Founding the Future:
The Evolution of Top Management Teams from Founding to IPO•

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Abstract

We contrast life-cycle and path dependent views of entrepreneurial firms by examining the evolution of top management teams. We show how initial conditions constrain subsequent outcomes by demonstrating that the founding team prior functional experiences and the initial organizational functional structures they implement predict subsequent top manager backgrounds and later functional structures. We find that narrowly experienced teams have trouble adding functional expertise not already embodied in the team. We also find that firms beginning with a limited range of functional positions are less likely to develop complete functional structures. Importantly, we do not find functional structure and functional experience to be interchangeable. We find that firms beginning with more complete functional structures are likely to go public faster, and firms beginning with broadly experienced team members obtain venture capital more quickly net of the experience and structural composition of the top management team in place at the time of these outcomes. Further, broadly experienced founding teams who build an early team with a full complement of functional positions achieve important milestones faster than firms that start with neither experience nor structure. This suggests that creating positions as 'placeholders' in new ventures, where positions are created and filled with the intent of bringing individuals with more relevant experience onboard later, is not obviously a path by which to succeed. By examining the origins of top management team experience and functional structures, we illustrate the lasting imprint of founders on top management team composition and firm outcomes.

Introduction

The popular press often portrays successful high-technology firms being launched by specialized technological geniuses: brilliant scientists found a company (frequently in a garage), then attract more broadly experienced executives and venture capital to bring the firm to the next level (Audia and Rider 2005). A similar view is taken by scholars who take a life-cycle perspective on entrepreneurial firm development: executives are replaced as the firm outgrows their capabilities in a process of "professionalization" (Hellman and Puri 2002, Boeker and Karachalil 2002). Our research examines the extent to which these images reflect reality. While there is broad consensus that successful firms are led by seasoned professional managers who bring a full range of functional skills to the venture (Roberts 1991, Cooper, Gimeno-Gascon and Yoo 1994, Schefczyk and Gerpott 2000, Burton, Sørensen and Beckman 2002) and create an organizational functional structure that has clear roles and accountability (Ancona and Caldwell 1992, Keck 1997, Roure and Keeley 1990, Sine, Mitsuhashi and Kirsch 2006), we know relatively little about how teams and firms evolve over time.

Although many pundits explicitly recommend that entrepreneurial firms replace founders with professional managers (Charan, Hofer and Mahon 1980, Willard, Krueger and Feeser 1992, Wasserman 2003), it is less clear how a new firm founded by narrowly experienced technologists in an undifferentiated functional structure is able to attract broadly experienced team members and develop a broad portfolio of functional positions. In fact, much of the extant organizational literature that emphasizes homophily (McPherson Smith-Lovin and Cook 2001, Ruef, Aldrich and Carter 2003), imprinting (Boeker 1988, Burton and Beckman 2007), and inertia (Hannan, Burton and Baron 1996, Phillips 2005) suggests that this kind of professionalization and organizational evolution would be both difficult and unlikely.

In this paper we explore how teams and firms evolve through understanding how the breadth of founder prior experiences and early decisions about functional structures influence the types of executives who are attracted and retained and the types of functional structures that are

subsequently put into place. We contrast the life-cycle perspective with a path-dependent view of firm development. We argue that, contrary to the images of the popular press and life-cycle theories of entrepreneurial firm development, homophily and imprinting operate such that subsequent executives and structures bear a strong resemblance to founding executives and structures. Our research extends the idea that founders of firms bring important experiences and make critical choices early in the firm's history that leave a lasting organizational imprint.

We build on established traditions in the top management team demography (c.f. Williams and O'Reilly 1998) and upper echelons (c.f. Finklestein and Hambrick 1996) literatures and examine two facets of the team: the breadth and depth of both the functional position assignments in the new venture and the prior functional experiences that team members bring to the firm (Bunderson and Sutcliffe 2002). We conceptualize prior functional experience as a measure of the team's human capital (whether someone has a prior sales or engineering experience, for example) and functional assignments in the firm as a measure functional structure that is distinct from the skills and qualifications of any specific incumbent (whether a firm has a VP of sales or engineering, for example).

Interestingly, while the extant literature recognizes both structural and human capital differences among nascent ventures, they are rarely considered simultaneously. Instead, scholars interested in functional structure tend to ignore the characteristics of the individuals who occupy structural positions (e.g. Roure and Keeley 1990, Sine et al. 2006), and scholars interested in teams and individuals tend to ignore structure (e.g. Cooper et al. 1994, Chandler 1996). Indeed, in much of the top management team (TMT) demography research, functional structure and experiences are considered interchangeable (e.g. Ancona and Caldwell 1992, Keck 1997. See Bunderson and Sutcliffe 2002 for an important exception).

Treating structure and experience as conceptual and empirical equivalents may be reasonable in established organizations, where we expect to see team members with relevant experience in a position (e.g., a person with a sales background in a sales job). In entrepreneurial

ventures, however, there may or may not be a match between prior functional experience and current functional assignment. Consider the technologist with no management experience who takes on the role of president, the sales person who is responsible for human resource management or customer service, and the recent business school graduate with prior engineering experience who fulfills the business development or marketing function. This potential for a mismatch between prior experience and structural assignment offers a compelling arena in which to compare life-cycle and path-dependent perspectives. Whereas lifecycle models advocate that firms create positions as "placeholders" until executives with the relevant experience can be hired and the firm can be professionalized (Hellmann and Puri 2002, Boeker and Wiltbank 2005), path-dependent models would be more cautionary given the potential dangers of functional structures filled by individuals with atypical experience (Burton and Beckman 2007). In sum, we argue that functional experience and functional structure are distinct, and we explore both their interrelationships and their effects on firm outcomes.

Theory and Hypotheses

Top manager prior experience and the functional structure of a firm have long been of interest in the TMT demography (Pfeffer, 1983) and upper echelons literatures (Hambrick and Mason, 1984). A relatively large body of empirical research confirms the intriguing and sensible possibility that the demographic composition of top management teams has consequences for organizational strategy and performance (see Finkelstein and Hambrick 1996 and Williams and O'Reilly 1998 for reviews).

A large number of studies have focused on functional diversity and demonstrated a relationship between top manager functional diversity and firm performance, strategic reorientation, and external communication (e.g. Eisenhardt and Schoonhoven 1990, Ancona and Caldwell 1992, Lant Milliken and Batra 1992, Keck 1997). When theorists posit a positive main effect of functional diversity, they generally argue that diversity enhances organizational performance because broad functional representation ensures that the TMT has the full range of

skills and abilities needed to manage the organization (e.g., Keck 1997, Randel and Jaussi 2003). While the mainstream demography literature has advanced to identify a variety of process variables that account for the relationship between diversity and outcomes (e.g., Smith et al. 1994), as well as a host of factors that moderate the relationship between diversity and outcomes (e.g. Jehn, Northcraft and Neale 1999), an important conceptual distinction between functional experience and functional structure has been largely ignored. To date the literature has generally used the same logic to account for diverse functional structures and diverse functional experiences, treating these dimensions as interchangeable and considering the choice of measuring structure or experience a methodological detail (see Bunderson and Sutcliffe, 2002 for an important exception).

While functional structure refers to the existence of *functional roles or positions* irrespective of any person who might occupy the role, functional experience refers to the human capital characteristics of the *individual incumbents*. This distinction is theoretically interesting as it allows us to consider team evolution from a structural perspective and from a human capital/social psychological perspective. If structure and experience are distinct and separable constructs, they should each have a unique effect on firm outcomes, may evolve through different paths, and one may be antecedent to the other. Our research considers these possibilities.

While there are large literatures in both organizational demography and entrepreneurship linking TMT characteristics to firm outcomes, few are longitudinal (see Boone, van Olffen, van Witteloostuijn and De Brabander 2004 for an exception). This is despite several calls for scholars to explore the source of demographic distributions in organizations (Mittman 1992, Lawrence 1997, Carroll and Harrison 1998). Most recently, Hambrick (2007) argues that we need to consider executive characteristics as dependent variables and ask why TMTs "look the way they do" (338). Little work has examined the process of path dependence that results in continued heterogeneity or homogeneity among teams (see Sørensen 2004 for a recent

exception), and it is only with longitudinal work that we can see how it is that teams change over time.

We directly take up these calls by examining the role of the founding team in creating the subsequent top management team (TMT). If path dependence occurs, then initial functional structures will predict a deepening of these structures over time. If homophily occurs, then initial functional experiences will predict a deepening of these experiences over time. If functional structure and functional experience are interchangeable, then having either will enable a firm to broaden as it evolves. Furthermore, we examine whether these initial characteristics of the team and firm have lasting consequences. If, as life-cycle theories predict, initial functional structures and experiences are irrelevant to subsequent changes, then there should be little relationship between the founding team experiences and structures and subsequent experiences and structures, particularly as founders are replaced and firms mature. Thus, in stark contrast to a path-dependent perspective, where origins are a source of subsequent constraint, the life-cycle perspective emphasizes opportunity and adaptation.

In summary, we consider five interrelated questions: (1) whether the functional experience of the founders shapes initial decisions about functional structure, (2) whether the initial functional structure constrains future functional structure, (3) whether the initial functional structure shapes the functional experience of those executives hired by the firm, (4) whether the functional experience of the founders influences the experiences of those executives who join subsequently; and (5) whether the initial functional structure and experiences shape firm outcomes.

In order to examine these questions, it is important to first distinguish between the founding team and top management team. Founding teams are made up of people who create the firm; irrespective of whether they hold executive titles. For example, a founder may hold a position titled “director of engineering” or “scientist” rather than hold a vice president or “chief” position. TMTs are made up of people that hold executive titles; regardless of when they join the

firm. Although there is overlap between these teams at founding if all founders hold executive titles, the teams are conceptually and empirically distinct. Founders are not added as the firm grows, and, as TMT members join the firm and founders leave, the divergence between the two teams increases.

Our first question regarding the relationship between prior functional background experience and initial functional structural decisions draws upon two ideas; that functional background experiences shape a person's world view and that people carry their prior experiences with them across organizational settings. We rely on early statements and recent empirical evidence suggesting that functional training conditions individual cognitions (Dearborn and Simon 1958, Sutcliffe 1994; Tripsas and Gavetti 2000) and an established empirical tradition demonstrating that when employees leave an organization, they carry that organization's routines and ideas to their new organizations (Baty, Evan and Rothermel 1971, Boeker 1997, Sørensen 1999, Phillips 2002). For example, the functional experience and strategy of the founder's prior firm influences the strategy of the new firm (Boeker 1988); and, founders' experiences in a prior firm shape the routines and practices they put in place in a new firm (Phillips 2005, Beckman 2006). In addition, there is growing evidence that the functional background experiences of a TMT influence how it defines and enacts organizational positions (Fligstein 1990, Phillips 2005). Extending this idea to initial decisions about the allocation of positions and responsibilities, we hypothesize that founders will put functional structures into place that mirror their own functional experiences (Schein 1992, Burton and Beckman 2007). For example, a founding team with a member from a sales and business planning background may decide to combine the sales and business planning functions under a single executive and build an organization where these functions are closely interrelated and are externally (customer) oriented. The background of the initial marketing executive—business development, classical marketing, or sales—leads to different choices about what the marketing function does and with which other functions it is aligned. Thus we hypothesize:

(H1) Founding team functional experience will shape initial functional structure.

