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RESEARCH ARTICLE

When does advice impact startup performance?

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Why do some entrepreneurs thrive while others fail? We explore whether the advice entrepreneurs receive about managing their employees influences their startup's performance. We conducted a randomized field experiment in India with 100 high-growth technology firms whose founders received in-person advice from other entrepreneurs who varied in their managerial style. We find that entrepreneurs who received advice from peers with a formal approach to managing people—instituting regular meetings, setting goals consistently, and providing frequent feedback to employees—grew 28% larger and were 10 percentage points less likely to fail than those who got advice from peers with an informal approach to managing people, 2 years after our intervention. Entrepreneurs with MBAs or accelerator experience did not respond to this intervention, suggesting that formal training can limit the spread of peer advice.

KEYWORDS
advice, business training, entrepreneurship, field experiment, management

1 | INTRODUCTION

The survival and growth of entrepreneurial firms varies widely (Audretsch & Mahmood, 1995; Birley & Westhead, 1990). Strategy researchers have long attributed these differences to resource and capability gaps (Baum, Calabrese, & Silverman, 2000; Helfat & Lieberman, 2002). Of particular interest is the gap in management quality, whereby entrepreneurs often lack the management capabilities needed to grow their companies (Armanios, Eesley, Li, & Eisenhardt, 2017; Azoulay & Shane, 2001; Bloom & Van Reenen, 2010; Kulchina, 2017). As a result, many otherwise promising startups fail.

How can entrepreneurs improve their management skills? Recent work on entrepreneurial training programs and business-plan competitions (e.g., Bryan, Tilcsik, & Zhu, 2017; Camuffo,

Gambardella, & Spina, 2018; Fairlie, Karlan, & Zinman, 2015; Howell, 2017; Lyons & Zhang, 2018) provide some evidence that entrepreneurs can acquire these skills. But another prevalent source of knowledge about management has been far less explored. Entrepreneurs often seek out advice from their peers to gain insights into how to manage their enterprises (Kuhn & Galloway, 2015; Vissa & Chacar, 2009). Interestingly, we have few insights about whether this advice is useful and the conditions under which it improves startup performance (cf. Lerner & Malmendier, 2013). Although numerous experimental studies on formal management training exist, the value of peer-to-peer advice remains an open question.

We use a field experiment to study how advice from peers helps entrepreneurs manage their human capital, a key determinant of firm growth and survival. To capture variation in the type of management advice an entrepreneur receives, we leverage the idea that advice reflects the adviser's own prior experience and knowledge (Hasan & Bagde, 2013; Lerner & Malmendier, 2013; Lindquist, Sol, & Van Praag, 2015; Sørensen, 2007). Specifically, we use a behavioral measure of how "formal" or "informal" the adviser is in the management of his or her own startup. Formal management involves consistently setting goals, providing feedback, and coordinating employees across various tasks (Bloom, Eifert, Mahajan, McKenzie, & Roberts, 2013). Informal managers take a more laissez-faire approach to management where they rarely direct, meet, or coordinate with their employees. A nascent literature has found that more formal management practices within firms, whereby leaders are actively setting incentives and providing feedback, is causally linked to improved firm performance (e.g., Bloom et al., 2013). We argue that an entrepreneur who receives advice from a peer with a formal management style will experience increased startup growth and survival. The plausible counterfactual, in our view, is that this advice makes no difference or that no differential impact exists based on who provides it.

Our field experiment randomized 100 growth-stage startup founders into pairs during a 3-day executive retreat in Mysore, India. The purpose of the retreat was for participants to learn from other founders in the Indian entrepreneurial ecosystem. Our research design builds on the standard "peer effects" specification to estimate the causal effect of advice spillovers within randomized founder pairs (Hasan & Bagde, 2015; Sacerdote, 2014). Our research design extends this approach and also addresses two of the major drawbacks of prior peer effects studies as we will describe below (Angrist, 2014). During the event, the paired founders advised each other on management and growth strategy. The peer-advising sessions lasted for approximately 2 days, and founders left the camp with a checklist of changes to make over the next year. We followed up with these startups almost 1 year after the retreat and then tracked outcomes 2 years after the retreat to understand how peer advice affected their survival and growth. Our sample consists of a substantial proportion of growth-stage software startups in India, allowing us to develop some general insights.

