*		28.30**		32.24***	
Chi-square for change in model			7.3**		3.38+		12.35***		14.85***	
Adjusted R-square	0.03		0.06		0.07		0.11		0.12	

Note. +*p* < 0.10; **p* < 0.05; ***p* < 0.01; ****p* < 0.001.

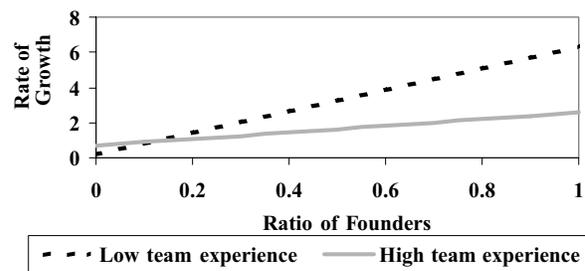
statistic indicates the overall significance of each model, and the second Chi-square statistic provides a test of statistical significance for the added variables (i.e., change) in a particular model. For Model 2, the Chi-square statistic for change compares the main-effects model with the control-variables-only model. For Models 3–5, the Chi-square statistic for change compares each model to the main effects model (i.e., Model 2).

I argue in the first hypothesis that the founder-based firm-specific experience in the top management team is positively related to the rate of entrepreneurial growth. The results support Hypothesis 1 in all models. The second hypothesis suggests a positive relationship between shared team-specific experience of managers and the rate of entrepreneurial growth. There was no support for this hypothesis for either measure of shared team-specific experience.² The third hypothesis suggests a positive relationship between industry-specific managerial experience and the rate of firm growth. This hypothesis was supported only when the interaction of industry experience and founder-based firm specific experience was controlled (i.e., in Model 4 and Model 5), providing a qualified support for the third hypothesis. Specifically, the effect of industry-specific managerial experience on entrepreneurial growth was not significant in the main-effect models (i.e., Model 2 and Model 3); however, it was positive and significant as predicted in the full model containing interactions.

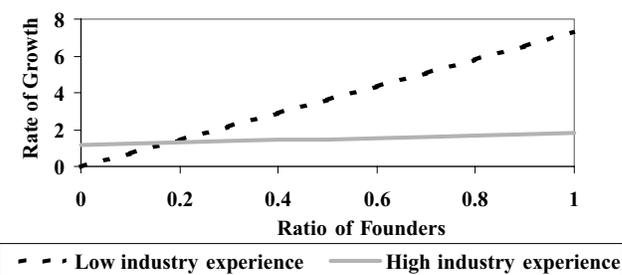
Further, I posit in Hypothesis 4 that the positive relationship between founder-based firm-specific experience and the rate of entrepreneurial growth weakens as the level of shared team-specific experience of the top managers increases. There was support for this argument (β -interaction = -0.60 , $p < 0.10$), and Figure 1(a) illustrates this conflict effect. The figure shows that the positive relationship between the ratio of founders in the top management team and the rate of sales growth is weaker when the team-specific management experience is high.

In support of Hypothesis 5, empirical evidence indicates that the positive relationship between the founder-based firm-specific experience and the rate of entrepreneurial growth weakens as the level of industry-specific management experience in the team increases (β -interaction = -5.49 , $p < 0.001$). Figure 1(b) illustrates this relationship. The Chi-square statistic for the full model (Model 5, Chi-square = 14.85, $p < 0.001$) indicates that adding both interaction effects to the main effects model makes a significant improvement in the predictive ability of the main effects model. Also, it is important to note that even after taking into account the negative (conflict) effects, participation of founders in the

Figure 1 Conflict Effects of Shared Team-Specific and Industry-Specific Management Experience



(a)



(b)

top management team has a net positive influence on the generation of sales growth.

By adding the squared terms to the equation, I also examined whether any of the experience variables are related to the rate of sales growth in a nonlinear form. No curvilinear relationships were present; therefore, we can be confident that the interaction effects are not a product of undetected nonlinearities between any experience variable and firm performance. I also ran the regression with year dummy variables to control for potential *time effects* and did not find significant changes that would alter the conclusion of any hypothesis testing. Finally, the results indicate that only one control variable (team size) is statistically significant. Despite the nonsignificance, these variables are theoretically relevant and should remain in the model.