Once the initial functional structures are put into place in an organization, they are likely to be maintained and strengthened over time. Support for this argument comes from several theoretical traditions. Social theorists have long argued that institutions are self-reinforcing (Michels 1915, Downs 1967). In addition, theories of organizational imprinting suggest that initial decisions about the allocation of responsibility among team members are the decisions that have lasting consequences (Stinchcombe 1965, Baron, Burton and Hannan 1996, Hannan et al. 1996, Burton et al. 2002). For example, Baron, Burton, and Hannan (1999) find that founding organizational blueprints, around which employment relations are managed, predict the subsequent decisions and structures that are adopted (including adding new functional positions; creating formal documentation and organizational charts). Finally, arguments of structural inertia suggest that initial structures will be maintained over time (Hannan and Freeman 1984). Thus, a range of work suggests that initial functional structures predict later functional structures. We therefore hypothesize:

(H2) Founding functional structure will shape the breadth and depth of subsequent functional structure.

Founding functional structure will also likely shape subsequent management functional experience. The extensive literature on job analysis – which in modern human resource management is the foundation of job descriptions, job design and re-design, performance appraisal, selection and training -- defines jobs as combinations of tasks that require particular knowledge, skills and abilities that can be generically specified (c.f. Fine and Cronshaw 1999). Indeed, the extensive literature on organizational design, formalization and even internal labor markets has a vision of clearly defined and hierarchically ordered positions or roles (see Osterman and Burton, 2004 for a recent review). Jobs exist in organizations as "placeholders" against which individuals in the labor market can be matched (e.g. Wanous 1992; see Miner 1987 for a review of this literature and an alternative view). Similarly, These characterizations

of roles, jobs and positions imply that the organizational functional structure shapes the characteristics of subsequent incumbents.

Consider again the firm where sales and business planning positions are closely aligned. When a new executive is recruited to take over the combined position, the structure of the position will influence the choice of a new executive. A different founding team might decide to create stand-alone sales and business planning functions, which would lead to different future candidates. Thus, the structural choices made by the founding team have implications for the characteristics of the subsequent executives who would be *capable* of filling the defined positions, *attracted* to the opportunity, and *attractive* to the incumbent team members. Our arguments imply that structural decisions made by firm founders constrain the pool of people who might be willing or able to make a move. Thus we hypothesize:

(H3) Founding functional structure will shape the breadth and depth of subsequent functional experience.

Finally, there are reasons to expect an association between the prior functional experiences of the founding team and subsequent TMT functional experience. Several mechanisms (which may operate simultaneously) could generate this path dependence. For instance, the attraction-selection-attrition (ASA) cycle described by Schneider (1987) would predict that founding and future TMTs will share similar characteristics. Managers seek organizations where existing personnel have similar characteristics, founders select managers like themselves, and managers who do not fit will leave. For example, Boone et al. (2004) find that even when environmental conditions shifted dramatically, Dutch newspaper executives tended to hire new executives who were demographically similar to those already in place. Thus, founders and managers alike should be attracted to one another when they share common experiences and knowledge.

A large literature on homophily also suggests this relationship (i.e., Rogers and Bhowmik 1971, Ruef et al. 2003). Although research on homophily has generally focused on

categories such as race and gender, there is growing evidence that the same processes apply to occupations (McPherson et al. 2001). Founders may privilege and recruit executives with similar functional experiences to their own rather than hire executives with functional experience that may be more relevant for the position being hired. For example, engineers might prefer a CEO with a technical background over one with a finance background. It is important to note that these tendencies toward functional homophily within a position may result in team-level functional heterogeneity. Teams will be functionally diverse if, for instance, individual preferences for homophily exist on founding teams where members come from a variety of functional backgrounds. Alternately, founders with diverse functional backgrounds (functional generalists) may value that variety and seek TMT members that themselves have diverse functional experiences. Thus, at the team-level, homophily and similarity-attraction arguments imply similarity between the functional experiences of the founding team and the functional experiences of the TMT. We therefore hypothesize:

(H4) Founding team functional experience will shape the breadth and depth of subsequent TMT functional experience.

Following a path dependent logic, all of our hypotheses suggest a tight linkage between initial team experiences/structures and subsequent TMT experiences/structures. Importantly, they also imply that there will be relatively little change in functional structure or human capital experience from the founding team to later teams. Thus, in sharp contrast to the dominant image of narrowly experienced engineers in an unstructured nascent venture who are replaced by professionals who formalize the functional structures and evolve the firm into a professional bureaucracy, our hypotheses imply that initial founding team characteristics and structural choices should be a powerful predictor of later functional experiences and structures – even controlling for compositional changes. Contrary to a life cycle perspective that would be agnostic about initial conditions, our theoretical arguments imply that initial conditions restrict subsequent firm and team options.

To understand the extent to which these initial conditions have lasting consequences, we also directly link founding experiences and structures to firm outcomes. Both the entrepreneurship literature and the TMT demography literature offers ample evidence linking human capital characteristics such as the type and amount of prior experience to firm success (Aldrich and Zimmer 1986, Roberts 1991, Cooper et al. 1994, Schefczyk and Gerpott 2000). Other work finds that a range of prior experiences as well as shared experiences benefit the firm (Eisenhardt and Schoonhoven 1990, Beckman, Burton and O'Reilly 2007). Still other work links the functional structure of the firm to firm outcomes (Ancona and Caldwell 1992, Keck 1997, Roure and Keeley 1990). More recently, Sine et al. (2006) demonstrate that formalized functional positions and functional specialization is positively associated with firm success in a sample of Internet start-ups. Together these studies convincingly document that a broad set of *both* team functional experiences and functional structures are predictive of firm outcomes. Thus, we hypothesize:

(H5) The breadth of founding team functional experiences and functional structures are positively associated with firm success.

Interestingly, the existing literature is silent as to whether structure might be more important to firm success than experience or vice versa. If the structure and experience are distinct conceptual constructs, then they should have independent effects. If, as the extant demography literature has implied, structure and experience are interchangeable representations of the same underlying construct, then having either broad functional experience represented among the founding team members or a differentiated functional structure should be sufficient to fuel the development of a firm with a broadly experienced TMT and a differentiated functional structure. However, if structure and experience are not interchangeable, then an increase on one dimension cannot compensate for a weakness on another dimension. We explore these alternatives in our analyses.

If, as we posit, the founding conditions set teams and firms on a particular path, then cross-sectional studies of top management teams over-attribute outcomes to the current team and underestimate the extent to which teams can be reformed. We pursue a research strategy that begins with the founding team, and then tracks changes in people—both through entrances and exits—and in functional composition to explore exactly how the founding team and initial structures shape the subsequent TMT and later structures.

Data and Methods

This paper begins with a sample of entrepreneurial high technology firms in California's Silicon Valley that were studied as part of the Stanford Project on Emerging Companies (SPEC) (see Baron et al. 1999 for a detailed description) but includes additional data on individual executives. The focus on firms in a single region allows us to hold constant key labor market and environmental conditions. Within the region, the SPEC study focuses on the high-technology industries of computer hardware and/or software, telecommunications, medical devices and biotechnology, semiconductors, manufacturing and research. The sampling frame explicitly over-samples young and small firms. The firms in the sample have at least 10 employees and are no more than 10 years old at the time data collection begins in 1994–96. About half of the firms are founded before 1989 and thus the median age of the firms in 1994 is five years. Our sample is not representative of all start-up firms in that we have fewer solo founders and more teams of three or more founders but this is instead more typical of high-technology start-ups (Eisenhardt and Schoonhoven 1990, Ruef et al. 2003). Our sampling frame has the disadvantage of biasing the sample toward firms that have survived several years and thus are more likely to be (or become) successful. That said, we sample firms that both do and do not receive venture funding and go public. We see no a priori reason to expect that our hypothesized effects, where TMTs are constrained and shaped by founding teams, will be different for a broader sample of start-up firms.

The key independent and dependent variables for this study are constructed from career histories. We construct a monthly database of every founder and every executive that ever worked for one of the sampled firms from founding through December 2000 or the time of IPO, acquisition, or failure (see below). The founding team was identified in an interview with the founder (the mean founding team has 2.82 members), and all subsequent TMT members are identified as those individuals ranked as vice-president or higher (e.g., senior vice- president, CTO, CIO, COO; see Wagner et al. 1984). It is important to note that founders do not always hold TMT titles (as evidenced by an average TMT smaller than the founding team at time zero). Our data sources included: interviews (conducted in 1994-95 and 1996-97), internal company documents (business plans and promotional documents), *Lexis/Nexis* news searches, *Dow Jones Interactive, Edgar Archives* (useful for firms about to go public and for top managers that have been involved with public companies), *The San Jose Mercury News* (the local paper has a regular column on promotions, movements and resignations in the Silicon Valley), and extensive web searches. Over a six-year period we completed at least four complete searches for each person and spent thousands of person-hours collecting career data on team members. We confirmed, via interview or telephone, nearly 50% of the career histories collected through 1996-97 with the person designated by the CEO or the HR person. This increased the reliability of the earliest team data, the most difficult period to gather consistent data through archival sources.

Despite extensive research, we did not obtain complete career histories on all team members. Often the chronology of careers was correct but the dates unclear. This data problem precludes us from constructing duration variables such as years of experience in a particular function, a method commonly pursued by demography scholars. Because some of our team data may be incomplete, we made a point to control for variables that may impact the completeness of the data (i.e., firm size) as well as the average amount of person data collected by firm.

Our final database contains information on 1,485 executives in 167 firms holding 1940 positions in our sampled firms. We collect a median of two past positions for each person,

including employer identity and job title, with a maximum of 19 positions for a single person, although we limited our analysis to the prior three employers. This includes data for executives (often founders) who we confirmed had no prior work experience (at least 38 founders joined one of our firms directly from school). For Hypotheses 1-4, and our analysis of team evolution we rely on our full sample (167 firms). For our analysis of outcomes, firms that were not independent (e.g., wholly owned subsidiaries) or at risk of going public (e.g., non-profit research centers), were excluded (nine firms).

Dependent Variables

In this research we examine three types of dependent variables: (1) functional organizational structure; (2) team member functional experience; (3) firm outcomes. The difference between functional structure and team functional experience mirrors the difference between functional assignment diversity and functional background diversity in the demography literature (Bunderson and Sutcliffe 2002).