Founders who were randomized to a peer who was one standard deviation higher on the *Peer Management Index* (moving from engaging in specific management activities monthly to weekly) had 28% more employees and were 10 percentage points more likely to have survived 2 years later. For the median firm, this effect size is equivalent to retaining an additional 2.5 employees and increasing the chances of survival from 75 to 85%. Additional evidence from our 1-year follow-up survey shows that advice from formal-management peers caused founders to make more changes to how they managed human capital. By contrast, founders paired with informal managers were more likely to fail, and those who survived grew more slowly. The size of the advice effect on survival is about one-third to one-half as large as the estimated effect of accelerator participation (e.g., Hallen, Bingham, & Cohen, 2014).

What accounts for the large effect of advice on startup success in our study? The stated goal of the retreat was to help founders grow their startups. Thus, those founders who attended the retreat were arguably the kind of entrepreneur who is most receptive to advice and most likely to translate advice into action. This argument is especially salient in the Indian ecosystem where founders often lack formal management training, even as they lead high-technology startups. In the absence of formal training, entrepreneurs are especially likely to turn to peer advice, both good and bad, to make decisions, structure firm policies, and learn how to manage (Vissa & Chacar, 2009). This logic implies startups led by founders with business training (e.g., via an incubator/accelerator or an MBA program) may be less in need and so less affected by peer advice. Indeed, we find that startups run by MBAs or incubator/accelerator participants show little positive or negative responsiveness to peer advice.

Although we find evidence that suggests founders shared management advice, we are also able to rule out a number of alternative explanations for our results. Controlling for the peer's experience and training, the peer's startup stage and size, and for the peer's personal characteristics, such as age and network size, do not change our results. Most importantly, by randomizing founder pairings as we do, we rule out the most severe confounds for advice effects, selection into pairs based on unobservables due to homophily, preferential attachment, or any alternative social-matching process (Manski, 1993). Our results suggest that the randomized-pairing induced variation in the quality of management advice which in turn influenced firm growth and survival, particularly for founders without formal management training.

2 | THEORETICAL FRAMEWORK

2.1 | Advice and startup performance

One of the primary goals of strategy research is to explain differences in performance across firms. In that spirit, much of the strategy research on high-growth startups has tried to explain why some succeed and so many fail (e.g., Lee, Lee, & Pennings, 2001). Prior work has documented the various reasons startups fail, and the lack of management capability has emerged as a key barrier to survival and growth (Armanios et al., 2017; Azoulay & Shane, 2001; Bloom & Van Reenen, 2010; Kulchina, 2017). Further, many young technology startups are knowledge-intensive with their key inputs being their employees, which implies management of human capital will have an outsized effect on performance. Ineffective management of this key resource could dampen growth and even threaten survival (Baron & Hannan, 2002; Beckman, Diane Burton, & O'Reilly, 2007). How then can founders improve the management of their companies?

Some startup founders handle these challenges by hiring experienced managers (Kulchina, 2016) or entering incubator or accelerator programs (Cohen & Hochberg, 2014). Most founders, however, likely rely on their own trial and error or on informal advice from peers and mentors (Lerner & Malmendier, 2013; Nanda & Sørensen, 2010; Scott & Shu, 2017). Prior work has conceptualized this advice as reflecting the adviser's own prior experience and knowledge (Lerner & Malmendier, 2013; Lindquist et al., 2015; Sørensen, 2007). Entrepreneurs can seek advice on a wide array of topics, including strategy, marketing, finance, and people-management issues such as how to hire, motivate, and best leverage employees. However, the content and quality of advice about business practices are highly variable (Vermeulen, 2018). Entrepreneurs also vary in their willingness to adopt the advice they are provided (Bryan et al., 2017).

