Focus or Diversify? Aligning Founding Teams with Strategy and Environment

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Abstract

We examine how innovation strategy and commercialization environment impact the performance of varying configurations of founding teams. While prior work on the characteristics of top management teams has typically found that diverse teams are more highly performing, we advance a view of founding team alignment with new venture strategy and environment. Using unique data from a novel survey of 2,067 firms founded over five decades, we show the conditions within which technology-focused versus diverse founding teams outperform. Our contribution is identifying the performance implications of founding team alignment with concrete strategies – i.e., innovation v. imitation, and competition v. cooperation. Strategy and environment significantly influence optimal founding team composition. These results cast doubt on predictions of the life-cycle perspective that ventures can professionalize over time to fit their strategy.

Keywords: entrepreneurship, performance, strategy, founding conditions, founding teams, new firms

Introduction

The upper echelon theory of organizations relates characteristics of the top management team (TMT) with both strategic choices and ultimate organizational performance (Hambrick and Mason, 1984), and this perspective has also influenced studies of founding team design in new ventures (Eisenhardt and Schoonhoven, 1990). Building on the upper echelon literature, studies of founding team composition suggest that diverse teams allow ventures to access a broader array of skills, while more uniform teams speed execution and implementation (Beckman, 2006). An important theme of the founding team context as compared to TMTs of established organizations is the long-lived effects of early choices by founders in setting organizational policies, procedures, routines and culture (Stinchcombe, 1965; Boeker, 1989; Hannan, et al., 1996; Beckman and Burton, 2007).

A missing perspective in the upper echelon literature as it applies to new ventures is the notion of aligning founding team composition with corporate strategy. The conventional view is that founding team composition choices and firm strategic choices are separate, yet individually important, considerations (Eisenhardt and Schoonhoven, 1990). Yet, team composition impacts both current skills and, as a result of founder imprinting, subsequent organizational structure and behavior. Consequently, we would expect different founding team characteristics to be important to different innovation and commercialization strategies.

Prior work shows that new venture commercialization strategy must fit the industry environment and competitive dynamics (Gans and Stern, 2003). It follows that a venture's innovation strategy and commercialization environment should differentially impact the association between team composition and performance. The research question we address in this paper is how the characteristics of high performance founding teams differ depending on startup innovation strategy and commercialization environments.

At a broad level, we believe this research question is important because the performance of entrepreneurial firms is a significant engine in driving economic growth and job creation (Roberts and Eesley, 2011; Haltiwanger, et al., 2010). At the more prescriptive level, while we know that founding team composition is disproportionately uniform relative to randomly assembled teams as a result of pre-existing network ties (Ruef, et al., 2003), we do not know *when* founders ought purposively to include more diversity in their teams.

We build on literatures in TMT demography and upper echelon theory to examine compositional aspects of the founding team: the diversity versus technical focus of the functional roles present at founding. More diverse founding teams are associated with higher performance, particularly in more complex environments (Beckman and Burton, 2008; Eisenhardt and Schoonhoven, 1990). A related dimension of team composition is the degree to which founding teams adopt a technical focus, with the associated human resource management practices (Baron, et al., 1999). For instance, a team composed solely of engineers or scientists with chief technology officer or VP of engineering roles would be highly technology focused.

We also examine two dimensions of organizational strategy. A common strategy choice examined in the literature is the distinction between an innovation versus imitator strategy (Eisenhardt and Schoonhoven, 1990; Hellmann and Puri, 2000). In addition, particularly for new ventures, the choice between a competition versus a cooperation strategy vis-à-vis industry incumbents is an important one (Gans and Stern, 2003).

While the existing literature recognizes the advantages in efficiency that focused teams provide and the advantages in information and skills that diverse teams bring, the fit between these dimensions of team composition and strategy has not been examined in detail (Beckman, 2006). To do so, we use unique data on the roles played at founding in 2,067 ventures, along

with information on their commercialization strategy and performance, to shed light on the moderating role of strategy choices. Our findings indicate that innovation and commercialization strategy should be taken into account in founding team design.

Our primary contribution is identifying the performance implications of founding team alignment with concrete strategies – i.e., innovation versus imitation, and competition versus cooperation. Simply put, strategy significantly influences optimal founding team composition. Specifically, we disentangle the competing views of optimal team composition by identifying two paths by which ventures can achieve success. One path is to build founding team functional diversity and the ability to succeed in competitive product markets with less innovation; the other method is to build a technically focused team and the ability to succeed with a cooperative commercialization strategy with more innovation. Overall, we find that founding teams that are diverse are likely to found high performing firms, but only under the boundary conditions of competitive commercialization and lower innovation. Consistent with the recent literature on founding teams (Beckman 2006; Beckman and Burton, 2008), our study illustrates the lasting imprint of founders on firm outcomes, but argues that founding team composition has to fit with firm strategy.

Theory and Hypotheses

Upper echelon theory argues that top management team (TMT) characteristics shape organizational performance (Hambrick and Mason, 1984; Pfeffer, 1983; Beckman and Burton, 2008), where a TMT member is any manager who occupies an executive-level position. While this literature has a long tradition regarding TMTs of established firms, far fewer studies have examined the link between founding teams and venture performance. In this section, we first discuss our motivation for examining founding teams and then review the literature on teams and

organizational performance. We then turn our attention to theorizing about ideal founding team composition under different innovation strategies and commercialization environments.

Founding teams are often the first TMT of an organization, and so we might initially expect the range of findings on TMTs to apply equally well to founding teams. We might more specifically expect this to hold under a pure "lifecycle" view of entrepreneurial TMT succession, in which founders are replaced with new managers with skills appropriate for the given life stage of a venture (Greiner, 1972), with little or no organizational memory and adjustment costs of organizational procedures and culture. However, a long tradition of work in the literature suggests that both environmental and founder imprinting are quite significant, and can have long-lived effects on organizational processes, structure, and outcomes, even long after a founding team departs a venture (Stinchcombe, 1965; Eisenhardt and Schoonhoven, 1990; Baron, et al., 1999; Beckman and Burton, 2008).