Functional organizational structure is measured as whether the firm has defined executive-level positions in each of the following six functional areas: sales and marketing, general administration (including human resources), science/R&D/engineering, operations, business development/strategic planning and finance/accounting. For each firm, we calculate whether a firm has a given functional position, when it is first established, and how many executive-level positions in a given function simultaneously exist in a team for each month of the firm's life. For example, a technology-intensive firm may be founded with a chief technology officer and a vice president of engineering. The vice president of engineering job is later transformed into the position of senior vice president of engineering and a vice president of hardware and a vice president of software are hired. This firm clearly has a science/R&D/engineering function. It was established at age 0 and there are ultimately four executive level positions in this function on the TMT.

We also create a count measure ranging from 0-6 that represents the number of functional categories covered in each month to predict the breadth of functional structure. Firms with no executive positions are coded zero for structure; firms with executive positions for all six functions are coded six.

Prior functional experience of top management team members is gathered from career histories. We coded up to three prior positions for every individual into one of the six functional areas (see above). From team level career histories we calculate a variable, updated monthly, indicating how many team members have prior experience in a function to capture the depth of functional experience on a team.

We also create a count measure ranging from 0-6 that represents the range of prior functional experience brought by the team in each month and thus captures the breadth of functional experience. Six indicates that all possible functions are represented in the prior experiences of the team.

We have two firm outcome measures: time to receive venture capital (VC); and time to initial public offering (IPO), and we conduct event-history analysis to examine these outcomes. These firm outcomes represent the most significant milestones in the life of a young start-up (Shane and Stuart 2002), particularly during the time period and in the region that we study. We focus on time to first venture capital funding rather than cumulative rounds or total funds raised because future rounds are based on more direct knowledge about the firm than the first VC financing and amount is a firm and industry specific choice (Gompers and Lerner 1999). By modeling time to first VC funding we examine characteristics of the team that allowed the firm to obtain funding more quickly than other firms as well as whether they receive VC backing. By choosing IPO as our second dependent variable, we can compare the performance of entrepreneurial firms across multiple industries—a task that is quite difficult using accounting-based measures of profitability. Recent studies have examined IPO as an outcome variable indicating firm success (Stuart, Hoang, and Hybels 1999, Certo et al. 2001, Shane and Stuart

2002, Hannan et al. 2006). This measure also allows us to examine a firm outcome that occurs over a longer time horizon than initial VC funding. VC financing and IPO data were collected via public and proprietary databases (such as Venture One and Venture Economics), SEC filings and annual reports, internal company documents and a survey instrument sent to the most senior finance executive in the firm (see Hellmann and Puri 2002).

Of our 158 firms at risk of IPO or VC, 26 exit the risk set through IPO, acquisition, merger, or failure without securing VC, and another 14 do not receive VC by the end of 2000. Thus, 118 firms (71%) obtain VC funding during our sampling period. At first glance this number seems unusually high; however, the end of our time period (late 1990s) witnessed an explosion of VC investments in entrepreneurial firms in the United States. Data on the occurrence of an IPO were obtained from interviews, press releases, newspaper articles and the CRSP US Stock database. Of the 158 firms in the outcome analysis, 87 (51%) go public during our sample period. As with venture capital, the late 1990s were a time when firms went public at very high rates.

Independent and Control Variables

Our key independent variables are the founding team's functional experiences and initial functional structures. These measures are created like the dependent variables but focus on the team and functional structures at founding. That is, we code the breadth and depth of initial functional structure and founding team functional experience in each of the following six functional areas: sales and marketing, general administration (including human resources), science/R&D/engineering, operations, business development/strategic planning and finance/accounting. At founding the mean number of unique functional positions, our measure of structure, is 1.8 which typically represents a firm with a general administrative position such as President or CEO and a vice president of science or engineering. The mean number of prior functional experiences at founding is 1.5.

Firm-level controls. Firm size is the number of employees at the start of a calendar year, lagged by one year. Because of the skewed distribution of this measure, we use a logged measure in our analyses. We controlled for whether the firm had an innovation strategy because strategy has been linked to venture capital financing in prior research (Burton et al. 2002). We also controlled for whether the firm sought to differentiate itself through its sales, marketing or service as this strategy would imply a greater need for the sales and marketing function than other strategies. Initial strategy was coded from interviews with the founder and has been empirically validated (see Hellmann and Puri 2000). For example, firms with innovation strategies were those that described themselves in terms of "first-movers." In addition, we control for the date the firm shipped its first product because product shipment may affect the skills and structures required as well as firm outcomes. We also included the cumulative number of rounds of VC funding that the firm had obtained because such firms are more likely to go public (Gompers and Lerner 1999), but we obtain similar results when we use a simple dummy variable (e.g., equal to one when the firm obtains venture capital). Finally, we controlled for the amount of firm-level team data collected by including the average number of prior positions collected for each person in the firm. This allows us to control for the possibility that we have more data on individuals in successful firms.

Team-level controls. We include founding team size and then include measures for the cumulative entrances and exits to the TMT team as controls. These variables capture both change and growth in the teams (Tushman and Rosenkopf 1996; Beckman et al. 2007). A life-cycle perspective suggests that growth is the critical determinant of success and these entrances and exits would be expected to wipe out any effects of origin. Further, these controls ensure that our effects for experience and structure are net effects of turnover. The percentage of the TMT positions held by founders in included to control for the extent to which founders with executive titles are counted as part of both teams. All team variables are updated monthly.

Industry-level controls. Medical devices and the biotechnology industry (combined as medically-related) is the only significantly different industry for our outcomes; thus we include a dummy variable for this industry in all models. The number of IPOs in each industry by year controls for industry-specific variation in rates of IPO, and the number of VC deals by year controls for available financial resources.

Results

Descriptive statistics and a correlation matrix for the full sample are presented in the appendix. To examine the influence of the founding team's prior functional experience on the initial functional structure (H1), we conduct an event history analysis predicting time to the first executive-level position in a functional area using Cox proportional hazards models with the Huber/White/sandwich estimator of error and clustered by firm to correct for repeated events by firm and associated heteroskedasticity and serial correlations. We model the time to the first functional position for 5 different functions (we exclude the general administration function because almost all firms start with a President or CEO) as a function of the prior functional experience of the founding team. The key independent variable is how many members of the founding team had prior experience in the function. We report these results in Table 1. For each functional area we generated a baseline model that included all of the reported control variables and then a test model that adds the indicator for having a founding team member with the relevant prior functional experience. The number of exits indicates the number of firms that ever create an executive-level position in the function reported. During our observation period 75% of the firms create a position in the science/engineering function (125 of 167); whereas only half ever create an executive position responsible for manufacturing/operations (82 of 167) and fewer than one fourth create an executive position in business development or strategic planning (42 of 167). Firms that have a function at founding – in other words, a member of the founding team creates the position – are censored immediately. Our models therefore capture the rate of

functional position creation for those firms that do and do not have the relevant prior functional experience.

Insert Table 1 about here

Table 1 reports hazard ratios and reveals that larger firms with larger founding teams, and those that obtain venture capital financing create functional positions at a higher rate. For two of our five functional areas, science/engineering and sales/marketing, we find that having functional experience represented on the founding team significantly increases the rate at which the structural position is added to the TMT. Founding teams with sales experience are 69% more likely to add a sales position. Founding teams with science experience are 44% more likely to add a science position. The coefficients are in the predicted direction for both Finance and Strategic Planning/Business Development, although they do not achieve statistical significance. Based on these results, we find modest support for Hypothesis 1.

To examine the relationships between initial functional experience and initial functional structure on subsequent team functional experience and later functional structures (H2, H3, and H4) we perform yearly panel-poisson regression analyses predicting counts of experience and structure for each function. We specify an AR1 error structure in order to account for serial autocorrelation and again report robust standard errors. These results are presented in Table 2.

Insert Table 2 about here

Table 2 is organized into two panels with yearly team-level observations. The first panel presents our results for TMT functional structure. The second panel presents our results for TMT prior experience. The first six models in each panel represent each of the functional areas of interest and are counts of the depth or number of functional positions or experience in each area. The final model in each panel, Model 7, is a cumulative count variable that ranges from 0 to 6 to capture the breadth of functional positions or experiences.

We test our second hypothesis, that founding functional structure will be associated with subsequent functional structure, in the first panel. Across all specifications, there is a strong positive relationship between the founding structure and the subsequent structure, even

controlling for whether or not the founding team has experience in a given functional area. Model 7, Panel 1, presents the count variable predicting the number of functional positions eventually covered by the firm. Consistent with the results for each function, firms that begin with more initial structure are likely to have more functional areas covered over time. Thus, while the founding team prior experiences shape initial structures (in modest support of H1, as reported in Table 1), it is these initial structures that shape subsequent structures (in strong support of H2, as reported in Panel 1 of Table 2).

We test the impact of initial structure and founding team prior experience on later TMT prior experience in Panel 2 of Table 2 (H3 and H4). Contrary to our prediction in Hypothesis 3, we find no evidence that initial functional structures serve as placeholders and facilitate bringing in later executives with relevant functional experience. Indeed, the only statistically significant finding (for sales/marketing positions) is opposite of this prediction.

However, the pattern of results revealed in Panel 2 of Table 2 shows support for Hypothesis 4. There is a strong relationship between the functional background experience of the founding team and that of the later TMT prior experience, even controlling for changes in team composition. The relationship is consistently revealed for each of the functional areas (Models 1-6) and in the cumulative count measure (Model 7). It is important to note that it is only the parallel structure or experience that is predictive. In supplementary analyses we confirmed there were no effects for the non-corresponding functions. In other words, sales experience does not predict the establishment of a science position, it is only science experience that is significantly associated with science functional structures and subsequent science experience. We present the more parsimonious models in the paper for purposes of clarity.

Across most specifications we see that large firms, and firms where teams are growing, have more broadly experienced TMTs and more functional positions. This suggests that firms are growing and becoming more experienced over time, consistent with a life-cycle perspective. Further, firms with VC funding often gain TMT experience and functional structures. However

our findings imply that structures and experiences accrue more to those firms that are already advantaged. Overall, our findings for structural precedent (we find support for H2 but not for H3) are weaker than our findings for cognitive framing (H1) and homophily (H4). Yet we see that initial functional structures matter (H2).

Finally, to test Hypothesis 5 regarding firm outcomes, in Table 3 we conduct event history analyses on monthly observations and report Cox proportional hazards models using maximum likelihood estimation and robust estimates of standard error (Lin and Wei 1989). The founding year is represented as age = 0 with all of the initial conditions represented as covariates that are updated where appropriate. Firms remain in the sample until they achieve the outcome of interest, until they cease to exist as independent entities through failure, merger, or acquisition, or until the end of the sample period at which time they are censored.

In Table 3 we show the influence of founding team on the timing of two different outcomes: obtaining venture capital and completing an initial public offering. We present our results for these outcomes in two panels. Model 1 is the baseline model that includes controls only. Note that team compositional changes are accounted for by the inclusion of measures of both entrances to and exits from the TMT. Model 2 examines founding team variables and includes count measures for both the amount of functional structure in the firm and the amount of prior functional experience possessed by the team members. In Model 3 we also include the interaction of these terms. The main effects are centered prior to calculating the interaction (as suggested by Cronbach 1987) in order to reduce collinearity between the main effects and the interaction term. Model 4 adds the same count variables and their interaction for the TMT team in order to assess whether the effects of the founding team are eliminated when the subsequent team is considered. It is in this model that we most strongly assess path dependence against life cycles in determining the relationship between team and firm characteristics and outcomes. As in Table 1, we report hazard ratios, so numbers larger than one indicate an increase in the rate and numbers smaller than one indicate a decrease in rate of achieving the firm outcomes.