Discussion

This paper develops and tests an experience-based model of top management team competence and its effects on a firm's capacity for entrepreneurial growth. This paper offers a theory of multilevel managerial experience in order to map out the fundamental differences in the knowledge bases represented by different levels of managerial experience. The theory presented here incorporates insights from Penrose (1959), the resource-based view, and group process research and explains

how management experience at firm, team, and industry levels adds value to entrepreneurial growth. The model also incorporates the conflict effects of combining multiple levels of experience. A joint exploration of direct and conflict effects enables us to identify the appropriate *bundle of managerial experience* to achieve entrepreneurial growth.

The empirical evidence demonstrates that founders' participation in the top management team contributes to the firm's overall management team competence and results in a higher rate of sales growth. Founder-based firm-specific managerial experience is the base of the top management team competence, because founders' historical and tacit knowledge of the firm's resources and capabilities strengthens the proper matching of firm resources and capabilities with opportunities. In high-tech entrepreneurial firms, founders' tacit understanding of the firm's technological knowledge bases informs the decisions about how to allocate the limited financial resources among competing paths of research and development. In addition, founders' experiential knowledge of the firm's employees is valuable in matching employee skills to projects and employees to each other in team settings. Founders can be significantly influential in these resource allocations, because their tacit knowledge of the firm's unique resources and capabilities is coupled with ownership and status-based power. A management team that possesses founder-based firm-specific managerial experience can be highly competent in identifying and seizing new growth opportunities. The founders' active managerial involvement in the firm gives a hard-to-imitate competitive advantage, because in many firms founders are no longer alive or able to participate in the management team. These results reinforce the extant research that indicated that founders play a unique role in efficient deployment of a firm's resources and growth generation (Chandler and Hanks 1998, Feeser and Willard 1990).

In addition, this paper demonstrates that past industry-specific management experience contributes to the competence of the top management team. Past managerial knowledge of the opportunities, threats, competition, and technologies specific to an industry is useful in creating entrepreneurial growth. Because of path-dependent developments in technology, competition, regulations, and other industry conditions (Oster 1999), tacit knowledge of how the industry functions helps managers identify and assess the emerging opportunities (e.g., new technologies) and position new products and services accordingly. It is also important to note that the economic significance of the founders' participation in the top management team is greater than the

significance of industry-specific management experience (as seen in Figure 1(b)). This finding confirms the resource-based view argument that firm-specific knowledge and skills can be a source of hard-to-imitate competitive advantage (Castanias and Helfat 1991, Harris and Helfat 1997). Because industry-specific managerial experience usually can be acquired in the labor market and deployed in many firms in the same industry, its value added to competitive advantage (e.g., comparative entrepreneurial growth) is smaller than the contribution of founders' firm-specific knowledge, which is not transferable between firms.

In addition, *bundling* specific managerial experiences produces significant effects on the top management team competence and on the firm's entrepreneurial growth. For example, a conflict effect occurs when the management team has high rates of both active founders and shared team-specific experience among managers. This combination may result in intense founder involvement and groupthink tendencies in strategic decision making. When founders and managers work together in the team for a long time, they can be less inclined to question each other when identifying new growth opportunities and allocating resources among projects. In such firms, founders will have dominant and unquestioned influence on development of firm capabilities. However, in high-velocity environments that involve limited information and frequent changes in demand, competition, and technology (Bourgeois and Eisenhardt 1988, West and Meyer 1998), a dominant and unquestioned approach to business development restrains a firm's capacity to sustain entrepreneurial growth. Even though the founder-sourced firm-specific experience adds value to the top management team competence through path-dependent identification of growth opportunities and capability development, its positive effects can be undermined by the conflict effect of excessive shared team-specific experience. Therefore, in producing an appropriate bundle of managerial experiences to sustain entrepreneurial growth, a firm is better off avoiding an excessive level of shared team-specific experience among managers when the team is highly endowed with founders.

The second conflict effect occurs when founders' participation in the team and managers' past industry experience reach high levels simultaneously. When founders and managers with considerable industry-specific experience dominate the top management team, the team becomes less effective in generating new business opportunities because too much emphasis is placed on past industry practices and norms. An intensely uniform view of choosing future growth opportunities based on path-dependent capability development *and* historical

industry conditions can limit the growth potential of a firm in rapidly changing, fast-paced business environments. Founder-rich top management teams are more competent in identifying and seizing entrepreneurial growth opportunities *when* these teams' stock of experiential knowledge of the prior industry conditions is not excessive or dominating. Theoretical modeling and empirical examination of these conflict effects are a contribution to the literature because they address important consequences of bundling managerial experiences in the top management team in alternative ways.