Existing work has examined strategic typologies and suggests that alignment between the strategic type and top management team expertise generates superior performance (Miles and Snow, 1978; Thomas, Litschert, and Ramaswamy, 1991). Among new ventures, those with management team experience that matches their competitive strategy (e.g., R&D experience and pursuing cooperative R&D activities) had higher performance (McGee, Dowling, and Megginson, 1995). Similarly, firms appear to require a match between the strategic type and the level of resource commitments in different functional areas (e.g., first mover strategies and competence in basic technology) (Maidique and Patch, 1982). Such path dependency can result from many sources, including organizational routines which can guide behavior and which may transcend particular individuals, to developed organizational reputations which can influence the type and quality of individuals attracted to work at a given firm. The high level consequence for

our purposes is that founding team composition and their decisions regarding business policy and organizational structure, including corporate strategy can be consequential even decades after founding the firm (Boeker, 1989; Miles and Snow, 1978).

Within the founding team literature, a main set of findings is that more homogenous founding teams may have advantages in faster decision-making and execution (Eisenhardt and Schoonhoven, 1990; Brown and Eisenhardt, 1997), while diverse teams tend to have a broader set of skills and draw on a wider variety of information and experiences (Beckman, 2006; Beckman and Haunschild, 2002). Teams with a diversity of knowledge and skills who at the same time are able to execute quickly and efficiently are in an even more privileged position (Eisenhardt and Schoonhoven, 1990; Beckman, 2008). This team configuration might be possible because teams could have diversity in their functional backgrounds, but have uniformity with respect to prior employer, for example. Despite these findings on founding team configuration, Ruef, et al. (2002) find that the composition of actual founding teams is much more uniform than would be expected relative to random pairings of founders.

At a broad level, these findings on founding teams largely echo the results from a large body of literature relating the demographic composition of TMTs to firm strategy and performance (for comprehensive reviews, see Finkelstein and Hambrick, 1996; Williams and O'Reilly, 1998). Many studies demonstrate a positive relationship between top management functional diversity and firm outcomes (Lant and Mezias, 1992). Diversity is thought to improve firm performance because it ensures that the TMT has a broader spectrum of experience and capabilities (Keck, 1997; Randel and Jaussi, 2003).

Unlike the founding team literature, the upper echelons literature on large, established firms has demonstrated certain contingencies shaping the optimal TMT composition. These

studies largely show that the more complex the environment or strategy, the more diversity among top executives is beneficial (Priem, 1990; Hambrick, et al., 1996; Carpenter, 2002). For instance, a firm's corporate diversification posture (Michel and Hambrick, 1992) and environmental turbulence (Haleblian and Finkelstein, 1993) skew the ideal TMT composition towards diversity. Furthermore, functionally diverse teams are more likely to survive disruptions in the environment (Keck and Tushman, 1993). Yet, within the literature on early TMTs, few papers discuss team demography contingencies or the importance of fit between the team and corporate strategy.[1]

In summary, while scholars have noted that many founding teams are more focused and homogenous than diverse, we have little knowledge of *when* such founding team composition might be misaligned with innovation strategy and commercialization environments. Even in the upper echelons literature on TMT demography, while we have some understanding of the business environment circumstances under which we might especially prefer a more diverse TMT, we do not have a commensurate understanding of the alignment of TMT composition with corporate strategy. We seek to begin gaining that understanding in this study by paying particular attention to the founding team, especially in light of the early team imprinting across a range of organizational processes. By doing so, we respond to Hambrick's (2007) call to examine in greater depth the role of the founding team. A recent meta-analysis on the relationship between TMT composition and firm financial performance suggests a moderate direct relationship, but calls for work on moderating influences shaping the relationship between team composition and organizational performance more generally (Certo, et al., 2006).

Innovation strategy. A firm's innovation strategy may impact the link between founding

[1] For example, Amason, et al. (2006) use a sample of 174 firms experiencing an IPO to argue that highly diverse TMTs have lower performance when the venture had more novel products and services.

team composition and venture performance. When considering the competitive strategies available to entrepreneurs, an important choice is between an innovator and an imitator strategy (Lieberman and Montgomery, 1988; Eisenhardt and Schoonhoven, 1990; Hellmann and Puri, 2000). While it is not clear that one strategy is better than the other (Reinganum, 1989; Maggi, 1996), the choice does have implications for the skills needed, team composition, and subsequent strategic choices. Imitators tend to compete on aspects other than technological innovation since they are not developing new-to-the-world products. Innovators introduce new products and services and compete against other firms based on advantages in technology. Since firms in theory have the choice of whether to pursue an innovator strategy, a natural question is whether this choice also has implications for the ideal founding team composition.

Beckman (2006) finds that more diverse teams (in terms of prior employer) are better at exploratory innovation, culminating in firm growth whereas more homogeneous teams excel at exploitative innovation. An innovation strategy may require the firm to be good at one dimension (producing new technology). However, an imitation strategy may require the firm to be good along many dimensions to compete (e.g., sales, marketing, distribution, low cost, etc.). We would expect that founding team diversity is more beneficial with complex strategies (Hambrick et al., 1996; Priem, 1990). Diversity in functional roles provides the team with breadth of information sources, perspectives and skill sets that are less available in more focused teams. Indeed, previous literature finds that structurally diverse founding teams are associated with greater performance (Van de Ven, et al., 1984; Beckman, 2006; Beckman and Burton, 2008).