Insert Table 3 about here

In the first panel, the VC analysis, we see that firm size and the average amount of data collected for team members are both positively associated with attaining VC financing. In addition, it appears that TMT departures are positively related to obtaining financing. This may indicate that firms are replacing executives in order to build a team that is attractive to venture capitalists. In Model 2 we find that each additional functional area that is represented in the pre-founding career history increases the likelihood of attracting VC financing by 14%. The effect of functional structure is also positive but not statistically significant. Interestingly, in Model 3, the interaction of structure and experience is negative and statistically significant. The interaction effect should be interpreted as the effect of experience on the outcome when structure is 0. The influence of founding functional experience on the time to VC financing is weaker for firms that begin with no functional structure, they have a 13% lower likelihood of receiving venture capital. Not surprisingly, the effects of the founding team are attenuated when we include characteristics of the subsequent team in Model 4 (although the interaction remains significant) because we know from Table 2 that TMT experience is predicted by founding team experience and that firms obtain VC funding relatively quickly. The strong correlation between the founding and TMT composition in the early years makes Model 4 difficult to interpret; however, the pattern of results suggest that the range of prior experience held by the founding team is an important correlate of VC financing, and firms that start with both experience and structure reach this milestone faster than other firms.

In Panel 2 of Table 3 we present a similar set of analyses for time to IPO. The control variables have larger effects on the rates of IPO. Firms in medical-related industries go public at least five times more quickly than firms in other industries, and firms in industries with a high number of IPOs go public more quickly than firms in other industries. In addition, we see that the effect of turnover has two countervailing effects on rates of IPO: firms benefit from entrances and are hindered by exits. These effects, while consistent with the life-cycle

perspective, do not wipe out the founder effects, as seen in Model 2. Thus, origins do matter for outcomes. In contrast to our venture capital findings, Model 2 in Panel 2 reveals that functional structure is associated with an increased likelihood of IPO while prior experience is not. In Model 3 we see that the interaction of structure and experience is negative and statistically significant suggesting that structure cannot substitute for a lack of experience. The influence of founding functional structure on the time to IPO is weaker for firms that begin with no prior functional experience, they have a 23% lower likelihood of going public. The effects of the founding structure persist through the inclusion of contemporary structure (see Model 4). Structure may be an important signal to public investors.

In general, our findings suggest that venture capitalists are more concerned with the prior experience of executives in firms that they fund whereas the public markets evaluate functional structure. Both milestones are more easily achieved by the firms that start with both structure and experience. A key conclusion from the analyses in Table 3 is that while the impact of the TMT tends to be stronger than the founding team on these outcomes, founding team effects persist controlling for changes to the team.

Supplementary Analyses

The above findings begin to establish organizational functional structure and incumbent prior functional experience as distinct constructs and demonstrate support for our main theoretical argument that the initial conditions constrain subsequent evolution. However, our hypothesis tests do not allow us to fully understand the interrelationships between structure and experience over time. The strong support for the effects of initial experience on subsequent experience and for the effects of initial structure on subsequent structure contrasted with the weaker or non-existent support for the cross effects. This suggests that structure and experience are not substitutable. Having one does not appear to compensate for the other.

In order to qualitatively explore the interrelationships of structure, experience, and outcomes, we first descriptively characterize the team and firm evolutionary patterns revealed in

our data (see Table 4). The first column presents overall means for all firms. We then divide our sample, using mean splits on counts of founding team functional experience and counts of initial structural positions, into four subsamples representing each of the archetype cells described in Figure 1. Cell 1 most closely captures the mythical "engineers in a garage" as it describes a firm with a narrow range of functional positions and a team that brings a narrow range of functional expertise. In contrast, Cell 4 most closely captures the professional team in a functional organization. The off-diagonals, Cells 2 and 3, represent situations where the founding team has either structure or experience, but not both.

Insert Figure 1 and Table 4 about here

Several points are noteworthy. First, Figure 1 and Table 4 demonstrate that experience and structure are clearly distinct concepts, and structure and prior experience do not always go hand-in-hand. The least common starting state is represented by Cell 2 – simple structure, but broadly experienced executives – which characterizes 14 of 167 firms; however, firms are relatively dispersed across the other cells. Firms with neither structure nor experience at founding (50 of 167 firms represented in Cell 1) appear to be disadvantaged on many fronts: they start with smaller teams, do not grow as much, and are less likely to receive venture capital or go public than firms with the most broadly experienced teams with complete structures (See Table 4, Rows 2, 6, 9, and 10). As such, Table 4 also lends additional support for Hypothesis 5, that the combination of initial background experience and functional structure is important for firm success. Firms in Cell 4 seem to achieve critical milestones more quickly than firms in Cell 1. In addition, there is suggestive evidence that narrowly experienced teams are not able to accrue needed additional functional expertise as easily as unstructured teams acquire structure. That is, comparing narrowly and broadly experienced teams at each level of structure (Cells 1 and 2; Cells 3 and 4), it appears that, regardless of the starting structure, narrowly experienced founding teams have significantly less broad TMT experience at the end of the sample period (See Table 4, Row 7). In contrast, when firms have broadly experienced teams, the firms that

lack initial functional structures (Cell 2) have the same level of structure at the end of the time period as those that started with more complete functional structures (Cell 4) (See Table 4, Row 8). Thus, those teams with early functional experience can develop functional structure; but those teams with early functional structure do not develop functional experience. Finally, it is worth noting that executives exit all types of firms at the same rate (see "Cumulative Exits", Row 4 in Table 4). There are no significant differences across the four starting states, suggesting there is not a clear signal about "winning" firms.

Insert Table 5 about here

In Table 5 we present monthly panel regression models, again correcting for autocorrelation and with robust standard errors, where we attempt to discern the relationship between origin state and ultimate destination. Given the evidence that successful firms have broadly experienced TMTs and complete functional structures, we are particularly interested in understanding the path by which firms end up in this state. Recall our count measures for breadth of experience and structure that range from 0 to 6. If we consider these as interval representations along two continua, then the product of experience and structure, an interaction variable with a theoretical range of 0 to 36, is a linear representation of the combined amount of structure and experience. The larger the product of TMT structure and TMT experience, the closer the firm is to having a complete structure and all functions represented in the prior experiences of the TMT (i.e. Cell 4). We treat this product as our dependent variable in a series of regression models where the key independent variables are initial structure, initial experience and the interaction of the two.

In Table 5, we report a baseline model, Model 1, with controls only. Models 2 and 3 add founder functional experience and initial functional structure, respectively, to the model. Model 4 includes both key independent variables. Model 5 includes the interaction of these two counts in order to assess the relative importance of each. This allows us to examine the extent to which experience and structure can serve as substitutes, and whether one is more important than

the other in influencing firm and team evolution. Consistent with life-cycle predictions of professionalizations, firm size, venture capital, and entrances to the TMT are positively associated with having a broadly experienced team and complete structure, and TMT entrances is one of the largest effects in the model. Yet net of all of these effects, we see that founding team experience and initial structure are important correlates of the final destination state. Comparing Models 2 and 3, we see that founder functional experience alone improves model fit more than initial functional structure alone. Thus, it appears that initial experience is a more substantial predictor than initial structure. But Model 4 demonstrates a significant joint effect, and Model 5 reveals a slight positive interaction. This is evidence of the advantages associated with starting with both structure and experience (Cell 4) at founding; however, the strength of the experience main effect, and the weak statistical significance attached to the interaction implies that Cell 2 is a better origin state than Cell 3.

We also explored several alternative explanations of our findings. An additional explanation is that a match between initial and subsequent functional experience is created through preferences for experienced executives. Although all firms may seek to hire broadly experienced executives, it is only firms with broadly experienced founding team members that are able to attract the executive talent necessary for future success. Although this would look like homophily, it would be a result of only broadly experienced founders being successful at recruitment. While it is difficult to empirically disentangle these mechanisms, it is worth noting that all varieties of founding team experiences influence TMT experience, regardless of whether the experience is particularly relevant for the firm's strategy. This gives more credence to the homophily explanation.

A final alternative explanation is that "good" firms attract both broadly experienced founding teams and TMTs rather than founding teams predicting TMTs. This concern of unobserved heterogeneity is a common issue in empirical work, and we have done what we can to explore this possibility that people are attracted to firms and not to other people. This would

imply that rather than initial experience and structure increasing the ability of the firm to reach important milestones, experienced TMT members may be drawn to firms that look like winners. Thus, the causality could go the other way: good firms attract good people rather than good people create good firms. Although we cannot rule out this possibility, we do control for several measures of firm quality. In addition to controlling for size and strategy, we are also including whether the firm had a product as a control. Also, recall that the exit rates and proportion of founders on the TMT across our four cells in Table 3 are not significantly different. On average, 1.7 executives leave the firm and founders account for over 50% of the TMT. This suggests firm quality is difficult to observe because otherwise executives and founders would leave low quality firms at higher rates. Thus, it seems likely that prospective TMT members have an easier time assessing the quality of the existing team than the firm itself because the quality of the firm (independent of people) is hard to assess. However, there may also be an "escalation of commitment" (Staw 1976), whereby subsequent team members remain with their firm despite lower potential returns. Of course, the entrance rates are significantly different across these cells. The founding teams with both experience and structure grow more rapidly than all other firms but it appears these changes in composition are driven by founding team composition. Still, understanding how people evaluate prospective employment opportunities in entrepreneurial firms is an important area for future research.

Because we were only able to observe firms for a relatively short period of time, we are limited in our ability to assess if and when founder imprints might decay. In supplementary analyses we explore the extent to which our results are driven by having relatively young firms. We first replicated all our time-series analyses including yearly dummy variables to control for the main effects of firm age and found results consistent with those reported. We also replicated the analyses in Table 2, Model 7 predicting both TMT functional structure and TMT experience including interactions with initial experience and structure and firm age. We find statistically

significant age interactions; however, the magnitude of the effects is trivial. We thus have some confidence that our results hold for many years post-founding.

We were concerned about several additional factors that could have influenced our results. First, our effects may be skewed by the bubble market of the late 1990s. In supplementary analyses, we examine the possibility that our results arise from period effects rather than our theorized mechanisms. Our results are robust to restricting our VC financing events prior to 1993 (before the market began to heat up) and our IPO events prior to 1996 (the first year that IPO rates jump significantly).

Firms may add positions to the TMT just prior to receiving external financing or going public to signal readiness to potential investors. We control for this 'window dressing' by report team entrances and exits, and proportion founders on the TMT, lagged twelve months in all outcome analyses. Thus, changes made within a year of the event were not considered. We found substantially the same results with shorter and longer lags, thus we feel comfortable using a conservative one year window. However, since we have announcement dates and not dates when these discussions commenced, we cannot completely rule out reverse causality.