This study has a number of limitations. Because it used secondary data, it was not possible to observe and measure the processes involved in team dynamics and decision making, such as the groupthink phenomenon. To measure managerial experience constructs that involve tacit, experiential knowledge, I relied on observable indicators such as years of experience or the number of managerial positions. Future research can be enriched with an indepth study of the specific process mechanisms that explain the links between different forms of managerial experience and organization outcomes like firm growth. Also, because the sample was restricted to a single industry and to relatively young, technologically intensive firms, the findings of this study may not be generalizable to other empirical settings, such as low-technology firms or stable industries. Further, because this study sampled entrepreneurial firms that went public, findings may not be generalizable to thousands of new technology-intensive firms founded each year that do not go public.

For future research, other forms of managerial experience, such as managerial experience outside the current industry, deserve to be examined because, in designing creative strategies, management teams of entrepreneurial firms may benefit from a diversity of industry experience (Eisenhardt and Schoonhoven 1990, West and Meyer 1998). An examination of the value of past startup experience is also important because entrepreneurial firms may avoid startup mistakes by hiring managers with this experience (Dyke et al. 1992). Managers' experience in related industries may also contribute to their competence (Castanias and Helfat 2001). For example, experiential knowledge of the pharmaceutical industry can be valuable in the medical and surgical instruments industry.

In addition, further exploration of the moderating effects of management experience is promising. A study of multinational corporations indicates that the positive relationship between a chief executive officer's past international assignment experience and financial performance is stronger when the rest of the top management

team has international experience as well (Carpenter et al. 2001). Also, studying direct and conflict effects of management experience in other industry settings would help us understand whether an industry characteristic (e.g., specific technology) moderates the value of managerial experience. Finally, even though a direct positive effect of shared team-specific managerial experience was not present in this study, this theoretically important construct deserves further examination.

The results of this study strongly suggest that founders' participation in the management team adds value to the overall competence of the team in generating entrepreneurial growth. With their experiential knowledge of the firm's history and resources, founders play a key role in matching the firm's capabilities with new productive opportunities. Founders' skills may become less current and applicable as the firm and its competitive environment change (Certo et al. 2001); however, this does not pose a significant threat for the firm unless the founders dominate the views of the team and the team suffers from groupthink. Also, founders' active participation will be most productive when industry-specific managerial experience is not excessive among managers.

This paper has shown that a theoretical model of top management competence should capture management experience at multiple levels (e.g., firm, team, and industry). Each level of managerial experience is linked to a different knowledge base and produces a unique effect on the growth capacity of a firm. An important implication of this study is that the ultimate effect of a certain type of management experience cannot be assessed without considering both the individual and conflict effects of this experience on strategic choices and outcomes. Conflict effects may significantly reduce the individual positive effects of each level of experience. A joint examination of direct and conflict effects enables us to identify the appropriate bundle of managerial experience to achieve a particular organizational outcome. For practitioners, the most important implication is that for sustained and healthy growth, entrepreneurial firms should balance different levels of managerial experience in the top management team. The results of this study suggest that one way to achieve this balance involves retaining valuable founder resources on the team while avoiding high levels of shared team-specific experience and industry-specific managerial experience to preempt groupthink and heavy reliance on prior industry assumptions.

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Endnotes

¹As one of the reviewers of this paper pointed out, the current measure of industry-specific experience may be tapping into job hopping as well as experience. Therefore, as an alternative measure, first, a dummy variable was created for each executive (1 = industry experience, 0 = no industry experience), and then the values of these dummy variables for all managers were summed. The results of hypothesis testing were unaffected when this measure was used.

²One of the reviewers of this paper generously offered two alternative measures of shared team experience. The first measure is the sum of the years of shared experience that each executive has with the team as it was composed when the focal executive joined the team. The second measure is the sum of the shared experiences across all dyads on the team. Either measure takes into account the shared experience of all executives. Both measures provided results that are similar to those presented here, with the exception that the first interaction effect was insignificant in Model 3. This insignificance can be due to the significantly increased correlations between joint team experience variables and some of the independent variables when alternative measures were used.

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