Teece (1986) argues that firms capture more of the value from their technological innovations when they have the complementary assets (and thus the complementary skills) to commercialize. Hellmann and Puri (2000) show that engagement with venture capitalists (VCs)

is associated with a reduction in the time to bring a product to market. This is seen as due to the business mentoring, corporate governance, strategic advice and professionalization provided by the VCs, and so suggests that a wide set of skills and backgrounds, especially at the executive level of the organization, might be necessary for organizational performance. An alternative interpretation of the same data is that diverse firms with that wide set of skills and background are more likely to attract VC investments, with whatever complementary assets the VCs bring.

Ventures pursuing an imitation strategy may need more diverse skills, such as sales and marketing, business development, or finance to build partnerships and operate efficiently. Prior work shows that it is difficult for narrowly focused founding teams to subsequently build broader TMTs (Beckman and Burton, 2008). More functionally diverse founding teams can more credibly build the complementary assets necessary to compete in the market. In either case, H1a applies:

H1a ***When using a low innovation strategy, diverse founding teams are positively associated with venture performance.***

On the other hand, some literature points to reasons to believe a more focused founding team may instead improve performance with an innovation strategy. A technically focused founding team is more likely to have higher firm performance when innovating for several reasons related to value creation and value capture. A technically focused founding team is more likely to achieve the technological milestones necessary to develop the invention (Boeker, 1989). In addition, firms pursuing an innovation strategy often have a number of different potential applications and directions they could pursue. Technically focused teams are more likely to have the perspectives and capacity to evaluate multiple strategies for product development.

Moreover, innovative firms with technically focused teams can sometimes rely on partnering with incumbent firms to perform complementary commercialization functions such as

sales and marketing activities. Being at the leading edge of innovation in a given category can certainly attract would-be partners to the focal firm and lead to more opportunities. Meanwhile, founding team functional background diversity could lead to lower performance with an innovation strategy due to lower efficiency in decision-making and technical execution (March, 1991). More diverse teams may be more likely to take exploration behavior too far and take longer in implementation and execution. We therefore expect:

H1b ***When using an innovation strategy, technically focused founding teams are positively associated with venture performance.***

Commercialization environment. A different dimension of entrant strategy outside of an innovation versus imitation strategy is the new venture's choice of whether to compete or cooperate with incumbent firms in commercializing its products and services. This choice not only has implications for resource allocation and investment decisions for the new venture (Aggarwal and Hsu, 2009), but also holds broader implications for competitive dynamics across industries (Gans, et al., 2002).

The prior literature has characterized different commercialization environments – a competitive environment and a cooperative environment (Gans and Stern, 2003). The expected competitive dynamics of cooperation versus competition between new ventures and industry incumbents depend on the effectiveness of intellectual property protection and on the importance of existing complementary assets for commercialization (Gans, et al., 2002; Gans and Stern, 2003).

In the *cooperative* environment, a firm can exclude others from using its technology and the startup's innovation reinforces the value of complementary assets owned by incumbents. In a cooperative commercialization strategy ventures tend not to compete in the product market directly with incumbents; instead they compete with one another to generate innovations and

partner with industry incumbents. This type of 'cooperative' commercialization environment characterizes industries like biotechnology and medical devices or chemicals. In a *competitive* commercialization environment, ventures (e.g., Internet firms) seek to compete in the product market against incumbent firms. This strategy is more likely when startup innovations are characterized by non-excludable technology while also overturning the value of incumbents' complementary assets.

When using a competitive commercialization strategy, entrepreneurial ventures have to make new investments in complementary assets and build the capabilities to compete in the market. The more functionally diverse and balanced founding teams can more credibly build the complementary assets necessary to commercialize a good. Often in a competitive environment, the product development cycle is short, leading the team to enter the market more quickly, but typically not partnering with incumbent firms for needed assets.

In addition, as the literature in the organizational imprinting tradition has argued, early choices such as founding team composition, human resource systems, and corporate strategy can have long-lived performance effects as a result of casting a shadow on future organizational processes and structures. For example, it is difficult for initially narrowly focused founding teams to subsequently build larger functional structures and therefore a more balanced TMT (Beckman and Burton, 2008). Initial executives in functional positions appear to imprint those positions, influencing the likelihood that the subsequent holders of those positions may stay or leave (Burton and Beckman, 2007). Consequently, we predict:

H2a: ***When in a competitive commercialization environment, diverse founding teams are positively associated with venture performance.***

In contrast, when in a cooperative commercialization environment, a different type of founding team composition may be important. In cooperative commercialization, ventures

compete with one another to partner with industry incumbents. Cooperative environments are marked by tight appropriability regimes and innovations are necessary that sustain existing complementary assets owned by incumbents. In industries such as biotechnology or chemicals, startup innovators feel more comfortable (due to tight appropriability) and have higher incentives (due to incumbents' preexisting investments in critical complementary assets) in bargaining with incumbents for partnerships.

In cooperative environments, competition is between entrepreneurial firms to supply innovation to larger firms, making a focus on technology and technical talent more important. Furthermore, startup innovators have the option to license or sell their innovation to the incumbent rather than bear the full cost of developing complementary assets. In the case of the mobile telecommunications market, for example, where a strong startup cooperative environment exists, new entrants did better when pursuing next generation technological innovation (He, et al., 2006). When using a cooperative commercialization strategy, a venture that is partnering can rely on an incumbent firm's capabilities in marketing, sales, and customer support, allowing it to have a more focused set of skills on the founding team.