Finally, we were concerned that the time-series data may over emphasize the within firm linkage between the founding team and top management team. In addition to using robust standard errors and correcting for autocorrelation in the reported models, we also ran a series of panel regressions. In these models we used founding team experience and structure to predict TMT experience and structure (as in Table 2) at a given firm age (e.g., at year 4 and at year 8) and find similar results.

Limitations

We have taken a first step in understanding TMT evolution with rich longitudinal data. Of course, our study has several limitations. First, as noted above, we observe firms for a relatively short period of time and are thus limited in our ability to assess the durability of founder effects over long periods of time. A second weakness in our study is that our data for

both executives and firms are somewhat incomplete. We do not have the same kind of detailed performance outcomes as are available for established public companies. In addition, we may have been unable to find data on TMT members who were not successful during their career. However, ours is the first study to our knowledge to attempt such a detailed look at the career histories of executives in small firms over time, and such an examination almost by definition involves problems with missing data. Furthermore, we have controlled for the potential problem to the extent possible in all analysis. A third limitation is that our sample has a success bias since the firms survived on average five years before we contacted them. We believe, however, that in demonstrating an empirical phenomenon in an interesting empirical setting and establishing a new model of longitudinal research, the benefits of the sample far outweigh the concerns. Finally, there are questions of unobserved heterogeneity that cannot be ruled out, although we explore them to the extent possible in the above supplementary analyses.

Discussion

Our research demonstrates that founding teams strongly influence the TMT through path dependence. Consistent with homophily expectations, founding teams that begin with broadly experienced team members are more likely to attract broadly experienced executives. Consistent with ecological research, firms that begin with a range of functional structures are more likely to develop more complete functional structures. Thus path dependence, where the founding team shapes the subsequent TMT, occurs both through homophily and through imprinting.

We see cumulative advantage, as high-quality founding teams become high-quality TMTs and less well-endowed founding teams never catch up. In particular, we see that 26% of our teams begin with broad functional structures but narrowly experienced people (Table 4), and they never catch up in terms of attracting a broad range of functional experience. Firms founded by narrowly experienced founders have difficulty attracting broadly experienced executives. It does not seem to be the case that narrowly experienced founders simply fail to recognize the importance of other types of functional expertise. Instead, even when the firm has created an

executive level position for a given function – a strong statement that they need and value that expertise -- the firm is limited in its ability to fill the position with the relevant expertise if it does not already have an executive in place with at least some experience in that function. This suggests that structure is a poor substitute for experience. Thus, our results stand in sharp contrast to the dominant image of engineers in an unstructured nascent venture who are replaced by broadly experienced professionals who then formalize the structures and evolve the firm into a professional bureaucracy. Our results imply that the narrowly experienced 'garage' entrepreneur is not likely to succeed (Audia and Rider 2005).

Despite the significant findings, two of our hypotheses receive modest or no support. We find only modest support that initial functional experience predicts the initial functional structure. Given the wealth of other research documenting this transfer (Boeker 1988, Burton and Beckman 2007, Phillips 2002, 2005), it is possible that our measures of functional structure do not adequately capture the nuance of how executives enact organizational positions. In addition, path dependence may operate more strongly through homophily in the cases of race or gender (see Phillips 2005). This would be a useful area for future research as initial functional structure is an important decision that founders make.

Our lack of support for functional structures predicting experience (H3) is quite relevant for human resource management. At least in entrepreneurial firms, the structure of the position does not predict the experience people bring to the firm, once controlling for initial experience. Instead, it appears that the ASA framework (Schneider 1987) and structural inertia (Hannan and Freeman 1984) together account for the relationship between early structure and experience and later structure and experience. As noted above, establishing positions and filling them with people who are "placeholders" appears to be detrimental to the firm's ability to ultimately attract broadly experienced executives.

Little research has examined changes in teams over time, much less from founding, and a major contribution of this paper is the detailing of the relationship between the founding team

and TMT. We demonstrate that the founding team exerts an influence on the firm not only through directly influencing firm outcomes, but also by shaping the very nature of the organization. An ahistorical account of the TMT will overstate the ability of the TMT to change; whereas, in fact, future teams may be best understood by a detailed examination of the teams that have come before. This finding limits the role of agency and suggests sharp deviations from the initial path are unlikely (and probably risky, see Hannan et al. 2006). Our research thus further highlights the benefits of an evolutionary perspective on firms and teams (see Aldrich 1999)

We clearly see evidence of path dependence in our analysis, and these effects are net of changes and growth among the firms. The significant influence of team entrances in many of our analyses, however, also offers support for a life-cycle model of entrepreneurial firm development. Growth does allow firms to add both functional experience and structure and these effects are substantive in our models. However, our intent here is to demonstrate that the initial conditions do matter and not all firms easily professionalize and grow. Particularly in light of our lack of support for Hypothesis 3, initial structure does not predict attracting that functional experience to the firm, firms should be cautious in assumptions of adding experience later. In contrast, our findings suggest deliberate planning into the future is usefully done at founding.

Our results also add to the organizational demography and upper echelons research, which has not to date focused on developing dynamic models or explaining the source of demographic distributions in organizations (Lawrence 1997, Hambrick 2007). Our work begins to address this weakness in the demographic approach by exploring the path dependence process that results in continued heterogeneity or homogeneity among teams. This is not to say that organizational demography research has not moved in important directions. To the contrary, critical work examines the team processes generated by diversity (Knight et al. 1999, Pelled, Eisenhardt and Xin 1999, Reagans and Zuckerman 2001, Ensley, Pearson and Amason 2002)

and the difficulties of using indirect measures of demographic composition rather than direct measures of social networks to predict firm performance (Reagans, Zuckerman and McEvily 2004). Still, scholars rarely conduct longitudinal studies (see Boone et al. 2004 and Sørensen 2004 for recent exceptions). More importantly, scholars have devoted little attention to the sources of demographic diversity. In addition, we point to a distinction between functional experience and functional structure that has received little attention in this literature; thus, our paper fills several important gaps in the literature.

For the entrepreneurial literature, our research suggests that the relevance of founding teams is more significant than has been acknowledged. Not only do founding teams directly impact firm outcomes, but, through a process of path dependence, the founding team shapes the TMT. Entrepreneurship research often focuses on the individual entrepreneur, but understanding the teams that come together and develop over time is essential to understanding the performance of entrepreneurial firms. We advocate more studies with longitudinal data as well as a focus on functional structure in addition to team human capital. Also important, but largely unexplored in this paper, is the impact of venture capital in shaping the TMT. Our findings offer suggestive evidence that VC backed firms are better able to add structure and experience than non-VC backed firms; however, the precise mechanisms are worthy of additional research.

Much more remains to be understood about entrepreneurial teams. How does a team attract founders with varied experiences when we know diversity is atypical (Ruef et al. 2003)? Given the long-term effects of these initial choices, such an exploration would be very useful. We know founding is not truly the beginning, because entrepreneurs bring experience and networks with them (Burton et al. 2002, Shane and Stuart 2002). A qualitative assessment of how people, ideas, experiences and structures come together to create a firm would be an important contribution of future work. In addition, delving into individual executive positions in the organization would help us understand in more detail the mechanisms that result in path dependence (Burton and Beckman 2007).

Despite the remaining questions, we are encouraged by the consistency of our results, how it contributes to and reflects current theories, and by the potential rewards of examining teams over time in this rich research setting of entrepreneurial firms. We demonstrate that founding teams matter—both directly and indirectly—largely through a process of path dependence. This sociological and evolutionary approach demonstrates how initial teams have a lasting impact on the firm.

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Table 2: Panel Poisson with robust standard errors, with AR1 error structure, predicting TMT experience and structure

	Panel 1: TMT Functional Structure							Panel 2: TMT Prior Experience						
	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num. of Functions	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num.of Prior Exp.
FT Prior Science Exp.	0.07							0.43***						
	[0.06]							[0.06]						
FT Science Position	0.33***							-0.04						
	[0.06]							[0.06]						
FT Prior Sales Exp.		0.29***							0.54***					
		[0.10]							[0.09]					
FT Sales/Mkt. Position		0.15*							-0.17**					
		[0.07]							[0.08]					
FT Prior Mfg/Ops Exp			-0.05							1.49***				
			[0.23]							[0.21]				
FT Mfg/Ops Position			0.96***							0.17				
			[0.15]							[0.20]				
FT Prior Fin/Acct Exp				-0.03							0.89***			
				[0.21]							[0.24]			
FT Fin/Acct Position				0.87***							0.18			
				[0.15]							[0.21]			
FT Prior Admin/HR					0.05							0.47***		
Exp					[0.06]							[0.13]		
FT Admin/HR Position					0.22***							-0.06		
					[0.03]							[0.08]		
FT Prior Biz. Dev. Exp						-0.11							1.24***	
						[0.51]							[0.31]	
FT Biz. Dev. Position						0.71**							0.05	
						[0.28]							[0.57]	

Table 2 (continued): Panel Poisson with robust standard errors, with AR1 error structure, predicting TMT experience and structure

	Panel 1: TMT Functional Structure							Panel 2: TMT Prior Experience						
	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num. of Functions	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num.of Prior Exp.
FT Prior Experience Count							-0.00							0.14***
							[0.02]							[0.03]
FT Structure Count							0.11***							0.01
							[0.02]							[0.03]
Log Firm Size	0.07***	0.07***	0.11**	0.05*	0.03**	0.15*	0.03***	0.01	-0.01	-0.01	0.09*	0	0.03	0.01
	[0.02]	[0.03]	[0.04]	[0.03]	[0.01]	[0.09]	[0.01]	[0.02]	[0.03]	[0.05]	[0.05]	[0.02]	[0.07]	[0.01]
Medical-related	0.53***	-0.37	0.35	0.45***	0.22**	1.17***	0.14**	0.19	-0.46*	0.42	0.27	-0.03	0.56*	0.11*
Industry	[0.14]	[0.34]	[0.25]	[0.15]	[0.10]	[0.39]	[0.07]	[0.14]	[0.27]	[0.26]	[0.24]	[0.24]	[0.33]	[0.07]
Innovation Strategy	0.1	-0.24*	0.07	-0.25*	0.08	0.26	-0.03	0.1	-0.1	0.42*	0	0.19	0.22	0.06
	[0.13]	[0.13]	[0.19]	[0.14]	[0.07]	[0.41]	[0.05]	[0.11]	[0.13]	[0.24]	[0.18]	[0.17]	[0.37]	[0.06]
Marketing Strategy	0.1	-0.17	0.31	-0.03	0.20**	0.44	-0.02	0.17	0.09	0.39	0.19	0.13	0.12	0.08
	[0.16]	[0.17]	[0.20]	[0.16]	[0.09]	[0.45]	[0.05]	[0.13]	[0.15]	[0.31]	[0.22]	[0.20]	[0.48]	]0.07]
Cumulative VC	0.01	0.04**	0.03	0.06**	0.01	0.04	0.02**	0.02	0.07***	0.08**	0.08***	0.04	0.01	0.04***
Rounds	[0.02]	[0.02]	[0.02]	[0.02]	[0.01]	[0.05]	[0.01]	[0.01]	[0.02]	[0.04]	[0.03]	[0.03]	[0.05]	[0.01]
Prop. founders	0.17	-0.72***	-0.64**	-1.31***	0.31***	-0.88	-0.37***	-0.13	-0.39	-0.91***	-1.49***	-0.66***	-0.49	-0.44***
on TMT	[0.23]	[0.20]	[0.27]	[0.30]	[0.09]	[0.61]	[0.08]	[0.18]	[0.25]	[0.33]	[0.36]	[0.25]	[0.49]	[0.11]
Avg num. prior	0.02	-0.25***	-0.1	-0.01	-0.02	-0.02	-0.03	0.17***	0.20***	0.28***	0.18**	0.08	0.31**	0.14***
Pers. positions	[0.07]	[0.06]	[0.09]	[0.07]	[0.03]	[0.16]	[0.02]	[0.04]	[0.06]	[0.09]	[0.08]	[0.06]	[0.12]	[0.03]
Founding Team Size	0.08**	0.06	-0.09	0.06	0.01	0.04	0.02*	-0.03	0.08*	0.08	0.1	0.1	0.02	0.03
	[0.04]	[0.05]	[0.06]	[0.05]	[0.02]	[0.09]	[0.01]	[0.04]	[0.04]	[0.09]	[0.07]	[0.06]	[0.16]	[0.02]
Cumulative TMT	0.16***	0.19***	0.17***	0.13***	0.09***	0.20***	0.09***	0.15***	0.24***	0.21***	0.16***	0.15***	0.25***	0.13***
entrances	[0.03]	[0.03]	[0.03]	[0.03]	[0.01]	[0.06]	[0.01]	[0.02]	[0.03]	[0.03]	[0.04]	[0.03]	[0.05]	[0.02]
Cumulative TMT	-0.22***	-0.22***	-0.26***	-0.20***	-0.09***	-0.35***	-0.15***	-0.16***	-0.22***	-0.17***	-0.27***	-0.13***	-0.29***	-0.15***
Exits	[0.03]	[0.03]	[0.05]	[0.04]	[0.02]	[0.10]	[0.02]	[0.03]	[0.05]	[0.04]	[0.05]	[0.05]	[0.08]	[0.02]
Product Developed	-0.29*	-0.26	-0.35**	-0.19	0.08	-0.46	-0.10*	-0.33**	-0.11	0.17	-0.53**	0.17	0.04	-0.03
	[0.16]	[0.17]	[0.17]	[0.15]	[0.07]	[0.48]	[0.06]	[0.14]	[0.14]	[0.27]	[0.25]	[0.16]	[0.35]	[0.06]

Table 2: (continued) Panel Poisson with robust standard errors and an AR1 error structure, predicting TMT experience and structure

	Panel 1: TMT Functional Structure							Panel 2: TMT Prior Experience						
	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num. of Functions	(1) Science/ Engin.	(2) Sales/ Mktg.	(3) Mfg/ Ops.	(4) Finance/ Acct.	(5) Admin/ HR	(6) Strategy/ Biz Dev.	(7) Num.of Prior Exp.
Constant	-1.65***	-0.37	-1.42***	-1.01***	-0.50***	-3.15***	0.86***	-1.26***	-1.97***	-3.36***	-2.12***	-1.51***	-3.62***	0.00
	[0.33]	[0.26]	[0.36]	[0.33]	[0.14]	[0.70]	[0.10]	[0.23]	[0.29]	[0.51]	[0.38]	[0.31]	[0.76]	[0.15]
Observations	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
Number of firms	167	167	167	167	167	167	167	167	167	167	167	167	167	167
Wald Chi-Square	359.44	437.37	290.98	170.94	380.4	193.19	502.59	288.2	352.42	220.31	157.88	152	129.33	507.41
Difference in Chi-Square from Baseline	120.22	12.4	106.78	-18.7	89.59	74.33	23.99	123.7	75.42	103.99	5.61	-3.87	6.97	111.08

Note: Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Event History Analysis: Effect of Founding Team on Firm Outcomes·

	Panel 1: Venture Capital				Panel 2: Initial Publi		
	(1)	(2)	(3)	(4)	(1)	(2)	
Firm Size	1.65***	1.65***	1.70***	1.61***	1.29	1.16	1
	[0.16]	[0.16]	[0.17]	[0.17]	[0.22]	[0.21]	[0
Medical-related industry	1.14	1.3	1.37	1.38	5.46***	6.97***	8.6
	[0.27]	[0.31]	[0.33]	[0.36]	[1.86]	[2.52]	[2
Innovation Strategy	1.29	1.33	1.36	1.38	0.74	0.7	0
	[0.30]	[0.31]	[0.32]	[0.34]	[0.20]	[0.19]	[0
Marketing Strategy	0.8	0.82	0.78	0.79	1.11	1.03	0
	[0.23]	[0.24]	[0.23]	[0.24]	[0.39]	[0.35]	[0
VC Deals/IPOs in Industry	1	1	1	1	1.18***	1.19***	1.1
	[0.00]	[0.00]	[0.00]	[0.00]	[0.03]	[0.03]	[0
Cumulative VC					1.12**	1.14***	1.1
					[0.06]	[0.06]	[0
Avg. Person Positions	1.19**	1.19**	1.18**	1.19**	2.21***	2.30***	2.4
	[0.09]	[0.09]	[0.09]	[0.09]	[0.31]	[0.33]	[0
Founding Team (FT) Size	1.02	0.99	1	1.01	1.13	1.02	1
	[0.05]	[0.05]	[0.05]	[0.05]	[0.09]	[0.09]	[0
Product Developed	0.91	0.94	0.89	0.89	0.66	0.69	0
	[0.20]	[0.21]	[0.20]	[0.21]	[0.18]	[0.19]	[0
Prop. Founders on TMT	0.95	0.97	0.94	0.97	0.54	0.59	0
	[0.10]	[0.11]	[0.12]	[0.12]	[0.22]	[0.25]	[0
Cumulative TMT Entrances	0.86	0.81	0.83	0.66**	1.63***	1.66***	1.6
	[0.13]	[0.13]	[0.13]	[0.12]	[0.16]	[0.17]	[0
Cumulative TMT Exits	1.71*	1.63*	1.80**	2.75***	0.66***	0.65***	0.6
	[0.48]	[0.46]	[0.50]	[1.00]	[0.06]	[0.07]	[0
FT Structure Count		1.07	1.11	0.87		1.41***	1.5
		[0.13]	[0.13]	[0.18]		[0.21]	[0
FT Experience Count		1.14*	1.19*	0.95		0.94	1
		[0.11]	[0.11]	[0.13]		[0.12]	[0
FT Structure*Experience			0.87*	0.79**			0.7
			[0.07]	[0.09]			[0
TMT Structure Count				1.4			
				[0.29]			
TMT Experience Count				1.53***			
				[0.24]			
TMT Structure*Experience				1.05			
				[0.12]			
Observations	6107	6107	6107	6107	13085	13085	13
Log-pseudolikelihood	-516.91	-515.43	-513.86	-506.96	-290.02	-287.6	-28
Exits	118	118	118	118	86	86	
Firms	158	158	158	158	158	158	1

Note: Robust standard errors. * significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1.
Archetype Founding Team Types