Technical milestones such as completion of design, proof-of-concept, prototype completion, pilot production, and the like indicate a new firm's development stage (Sahlman, 1990), and a technically focused team can more quickly progress through technical stages of development (Katila, et al., 2008). Such development can help the startup innovator more successfully gather financial resources (Hallen, 2008) and enable the firm to give up less equity when raising financial capital (Gompers, 1995). Getting the pilot completed and beginning initial sales can also help the firm gain more direct feedback from the market. If customer feedback signals that a new set of features is needed, then such a team may more easily re-engineer the

product to new specifications. Furthermore, completing more of the technical development enables a firm to be in a better negotiating position, allowing it to capture more value (Katila, et al., 2008). As a result, we expect that a technically focused founding team will be more important for firms in a coooperative commercialization environment:

H2b: ***When in a cooperative commercialization environment, technology-focused founding teams are positively associated with venture performance.***

Data and Measures

We test our hypotheses using a sample of 2,067 ventures founded between 1947 and 2003. We developed this sample from a novel survey administered in 2001 to all 105,928 alumni from the Massachusetts Institute of Technology (MIT) to generate a sample of firms where we have detailed information on founders as well as on firm performance. An alumni survey is particularly appropriate because it enables gathering data from a well-defined population of comparable individuals in multiple industries (Eesley, 2011b). The alumni survey increases the response rate and trust in the survey for the respondents. By surveying all alumni, we have surveyed all who could have founded a firm within this population. Due to these advantages, the use of alumni surveys as a data collection methodology has been growing, especially in the domain of entrepreneurship (Burt, 2001; Dobrev and Barnett, 2005; Hsu, et al., 2007; Lazear, 2004; Lerner and Malmendier, 2011).

The 2001 survey generated 43,668 responses from MIT alumni for a 41.2% response rate. Out of 7,798 alumni who had indicated that they had founded a company, 2,111 founders completed more detailed surveys in 2003, representing a response rate of 25.6%. Removing duplicates where more than one cofounder reported on the same firm brings us to a total sample of 2,067 companies. We are able to compare data on demographic and educational

characteristics of the entire population of alumni with the survey respondents. Difference in means tests of observed characteristics of the responders and non-responders of both the 2001 and 2003 surveys detect little difference between the groups.[2]

The data were matched with complementary data sources through 2006 via Compustat (for public companies), the United States Patent and Trademark Office (USPTO), and Dun and Bradstreet (private companies). Industries covered in the sample include aerospace, architecture, biomedical, chemicals, consumer products, consulting, electronics, energy, finance, law, machine tools, publishing, software, telecommunications, other services, as well as other manufacturing. A key feature of this dataset is its scope of coverage, with all living MIT alumni graduating from 1930 to 2001 surveyed.

Dependent Variables

Following many studies in the literature, we measure entrepreneurial success through observed IPO or acquisition liquidity events (Shane, 2002; Gompers et al., 2010). We define a *good exit* as either an IPO or an acquisition if that acquisition met either of two criteria: it made money for the investors (the valuation was higher than the capital raised) or if the acquired firm was older than five years and had positive (greater than zero) revenues. This measure eliminates acquisitions where the firm was acquired at a low valuation, was not generating positive cash flow and would have otherwise gone out of business. Arora and Nandkumar (2011) recently use similar screening criteria to measure favorable exits. The acquisition and IPO events were self-reports in the MIT survey. We confirmed their accuracy with the Compustat and the SDC Platinum databases. We also tested the results for robustness by using alternative performance

[2] Only a few instances do the differences between the sub-samples vary by three percentage points or more. For the 2001 survey, only the variables male, European citizen, and Middle Eastern citizen meet these criteria.

measure, *exits,* which equals 1 if the firm experienced any type of acquisition or IPO and 0 if not (as of 2003).

Independent Variables

Team characteristics. We measure diverse teams by the different functional roles on the founding team with the variable *diverse*. The survey asked respondents for the role at founding for himself or herself and for each cofounder. These roles were then coded according to whether they fell under technology roles (CTO, Chief Scientist, etc.), finance, sales and marketing, or other. The number of roles thus ranges from 1 to 4. A *diverse team* is coded as 1 if the team is above the median number of roles and 0 if below. Beckman and Burton (2008) similarly use the count of the number of functional roles on the founding team. We test for, and find, robustness to using this measure as well. However, we prefer the dichotomized measure to ensure the results are not sensitive to a small proportion of the firms with a large (or small) number of roles on the founding team. As a measure of how technology-focused the founding team is, we created the variable *technically focused team* as a dichotomous variable equal to 1 if the founding team was entirely composed of individuals who indicated that their role at founding was focused on the development of the technology (as opposed to other roles including marketing, sales, finance, management, etc.).

Innovation. We measure firms' innovation strategy by creating a composite index of the extent to which a firm innovates as the basis of its strategy. The variable *innovator* ranges from 0 to 3 depending on how innovative the firm is. A firm receives a three if it indicated that innovation was critical for its success, if it held at least one patent at the time of the survey and if the idea for the venture came from a research lab (corporate or university). The firm receives a 2 if two of these conditions hold, a 1 if only one of them holds, and a 0 if none of them holds.

Compared with prior studies that use patent counts as a measure of innovation, this measure has the advantage that it applies to both young and older firms (younger firms often have fewer resources to file for patents). The measure also has the advantage that it can be used across industries, including those industries where patenting may not be used as frequently since it is less effective (Cohen, et al., 2000). As a robustness check, we examine the results using the components of the innovator index and by using the average patent "originality" score for a firm's patents. The originality measure, a common one in the innovation literature, is a concentration index of the diversity of different patent classes that a focal patent cites, with a patent citing a more diverse set of patent classes said to be more original (Hall, et al., 2001).