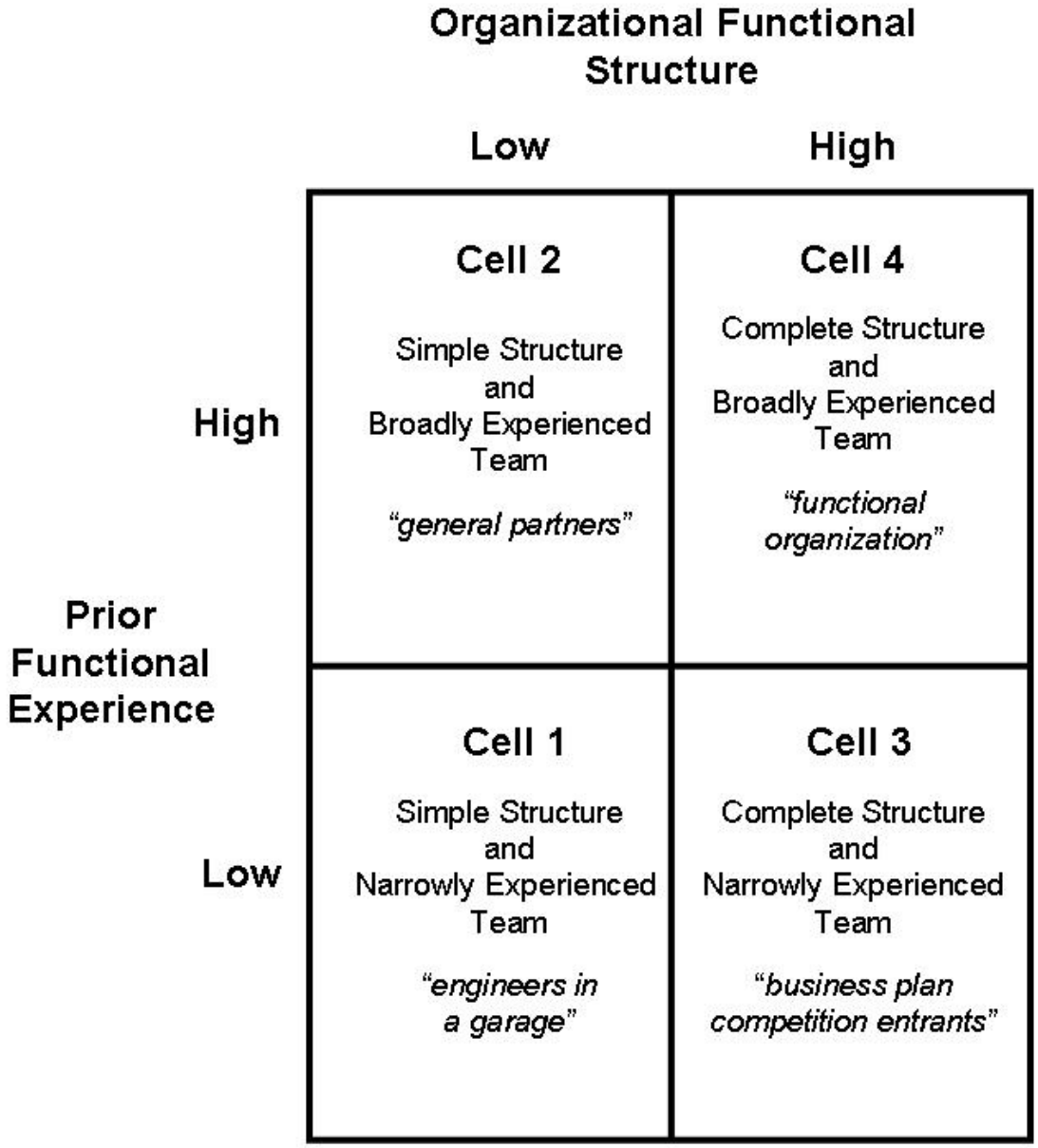

Table 4: Descriptive Statistics for Founding Teams Initial Types

Row	Variable	Full Sample	(1) Simple Structure (Narrow range of functional positions) Narrowly Experienced Team (Limited range of prior functional experiences)	(2) Simple Structure Broadly Experienced Team (Broad range of prior functional experiences)	(3) Complete Structure (Broad range of functional positions) Narrowly Experienced Team	(4) Complete Structure Broadly Experienced Team	(4) versus (1)	(4) versus (3)	(3) versus (1)	(2) versus (1)
1	Number of Firms	167	50	14	44	59				
2	Mean Founding Team Size	2.82	2.16	2.71	2.82	3.41	17.57**	3.65*	4.23*	n.s.
3	Cumulative Entrances	5.50	4.30	5.64	5.61	6.39	10.32**	n.s.	3.53†	n.s.
4	Cumulative Exits	1.68	1.48	1.93	1.73	1.76	n.s.	n.s.	n.s.	n.s.
5	Proportion of Founders on TMT	.55	.60	.50	.56	.52	n.s.	n.s.	n.s.	n.s.
6	Mean TMT Size	4.42	3.24	4.43	4.32	5.49	20.02**	5.06*	3.97*	n.s.
7	TMT Experience	2.78	2.12	3.36	2.61	3.32	14.56**	4.71*	n.s.	6.23**
8	TMT Functions	3.27	2.56	3.64	3.55	3.58	9.21**	n.s.	7.49**	4.22*
9	Proportion VC-backed	.71	.58	.71	.68	.83	8.42**	2.76†	n.s.	n.s.
10	Proportion that achieve IPO	.51	.42	.43	.52	.61	3.93*	n.s.	n.s.	n.s.
11	Firm age at end of observation period	7.00	9.00	7.50	7.00	6.00	16.58**	n.s.	5.58**	2.94†

Note: **p<.01; *p<.05; † p<.10; two-tailed tests for F-statistic. We do not include comparisons between cells 2&3 and cells 2&4 because there are not significant differences.

Table 5: Population-averaged Panel Regression Analysis Predicting TMT Structure*Experience , with robust standard errors a
structure

	(1)	(2)	(3)	(4)	(5)
Log Firm Size	0.33***	0.34***	0.33***	0.34***	0.34***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Medical-related Industry	-1.03	-0.35	0.14	0.18	-0.03
	(1.11)	(1.05)	(1.10)	(1.07)	(1.03)
Innovation Strategy	1.33	1.40	1.44	1.45	1.44
	(0.87)	(0.81)	(0.83)	(0.80)	(0.79)
Marketing Strategy	0.39	0.49	0.12	0.32	0.59
	(1.05)	(0.94)	(1.02)	(0.94)	(0.93)
Cumulative rounds of venture capital	0.35***	0.37***	0.36***	0.37***	0.38***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Prop. founders on TMT	-0.09***	-0.09**	-0.09**	-0.09***	-0.09***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Product developed	0.21	0.23	0.22	0.23	0.23
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Average number of prior person positions	0.12	0.12	0.13	0.12	0.12
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Founding Team (FT) Size	0.66**	0.39*	0.28	0.23	0.17
	(0.27)	(0.19)	(0.23)	(0.19)	(0.18)
Cumulative entrances to the TMT	0.16***	0.17***	0.16***	0.17***	0.17***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Cumulative exits from the TMT	0.08	0.07	0.08	0.07	0.06
	(0.12)	(0.12)	(0.12)	(0.13)	(0.13)
FT Prior Experience		1.90***		1.52***	1.29***
Count		(0.37)		(0.42)	(0.43)
FT Structure			1.80***	1.02**	0.86*
Count			(0.45)	(0.48)	(0.46)
FT Exp.*Structure					0.70*
					(0.38)
Constant	2.16**	2.61***	3.02***	3.00***	2.82***
	(0.85)	(0.71)	(0.81)	(0.71)	(0.69)
Observations	14269	14269	14269	14269	14269
Chi-square	131.58	183.36	160.08	192.54	192.27

Note: Robust standard errors. * significant at 10%; ** significant at 5%; *** significant at 1%, two-tailed tests

Appendix: Table A Descriptive Statistics (N=167)

Variable	Mean	Std. Dev.	Min	Max
Firm Size (logged)	4.07	0.99	0.69	7.47
Medical-related Industry	0.14	0.35	0	1
Innovation Strategy	0.48	0.50	0	1
Sales/Marketing/Service Strategy	0.23	0.42	0	1
Cumulative rounds of venture capital	3.10	2.82	0	11
Proportion of founders on TMT	0.67	0.68	0	5
Product developed	0.77	0.42	0	1
Average number of prior person positions (by firm)	2.12	0.85	0	5
Founding team size	2.82	1.61	1	10
Cumulative entrances to TMT	5.50	3.46	0	18
Cumulative exits from TMT	1.68	2.22	0	15
FT Prior Experience				
Science/Engineering	0.95	0.96	0	3
Sale/Marketing	0.31	0.55	0	3
Manufacturing/Operations	0.10	0.30	0	1
Finance/Accounting	0.11	0.31	0	1
Administration/HR	0.38	0.58	0	3
Business Development/Strategic Planning	0.07	0.25	0	1
Initial Structure				
Science/Engineering	0.58	0.80	0	3
Sale/Marketing	0.23	0.56	0	3
Manufacturing/Operations	0.11	0.35	0	2
Finance/Accounting	0.14	0.35	0	1
Administration/HR	1.53	1.11	0	6
Business Development/Strategic Planning	0.04	0.22	0	2
TMT Prior Experience				
Science/Engineering	1.34	1.24	0	5
Sale/Marketing	1.03	1.23	0	5
Manufacturing/Operations	0.40	0.64	0	2
Finance/Accounting	0.53	0.62	0	2
Administration/HR	0.80	0.99	0	5
Business Development/Strategic Planning	0.28	0.55	0	3
TMT Structure				
Science/Engineering	1.23	1.29	0	7
Sale/Marketing	1.28	1.51	0	6
Manufacturing/Operations	0.56	0.77	0	3
Finance/Accounting	0.68	0.67	0	3
Administration/HR	2.32	1.68	0	8
Business Development/Strategic Planning	0.24	0.54	0	2
FT Experience Count	1.47	1.03	0	4
TMT Experience Count	2.78	1.71	0	6
FT Structure Count	1.77	0.96	0	4
TMT Structure Count	3.38	1.63	1	6
IPOs in Industry	4.51	4.49	0	18
VC Deals in Industry	1502.22	1000.60	567	3367
Ever VC	0.71	0.46	0	1
Ever IPO	0.51	0.50	0	1