Commercialization strategy environment. We follow Gans and Stern (2003) in contrasting two startup commercialization environments, which depend on the extent to which existing complementary assets are made obsolete by innovation and the appropriability regime surrounding innovation. We follow Teece (1986) in defining complementary assets as the assets or capabilities of firms that assist in the commercialization of innovations.[3] These assets can be resources that firms own, such as brand reputation, distribution channels, or customer relationships. They can also be organizational competencies, such as manufacturing capabilities, sales and service expertise, or the ability to capture customer knowledge. When intellectual property rights (IPR) are strong, innovation is more valuable due to the reduction of potential opportunism or expropriation (Anton and Yao, 1994; Arora et al., 2001; Gans et al., 2002). Startups have less fear of disclosing their IP when forming an alliance or partnership in this case (Katila, et al, 2008). Formal intellectual property rights are one of several channels innovators can use to capture the value of their innovations. IPR may be particularly important in some

[3] Rosenbloom and Christensen (1994) describe a similar idea using the term 'value network' to describe the system of producers and markets serving 'the ultimate user of the products or services to which a given innovation contributes.'

industries in reducing the risks of expropriation (since patent protection varies by industry (Cohen et al., 2000)), and thereby easing innovator contracting and knowledge disclosure.

We define an environment where a competitive commercialization strategy is more frequently used as one in which the patent channel of appropriability is relatively weak while at the same time, incumbents' extant complementary assets for commercialization are largely disrupted (startup innovators fear bargaining with industry incumbents for fear of expropriation at the same time as the cost of entry is relatively low). A cooperative commercialization strategy environment is defined in the opposite way, where patent protection is effective and the importance of incumbents' existing complementary assets is sustained (and so startup innovators feel more comfortable bargaining with incumbents, who have a comparative advantage in assembled complementary assets for commercialization).

We measure the importance of complementary assets and the effectiveness of patent protection in a firm's industry by matching the industry sectors with the Carnegie Mellon industry R&D survey (Cohen, et al., 2000). In doing so, we create the measure of complementary asset importance by averaging the importance of complementary manufacturing and sales or services (then we took the natural log to account for the skewed distribution). Sectors scoring high on this measure included electronics, telecommunication, machinery, chemicals and materials, drugs, biotech, medical devices and consumer products (scoring low were software, finance, and services). Similarly, we created an average of the importance of patents for protecting products and processes and took the natural log (to adjust for the skewed distribution) to create the measure of patent strength. Sectors high in patent strength included energy, electric utilities, aerospace, chemicals, materials, machinery, and drugs, biotech and medical devices (scoring low were finance, software, and services). We use the median values of these measures

as the cutoff point. We use the median of the ratings on the importance of complementary assets in the sector, *complementary assets*, and the effectiveness of patent protection, *IPR strength*, to split the sample into firms that are in an environment where complementary assets are important and patent protection is strong (499 firms) and an environment where complementary assets are less important and patent protection is weak (885 firms).

Control Variables. Another aspect of the environment that is likely to shape the characteristics of the founding team is the economic cycle, in particular whether the firm was founded in a recession. General economic conditions at the time of founding were classified into expansion or contraction (recession) using the widely used National Bureau of Economic Research (NBER) Business Cycle Dating Committee's classifications (Stock and Watson, 2010). The variable *recession year* is equal to 1 if the firm was founded during a recession. We include this variable to proxy founding conditions, as some prior literature suggests that founding in growth markets or high demand increases performance (Carroll and Delacroix, 1982; Romanelli, 1989; Eisenhardt and Schoonhoven, 1990), while other studies suggest that more successful companies are more often founded in conditions of scarcity (Stangler, 2009).

Prior literature shows that firm performance is partly related to industry factors, so we use a set of industry dummies as controls for the industry segment (such as biotech, software, and electronics). Survey respondents chose the industry category that best fit their firm.

Since prior work finds that entrepreneurial performance is related to the founder's education level (Roberts, 1991), we control for the education level with *master's degree* and *doctorate degree* controls. While having a founder with a doctorate degree might be an indication of a technology-focused team, not all doctorates in the sample are in technical fields, so we prefer the founding role measure and leave educational degrees as a control. Since more

general experience may increase entrepreneurial performance, we control for age (Evans and Leighton, 1989). The variable *founder age* is the entrepreneur's age when the firm was founded. A number of studies show that the founder's prior industry experience increases firm performance (Klepper and Simons, 2000; Klepper, 2002; Ingram and Baum, 1997). Older, more experienced TMT members are found to aid firm performance. CEOs in the microcomputer industry with an older experienced counselor make faster decisions, improving performance (Eisenhardt, 1989). We also measure experience in founding a firm with the variable *serial entrepreneur* as a binary variable indicating whether the founder has prior entrepreneurial experience. Prior work has shown experienced entrepreneurial founders outperform their less experienced counterparts (Delmar and Shane, 2006).

Finally, we control for other team and firm-level effects that may influence firm performance. Since larger founding teams have been shown to outperform, we control for *founding team size* (in addition to the respondent) since having multiple members of a team leads to higher performance (Eisenhardt and Schoonhoven, 1990; Roberts, 1991). Older firms tend to be larger and have higher revenues, so we control for the age of the startup, as measured by *firm age*. Since raising funding from external investors has been shown to be associated with higher firm performance and also may be easier for an experienced entrepreneur, we seek to control for these effects (Hellmann and Puri, 2002, Hsu, 2007). *External funding* is equal to 1 if the individual raised funds from venture capital firms or angel investors.

Analysis and Results

Insert Tables 1 - 2 about here

Table 1 provides descriptive statistics and Table 2 is a pair wise correlation table. Table 3 reports the results of the logit regressions predicting *good exits*. Table 3, model 3-1 shows results for just the controls, while models 3-2 and 3-3 test the effects of the interaction between team composition and the innovator commercialization strategy. Hypothesis 1a was that when using a low innovation strategy, diverse founding teams are positively associated with venture performance. Model 3-2 provides evidence supporting hypothesis 1a, as we find a negative (below 1) coefficient on the interaction term between *innovator* and *diverse team*. We find a positive coefficient in model 3-3 when interacting *innovator* and *technically focused team*, supporting hypothesis 1b that when using an innovation strategy, technically focused founding teams are positively associated with venture performance.

Hypothesis 2a predicted when in a competitive commercialization environment, diverse founding teams would be positively associated with venture performance. In Table 4, models 4-1 and 4-2 report results for only the controls in the competitive and cooperative strategy settings, respectively. We find support for the hypothesis in the significant, positive coefficient on *diverse team* in the competitive strategy environment (model 4-3). The coefficient is significantly ($p<0.05$) larger than in the cooperative strategy setting. Hypothesis 2b predicted that technically focused teams would be positively associated with venture performance when in a cooperative commercialization environment. This hypothesis was supported, as the coefficient on *technically focused team* is positive and significantly larger than the same coefficient in the cooperative environment setting (model 4-6).

Insert Tables 3 and 4 about here

Additional Analysis, Robustness and Limitations

We ran additional analyses with variants of the dependent variable, independent variables, industry environment, and other periods of time to investigate result robustness. The results are robust to using *exit* as a measure indicating whether the firm experienced any acquisition or IPO event instead of *good exit*. We also tested for and found that the results are not sensitive to alternative measures of our key independent variables. We narrowed the sample to those firms with patents so that we can test the impact of patent-based measures of the degree of innovation (*patent originality)* and found the results robust. The results (available from the authors) are also not sensitive to using patents and the percentage of revenues spent on R&D as alternative innovation measures. We also find the results robust to using a count of the number of structural roles on the founding team (*functional diversity)* as an alternative to *diverse team*.

Furthermore, defining the industry environments in alternative ways does not alter the results. While we decided to use the median values of *complementary assets* and *patent protection,* the results were robust to changing the exact division points across these environments and to simply defining them based on industries. Finally, we found that our results hold across a broad range of different time periods (either restricting the data to more recently founded firms or to just firms founded before a certain year to test whether right side censoring was driving our results).

Our results suggest that holding all else equal, for a diverse team taking a misaligned innovator strategy results in a 45 percent lower likelihood of a good exit and taking an imitator strategy results in a 120 percent higher likelihood of a good exit. For a technically focused team, an imitation strategy results in a five percent lower likelihood of a good exit compared with an innovator strategy resulting in a 43 percent higher likelihood of a good exit. For a diverse team in a competitive commercialization environment, there is a 78.1 percent higher likelihood and in a

misaligned, cooperative environment, a 28.2 percent lower likelihood of a good exit. Alternatively, for a technically focused team, in the aligned, cooperative commercialization environment, there is a 53.7 percent higher likelihood of a good exit, compared with a 16.5 percent lower likelihood in the misaligned competitive environment.

Discussion and Conclusion

Prior literature shows that the demographic composition of TMTs influences firm strategy and performance (Finkelstein and Hambrick, 1996; Williams and O'Reilly, 1998). Many studies demonstrate a positive relationship between top management team functional diversity and firm outcomes (Eisenhardt and Schoonhoven, 1990; Lant et al., 1992). Few studies examine when diversity is harmful or explain the processes and mechanisms underlying the relationship between diversity and performance (Jehn, et al., 1999; Smith, et al., 1994). We respond to Hambrick's (2007) call to examine the role of the founding team as well as calls for work on moderating influences (Certo et al., 2006). This paper contributes to the literature on top management teams by showing that the characteristics of highly performing founding teams may be contingent on their alignment with commercialization strategy. First we explore innovation versus imitation strategic choices. Second we examine two major competitive environments, one where ventures typically compete with large, incumbent firms and a second where they compete primarily with other ventures.

Anecdotes and popular accounts often suggest that focused engineers and scientists are the creators of technology firms (Audia and Rider, 2005). Life cycle models have argued that ventures add the appropriate skills as they are needed. Those models assert that a venture becomes "professionalized" over time and so a fit between the founding team and the eventual commercialization strategy is unnecessary as the right skills can be added at a later stage

(Hellmann and Puri, 2000). Eventually as the firm ages, diversity is thought to improve firm performance because it adds new information and perspectives and ensures that the TMT has the entire spectrum of capabilities necessary to manage (Keck, 1997; Randel and Jaussi, 2003).

Yet, imprinting models argue that the founding team composition has lasting influences on firm strategy and success. For decades contingency theorists have argued that the alignment or "fit" of an organization with its environment or strategy is important (Burns and Stalker, 1961). Even once industry and strategic variables are taken into account, organizational alignment (measured by structural integration and structural differentiation) contributes to firm financial performance (Powell, 1992). This idea of alignment has been integrated into the literature on top management teams, but mainly to the extent that the team composition should fit the complexity of surrounding the organization. The main argument for this is from the sociocognitive perspective, which says that in complex environments more information and perspectives are needed in decision-making.

The interactions between commercialization strategy and top management team composition has remained underexplored relative to its importance. This paper addressed this gap by contributing insight into the ways that the performance of ventures is shaped by the alignment between the strategy and the diversity versus technical focus of the founding team. We use two commercialization strategies and environments to show that when founding team composition is considered alongside strategy and is aligned, firm performance tends to improve. Skills and the type of competition appear to drive the rationale for alignment.

The results show that for ventures pursuing an innovator strategy, diverse founding teams have lower performance and technically focused teams have higher performance. Prior literature had suggested that due to multiple sociocognitive perspectives, diverse teams would do better

when using an innovator strategy. However, it appears that while diversity in prior affiliations promotes exploration (Beckman, 2006), the benefits of technically focused founding teams outweigh the benefits of diversity when an innovator strategy is pursued.

When using a competitive commercialization strategy, diverse founding teams are aligned and technically focused teams, which are misaligned, do not perform as well. In contrast to the competitive commercialization environment, in the cooperative environment, technically-focused founding teams do better and diverse teams are not aligned.