Appendix: Table B Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Firm size (log)	1.00																					
2	Medical Industry	-0.15	1.00																				
3	Innovation Strategy	-0.08	0.26	1.00																			
4	Marketing Strategy	0.08	-0.10	-0.52	1.00																		
5	Venture Capital	0.20	0.06	0.20	-0.19	1.00																	
6	Prop. Founders on TMT	-0.18	0.11	-0.07	0.07	-0.18	1.00																
7	Product Development	0.17	-0.27	0.01	0.16	0.13	-0.06	1.00															
8	Average Prior Positions	0.03	0.04	0.07	-0.06	0.07	-0.17	-0.03	1.00														
9	Founding Team Size	0.13	0.11	0.08	0.02	0.03	0.40	0.01	-0.17	1.00													
10	Cum.TMT Entrances	0.37	-0.16	0.24	-0.10	0.31	-0.37	0.22	-0.04	0.24	1.00												
11	Cum.TMT Exits	0.21	-0.18	0.12	-0.04	0.14	-0.03	0.19	-0.21	0.18	0.63	1.00											
12	FT Exp. Science/Eng.	0.06	0.08	0.20	-0.18	0.06	-0.14	-0.03	0.01	0.22	0.20	-0.04	1.00										
13	FT Exp. Sales/Mktg.	0.01	-0.17	-0.14	0.19	-0.02	-0.08	0.07	0.11	0.17	0.05	-0.02	0.15	1.00									
14	FT Exp. Mfg./Ops.	-0.02	-0.03	-0.01	0.01	-0.03	0.05	0.04	-0.08	-0.05	-0.01	0.06	0.04	-0.08	1.00								
15	FT Exp. Fin./Acct.	-0.02	-0.03	-0.02	0.00	-0.06	-0.02	-0.04	-0.02	0.23	0.10	0.11	0.08	0.23	0.01	1.00							
16	FT Exp. Admin,/HR	0.04	-0.09	-0.11	-0.01	-0.05	-0.12	-0.02	0.00	0.14	0.17	0.11	-0.16	0.09	-0.08	0.04	1.00						
17	FT Exp. Bus.Dev.	-0.05	0.10	0.04	0.09	0.14	-0.07	0.09	0.08	-0.03	0.01	-0.06	-0.04	0.07	0.15	-0.01	-0.05	1.00					
18	FT Struc. Science/Eng.	0.07	-0.04	0.17	-0.13	0.19	-0.04	0.05	0.05	0.31	0.23	0.08	0.60	0.20	0.03	0.18	0.06	-0.07	1.00				
19	FT Struc. Sales/Mktg.	0.23	-0.17	-0.08	0.03	-0.08	-0.03	0.10	-0.03	0.29	0.21	0.11	0.11	0.48	0.04	0.20	0.23	0.06	0.22	1.00			
20	FT Struc. Mfg./Ops.	0.18	-0.08	-0.17	0.19	0.01	-0.04	0.05	-0.17	0.13	0.04	-0.06	0.12	0.16	0.00	-0.06	0.23	-0.09	0.04	0.26	1.00		
21	FT Struc. Fin./Acct.	0.07	-0.12	-0.05	0.06	-0.20	-0.05	-0.02	-0.24	0.00	0.03	0.00	0.15	0.05	-0.03	0.19	-0.12	-0.11	0.11	0.07	0.16	1.00	
22	FT Struc. Admin,/HR	-0.01	-0.01	0.03	-0.02	-0.19	0.26	-0.05	-0.14	0.52	0.12	0.14	0.00	0.03	-0.05	0.22	0.19	-0.04	-0.09	0.15	0.01	-0.14	1.00
23	FT Struc. Bus.Dev.	-0.04	0.17	0.06	0.04	-0.06	0.08	-0.11	0.04	0.31	0.06	-0.04	0.07	0.06	-0.06	0.03	0.18	-0.04	0.09	0.08	0.10	-0.07	0.20
24	TMT Exp. Science/Eng.	0.20	0.18	0.25	-0.09	0.22	-0.28	0.08	0.17	0.17	0.44	-0.11	0.48	0.00	-0.04	-0.06	-0.08	-0.03	0.34	0.10	0.06	-0.08	-0.06
25	TMT Exp. Sales/Mktg.	0.19	-0.16	0.02	0.01	0.30	-0.30	0.15	0.18	0.11	0.52	0.03	0.13	0.25	-0.09	-0.07	0.07	0.09	0.15	0.12	0.12	0.07	-0.03
26	TMT Exp. Mfg./Ops.	0.15	0.04	0.11	0.02	0.23	-0.18	0.21	0.07	0.06	0.42	0.09	0.04	-0.09	0.25	-0.13	-0.09	0.10	0.08	-0.06	0.06	-0.12	-0.02
27	TMT Exp. Fin./Acct.	0.12	-0.05	0.03	0.06	0.13	-0.28	0.05	0.23	0.10	0.35	-0.10	0.24	0.19	-0.03	0.26	0.04	0.08	0.22	0.16	0.11	0.03	0.02
28	TMT Exp. Admin,/HR	0.22	0.00	0.14	-0.07	0.12	-0.27	0.01	0.07	0.12	0.47	0.14	0.08	0.07	-0.11	0.15	0.30	-0.07	0.12	0.18	-0.04	0.03	0.03
29	TMT Exp. Bus.Dev.	0.05	0.17	0.18	-0.06	0.13	-0.17	-0.04	0.11	0.00	0.24	-0.04	0.05	0.00	-0.06	-0.03	0.03	0.27	0.00	0.04	-0.13	-0.11	0.01
30	TMT Struc. Science/Eng.	0.20	0.26	0.27	-0.11	0.23	-0.16	-0.03	0.08	0.35	0.38	-0.09	0.48	0.03	-0.06	0.09	0.10	-0.01	0.46	0.11	0.10	-0.01	0.10
31	TMT Struc. Sales/Mktg.	0.34	-0.20	0.03	-0.05	0.22	-0.32	0.21	-0.02	0.19	0.59	0.08	0.15	0.20	-0.04	0.05	0.14	0.05	0.10	0.39	0.20	0.10	0.05
32	TMT Struc. Mfg./Ops.	0.29	0.01	0.05	0.07	0.16	-0.27	0.14	0.05	-0.03	0.30	-0.09	0.07	0.12	-0.04	-0.15	-0.02	0.06	-0.04	0.11	0.29	-0.01	-0.18
33	TMT Struc. Fin./Acct.	0.20	0.02	0.06	0.00	0.14	-0.33	0.11	0.13	0.05	0.44	-0.02	0.11	0.02	-0.11	0.08	0.02	0.02	0.12	0.10	0.03	0.17	0.00
34	TMT Struc. Admin./HR	0.10	0.13	0.16	0.04	0.02	0.19	0.05	-0.04	0.55	0.39	0.10	0.09	-0.05	-0.09	0.12	0.12	-0.05	0.06	0.09	-0.03	-0.09	0.40
35	TMT Struc. Bus.Dev.	0.06	0.23	0.11	0.00	0.06	-0.11	-0.08	0.04	0.20	0.20	-0.06	0.14	0.06	-0.08	0.06	0.13	0.06	0.09	0.09	-0.02	-0.06	0.16
36	FT Exp.Count	0.00	-0.10	-0.03	-0.01	0.04	-0.20	0.04	0.04	0.22	0.19	0.05	0.43	0.58	0.27	0.46	0.37	0.28	0.34	0.36	0.17	0.10	0.11
37	TMT Exp.Count	0.26	0.05	0.19	-0.06	0.35	-0.43	0.14	0.29	0.12	0.61	-0.01	0.24	0.14	-0.06	0.06	0.12	0.12	0.22	0.14	0.06	-0.05	-0.09
38	FT Structure Count	0.19	-0.22	-0.10	0.10	-0.09	-0.06	0.06	-0.12	0.33	0.22	0.08	0.44	0.38	0.04	0.21	0.15	-0.04	0.56	0.56	0.52	0.48	0.08
39	TMT Structure Count	0.30	0.05	0.13	-0.07	0.30	-0.40	0.13	0.14	0.12	0.54	-0.07	0.20	0.06	-0.12	0.03	0.04	0.09	0.12	0.17	0.08	0.06	-0.03
40	IPOs in Ind.	0.07	0.13	0.08	0.00	0.08	-0.05	0.02	0.05	0.14	0.17	0.05	-0.03	0.06	0.13	0.00	0.05	0.03	0.07	0.04	0.08	-0.05	0.09
41	VC Deals in Ind.	-0.06	-0.19	-0.14	0.07	-0.17	0.18	-0.11	-0.19	-0.07	-0.30	0.13	-0.11	0.01	0.03	0.00	0.03	-0.07	-0.04	-0.02	-0.02	-0.05	0.10
42	VC	0.19	0.15	0.22	-0.18	0.71	-0.15	0.15	0.22	0.09	0.28	0.01	0.12	0.07	0.00	-0.03	-0.06	0.12	0.17	-0.01	0.02	-0.15	-0.09
43	IPO	0.14	0.19	0.16	-0.10	0.27	-0.29	-0.04	0.31	0.12	0.39	-0.17	0.22	0.04	-0.11	-0.09	0.05	-0.03	0.27	0.06	0.04	-0.01	-0.07

Appendix: Table B Correlation Matrix (continued.)

		23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
23	FT Struc. Bus.Dev.	1.00																			
24	TMT Exp. Science/Eng.	0.13	1.00																		
25	TMT Exp. Sales/Mktg.	-0.09	0.36	1.00																	
26	TMT Exp. Mfg./Ops.	0.11	0.44	0.34	1.00																
27	TMT Exp. Fin./Acct.	-0.01	0.32	0.40	0.32	1.00															
28	TMT Exp. Admin./HR	0.29	0.27	0.16	0.05	0.14	1.00														
29	TMT Exp. Bus.Dev.	0.12	0.22	0.27	0.04	0.13	0.16	1.00													
30	TMT Struc. Sci./Eng.	0.27	0.69	0.28	0.18	0.37	0.35	0.13	1.00												
31	TMT Struc. Sales/Mktg.	0.01	0.34	0.68	0.29	0.44	0.36	0.28	0.29	1.00											
32	TMT Struc. Mfg./Ops.	-0.01	0.36	0.38	0.44	0.35	0.11	0.09	0.18	0.38	1.00										
33	TMT Struc. Fin./Acct.	0.04	0.31	0.38	0.34	0.67	0.25	0.21	0.30	0.45	0.36	1.00									
34	TMT Struc. Admin,/HR	0.12	0.33	0.22	0.24	0.19	0.24	0.17	0.30	0.24	0.12	0.19	1.00								
35	TMT Struc. Bus.Dev./St.Pl.	0.34	0.31	0.21	0.07	0.19	0.18	0.33	0.42	0.18	0.09	0.15	0.12	1.00							
36	FT Exp.Count	0.14	0.10	0.19	-0.05	0.31	0.18	0.05	0.23	0.24	0.02	0.09	0.02	0.13	1.00						
37	TMT Exp.Count	0.12	0.61	0.65	0.54	0.63	0.43	0.44	0.49	0.58	0.48	0.61	0.30	0.33	0.22	1.00					
38	FT Structure Count	0.22	0.15	0.22	0.02	0.24	0.15	-0.07	0.30	0.31	0.11	0.18	0.04	0.06	0.48	0.13	1.00				
39	TMT Structure Count	0.06	0.54	0.55	0.44	0.61	0.32	0.30	0.47	0.62	0.64	0.71	0.25	0.42	0.13	0.80	0.15	1.00			
40	IPOs in Ind.	0.11	0.12	0.13	0.17	0.07	0.15	0.17	0.21	0.18	-0.02	0.08	0.10	0.18	0.08	0.15	0.07	0.13	1.00		
41	VC Deals in Ind.	-0.10	-0.39	-0.32	-0.37	-0.44	-0.32	-0.15	-0.38	-0.38	-0.31	-0.50	-0.20	-0.17	-0.05	-0.57	-0.06	-0.54	-0.26	1.00	
42	VC	0.05	0.24	0.35	0.30	0.26	0.11	0.16	0.29	0.26	0.25	0.30	0.03	0.07	0.09	0.42	0.01	0.39	0.21	-0.35	1.00
43	IPO	0.05	0.59	0.46	0.44	0.53	0.28	0.14	0.53	0.39	0.48	0.56	0.28	0.21	0.03	0.66	0.13	0.67	0.27	-0.52	0.45

Table 1: Event History Analysis Predicting Time to First Functional Position

	(1) Science/ Engineering	(2) Sales/ Marketing	(3) Mfg/ Operations	(4) Finance/ Acct.	(5) Strategy/ Biz. Dev.
Log Firm Size	1.20**	1.29**	1.25*	1.08	1.49***
	[0.09]	[0.13]	[0.14]	[0.11]	[0.23]
Medical-related Industry	0.98	0.28***	0.9	1.21	2.05*
	[0.21]	[0.11]	[0.32]	[0.30]	[0.85]
Innovation Strategy	1.26	1.14	1.23	0.97	1.46
	[0.22]	[0.27]	[0.38]	[0.22]	[0.70]
Marketing Strategy	0.8	0.84	1.81*	0.9	1.59
	[0.23]	[0.24]	[0.62]	[0.24]	[0.76]
Cumulative rounds of venture capital	1.49***	1.29***	1.26***	1.21***	1.19*
	[0.14]	[0.10]	[0.08]	[0.08]	[0.12]
Prop. founders on TMT	0.92	0.88	0.82	0.59**	0.95
	[0.07]	[0.12]	[0.19]	[0.13]	[0.28]
Product developed	1.01	0.77	0.50**	1.18	0.55*
	[0.23]	[0.17]	[0.15]	[0.27]	[0.20]
Average number of prior person positions	1.06	0.91	0.97	0.88	1.2
	[0.08]	[0.09]	[0.09]	[0.09]	[0.16]
Founding Team (FT) Size	1.17***	1.16**	0.99	1.18*	1.1
	[0.06]	[0.09]	[0.09]	[0.10]	[0.15]
Cumulative entrances to the TMT	1.12	1.25**	1.1	1.02	1.05
	[0.13]	[0.14]	[0.11]	[0.09]	[0.17]
Cumulative exits from the TMT	0.82	0.87	0.9	0.79	0.85
	[0.23]	[0.20]	[0.19]	[0.23]	[0.17]
FT Prior Science/Engineering Exp.	1.44***				
	[0.11]				
FT Prior Sales/Marketing Exp.		1.69***			
		[0.24]			
FT Prior Mfg/Operations Exp.			0.76		
			[0.31]		
FT Prior Finance/Accounting Exp.				1.4	
				[0.38]	
FT Prior Strategy/Business Dev. Exp.					1.63
					[0.97]
Observations	6054	7343	9762	8756	12562
Exits	125	121	82	114	42
Firms	167	167	167	167	167
Log-pseudolikelihood	-558.62	-515.27	-367.73	-498.34	-187.38

Note: Robust standard errors. * significant at 10%; ** significant at 5%; *** significant at 1%