Implications for Entrepreneurship. The findings contribute to work on venture performance that has mainly examined factors such as career history of founders and top management team, strategy, and market growth (Eisenhardt and Schoonhoven, 1990). While a good deal of work has looked at the composition and experience of top management teams (Hambrick, et al., 1996, Ruef, et al., 2003), less work has looked at how different strategic choices might shape the optimal founding team.

There appear to be two paths by which entrepreneurs can build a founding team that increases their likelihood of building a successful venture. However, the choices regarding characteristics of the founding team depend on the commercialization strategy. If the firm is planning to use a cooperative commercialization strategy or is pursuing an innovation strategy, then building a technically focused founding team is better. However, if the firm is planning to pursue a competitive commercialization strategy or an imitator strategy, then a diverse founding team is superior. In the competitive strategy, competition tends to be between incumbents and ventures in the product market. Through this path, the founding team with broader expertise and competencies for competing in the market makes it easier to build the complementary assets, functions and capabilities necessary relative to more focused teams.

Prior literature has generally argued that a more well-balanced and functionally diverse founding team is optimal, particularly when complexity is high (Beckman, et al., 2007). However, firms tend to be founded based more on considerations of homogeneity (Ruef, et al., 2003). Yet, we provide theory and evidence that in some cases, a more (technically) focused founding team does better. In an environment where patent protection is strong and complementary assets are important, competition tends to be more between ventures to pursue a cooperative strategy and partner with incumbent firms. In this type of environment, breadth and diverse skills matter less and a focus on the technology allows the firm to use several defense mechanisms against larger, established firms to reduce the risk of expropriation (Katila, et al., 2008). They can more quickly overcome technical hurdles and milestones as well as more effectively embed the innovation in a product. The technical focus or experience of the founding team enables it to build a reputation based on technological achievements making future technical and managerial talent easier to acquire. More technical development reduces competition from other ventures, improving the firm's negotiation position in attempting collaborations with established firms, and is more likely with a technically focused team. We find that this path is more effective in utilizing a cooperative or innovator commercialization strategy, such that ventures compete more on the basis of technological innovation.

Implications for Commercialization Strategy. Our results also have implications for those interested in the impact of different commercialization strategies and environments. The prior literature on the commercialization of innovation by new ventures has shown that the extent to which firms profit from innovation is driven by specific aspects of the industry environment that shape the competitive dynamics and firm strategy (Gans, et al., 2002; Gans, et al., 2008). Controlling complementary assets and intellectual property protection guide the strategic choices

of competition versus cooperation. Prior strategy literature on the conditions when larger, established firms are better able to capture the value from innovation focuses on correct strategic partnering decisions (Teece, 2006). Previous work has shown that high performing venture strategies vary with the broader institutional environment (Eesley, 2011a; Li and Atuahene-Gima, 2001) and industry environment (Eesley and Roberts, 2011). Yet, how top management teams and environmental differences impact firm strategies had been largely unexplored (Peng, 2003).

These previous studies relate to the competitive relationship between large and small firms, and focus less on the drivers of competitiveness among ventures. This study brings insights to this literature by extending the theory of commercialization strategy into an entrepreneurial context where firms begin with little or no resources, making it difficult to own complementary assets, and where the firm does not have an established reputation, making cooperating difficult. However, firms with certain founding team characteristics and which are starting in certain types of commercialization environments can overcome these challenges more easily than other firms.

This study helps address the interaction between the top management team and strategy. Broadly speaking, a venture has two strategic options to achieve alignment: they must either focus on the technology or they must balance and build the business side and/or have the experience to compete in the market. The best choice between these options depends not only on the industry but also on characteristics of the founding team. The results hold implications for ventures in how to prioritize development of founding team composition when using different commercialization strategies. Our findings also point to ways for incumbents to identify ventures that are particularly threatening (or promising to partner with) due to their likelihood of success.

One potential difficulty for entrepreneurs in implementing these findings arises from the changes in their strategic plans (even in so far as product and market choice) that frequently affect startup firms. Future research should explore research designs that can better address the endogeneous selection of cofounders and commercialization strategy. While our data contains many failed ventures, we do not have the benefit of the ideal experiment that would randomly allocate different types of teams to different strategies. Using observational data and lacking instrumental variables limits the ability of our current study to discern precise causal mechanisms. For instance, future work might examine to what extent founders knowingly choose cofounders before or after choosing a commercialization strategy.[4]

Overall, the results suggest that high performing top management teams exhibit strong contingencies with the commercialization strategy. This work may also aid existing efforts to better understand the fit between innovations and the firm structures best suited to commercializing those ideas. Our paper is among the first to suggest that entrepreneurs may need to take into account likely future strategic commercialization decisions when forming their founding team.

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[4] Additional future work might examine team composition in the case of an industry with low IP protection and high importance of complementary assets (e.g., enterprise software) and the reverse where we might expect moderately diverse teams to do better.

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Table 1: Variables and Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Goodexit	1809	0.226	0.419	0	1
L(rev)	1120	2.235	1.921	0	7.847
Diverse	1809	0.206	0.404	0	1
Technically focused	1809	0.165	0.371	0	1
Innovator	1552	0.218	0.413	0	1
Recession	1809	0.746	0.815	0	2
Master's degree	1520	0.263	0.440	0	1
Doctorate degree	1809	0.427	0.495	0	1
Experienced entrep.	1809	0.163	0.369	0	1
Age founded	1501	38.264	10.375	18	83
Firm age	1127	13.268	9.852	1	71
Ext funding	1771	0.427	0.495	0	1
Founding team size	1764	1.218	1.346	0	4
L(emp)	1096	3.844	2.168	0.095	14.509
L(compl)	1267	3.756	0.086	3.658	4.148
L(patent)	1267	2.576	0.824	1.800	3.960

Table 2: Variable Correlations

		1	2	3	4	5	6	7		
1	*Goodexit*	1								
2	*L(rev)*	0.532	1							
3	*Diverse*	0.226	0.129	1						
4	*Technically focused*	0.213	0.004	-0.105	1					
5	*Recession*	0.365	0.294	0.324	0.286	1				
6	*Innovator*	0.109	0.116	0.024	-0.013	0.028	1			
7	*Master's degree*	0.156	0.029	0.144	0.130	0.254	-0.023	1		
8	*Doctorate degree*	0.095	0.007	0.065	0.061	0.146	-0.027	0.049		
9	*Experienced entrep.*	0.145	0.082	0.022	0.040	0.088	-0.001	-0.088		
10	*Age founded*	-0.097	-0.010	-0.060	-0.040	-0.083	0.008	-0.049		
11	*Firm age*	0.111	0.225	0.011	-0.041	0.049	0.244	0.004		
12	*Ext funding*	0.283	0.396	0.201	0.162	0.503	-0.097	0.042		
13	*Founding team size*	0.274	0.264	0.535	0.200	0.398	0.017	0.026		
14	*L(emp)*	0.426	0.785	0.165	-0.028	0.304	0.095	0.061		
15	*L(compl)*	0.032	-0.009	0.036	-0.036	0.137	0.043	0.022		
16	*L(patent)*	0.153	0.098	0.035	0.053	0.339	0.034	0.036		
		8	9	10	11	12	13	14	15	16
8	*Doctorate degree*	1								
9	*Experienced entrep.*	0.022	1							
10	*Age founded*	0.021	0.259	1						
11	*Firm age*	-0.063	-0.124	-0.069	1					
12	*Ext funding*	-0.009	0.185	-0.102	-0.183	1				
13	*Founding team size*	0.010	0.135	-0.128	-0.053	0.374	1			
14	*L(emp)*	-0.021	0.047	-0.137	0.200	0.406	0.294	1		
15	*L(compl)*	-0.070	0.009	0.028	0.073	0.029	0.002	0.060	1	
16	*L(patent)*	-0.047	-0.009	0.032	0.093	0.186	0.045	0.127	0.452	1

Table 3: Logits of *good exit* for varied founding team structures under an innovator strategy

VARIABLES	All (3-1)	All (3-2)	All (3-3)
Diverse team		2.199***	
		(0.496)	
Technically focused team			0.954
			(0.168)
Innovator x diverse		0.550***	
		(0.076)	
Innovator x tech focused			1.430**
			(0.205)
Innovator	1.683***	1.353***	1.071
	(0.263)	(0.114)	(0.081)
Recession	1.125	1.727***	1.677***
	(0.082)	(0.270)	(0.261)
Master's degree	0.818	0.859	0.803*
	(0.105)	(0.111)	(0.104)
Doctorate degree	1.025	1.034	1.034
	(0.175)	(0.184)	(0.178)
Experienced entrep	1.681***	1.625***	1.729***
	(0.229)	(0.229)	(0.236)
Age founded	0.996	0.995	0.994
	(0.006)	(0.006)	(0.006)
Firm age	1.035***	1.035***	1.035***
	(0.008)	(0.008)	(0.008)
Ext. funding	2.104***	2.187***	2.113***
	(0.325)	(0.345)	(0.330)
Founding team size	1.234***	1.216***	1.241***
	(0.064)	(0.071)	(0.065)
Constant	0.168***	0.139***	0.176***
	(0.053)	(0.045)	(0.056)
Industry F.E.	Y	Y	Y
Observations	1193	1193	1193
Pseudo-R2	0.084	0.124	0.126

Coefficients are odds ratios (numbers below one represent a decreased odds. Robust, two-tailed standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Logits of *good exit* for varied founding team structures under different commercialization environments

VARIABLES	Competitive (4-1)	Cooperative (4-2)	Competitive (4-3)	Cooperative (4-4)	Competitive (4-5)	Cooperative (4-6)
Diverse			1.781**	0.718		
			(0.478)	(0.177)		
Technically focused					0.835	1.537**
					(0.232)	(0.330)
Innovator	1.337	1.171	1.537***	0.922	1.614***	0.838
	(0.347)	(0.254)	(0.192)	(0.105)	(0.202)	(0.107)
Recession	1.176	1.386***	0.594*	2.338***	0.556**	2.001***
	(0.157)	(0.142)	(0.177)	(0.605)	(0.164)	(0.496)
Master's degree	0.662*	1.072	0.907	0.713*	0.919	0.764
	(0.152)	(0.204)	(0.208)	(0.139)	(0.209)	(0.154)
Doctorate degree	0.494**	1.052	0.575	2.105***	0.566	2.140***
	(0.143)	(0.243)	(0.201)	(0.570)	(0.197)	(0.586)
Experienced entrep	2.241***	1.117	1.886***	1.427*	1.810**	1.256
	(0.482)	(0.206)	(0.461)	(0.293)	(0.443)	(0.276)
Age founded	0.987	0.996	1.000	1.002	1.002	0.994
	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)	(0.011)
Firm age	1.008	1.088***	1.003	1.064***	1.004	1.000
	(0.012)	(0.010)	(0.013)	(0.013)	(0.013)	(0.011)
Ext. funding	1.188**	1.429***	1.130	3.160***	1.156	2.530***
	(0.100)	(0.102)	(0.283)	(0.805)	(0.293)	(0.677)
Founding team size	1.843**	2.661***	1.079	1.371***	1.176*	1.258***
	(0.482)	(0.551)	(0.116)	(0.122)	(0.107)	(0.108)
Constant	0.360**	0.045***	0.106***	0.099***	0.104***	0.174***
	(0.172)	(0.020)	(0.051)	(0.050)	(0.051)	(0.087)
Observations	499	885	499	581	499	581
Pseudo-R2	0.072	0.189	0.070	0.128	0.062	0.074

Coefficients are odds ratios (numbers below one represent a decreased odds. Robust, two-tailed standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1