Informal advice is distinct from coaching (Bryan et al., 2017), mentoring (Scott & Shu, 2017), and general feedback in a business-plan competition (Clingingsmith & Shane, 2017; Howell, 2017). The advice that entrepreneurs seek out and receive (Vissa & Chacar, 2009) can be unstructured and highly dependent on the knowledge and experience of the adviser. Because advice is typically dispensed via conversations, it may be more customized than other sources of knowledge, because clarifications can be requested and additional information can be provided in real time. Despite the prevalence of this kind of advice, we know little about if or when it will lead to better startup performance.

Advice about management is particularly germane to the interests of strategy scholars. Recent work has demonstrated a causal effect of formal management practices on firm performance (Bloom et al., 2013). In several contexts, including small businesses, large firms, schools, and hospitals, scholars find that formal management practices are consistent with increased profits and survival (Bloom et al., 2013; Bloom, Lemos, Sadun, & Van Reenen, 2015; Bloom, Sadun, & Van Reenen, 2014; Bloom & Van Reenen, 2006, 2010). These practices include providing consistent feedback, setting clear goals, and frequent monitoring of performance.

Theory and evidence suggests human resource management, sometimes called people management, specifically makes a difference for firm performance (Bloom et al., 2013; Cardon & Stevens, 2004; Hoffman & Tadelis, 2018; Huselid, Jackson, & Schuler, 1997; Kamoche, 1996). Basic elements of managing people include assigning the right tasks to the right people, monitoring employees' progress, setting goals, giving feedback, and coordinating across people, teams, and tasks (Bloom & Van Reenen, 2006). But not all entrepreneurs employ the same approach to human resource management. Some prioritize these activities, whereas others do them infrequently. This prior work implies these differences could drive variation in performance among entrepreneurial startups. Entrepreneurs who do not exert much effort in managing people are less able to assess and reward their high-performing employees, increasing the risk of losing key personnel. Similarly, lax human resource management leads to poor coordination across teams and projects, and can slow growth.

The entrepreneurs that do focus on their people should have more information about their employees and have fewer frictions in their work flow (Sappington, 1991). In well-functioning organizations such as these, good employees remain, weak employees are fired, and recruits are clamoring to join.

A key question is whether knowledge about human resource management diffuses through peer-to-peer advice and whether it will have the same effect on adopting firms. We have many reasons to believe the answer may be no. Management knowledge, when disembodied from the organization it comes from, could be far less useful. Significant parts of management practice could be tacit (Nelson & Winter, 1982; Polanyi, 1966) or highly specific to an individual. Even if management can be learned, the nature of informal advice might not well suited to the acquisition of new knowledge. The management practices identified in prior studies might not be well suited to knowledge-intensive startups, where some aspects of effective management, such as frequent monitoring and performance evaluation, could have negative effects on performance (Azoulay, Graff Zivin, & Manso, 2011; Ederer & Manso, 2013; Manso, 2011). Finally, recipients might simply ignore advice provided by one of the many individuals they interact with on business matters.

To answer this open question, we explore the impact of advice about management, which varies by the management style of the entrepreneur providing it (and the attributes of the entrepreneur who receives it). We expect advice from formal managers to both provide substantive knowledge about managing people and direct the receiver's attention to these activities. Informal managers will have

less to say about managing people and direct the recipient's attention to other activities. Regardless of the source of the advice, we expect it to influence the recipient. Prior work indicates that although managers can describe their management practices in detail, they cannot judge whether these practices are indeed "good" or "bad" (Bloom & Van Reenen, 2010). Thus, we do not expect those entrepreneurs paired with informal managers to systematically disregard their advice. Both kinds of advice should influence performance, albeit in different directions.

3 | ADVICE AND FORMAL TRAINING

We expect that the characteristics of entrepreneurs (Bryan et al., 2017; Howell, 2017; Lyons & Zhang, 2018) will moderate how influential advice is on their firms' future prospects. Specifically, the impact of advice will depend on whether the entrepreneur has any other sources of managerial knowledge on which to rely. For example, entrepreneurs who have attained a MBA degree (Lerner & Malmendier, 2013) or have participated in a formal accelerator or incubator program (Cohen & Hochberg, 2014) will have a basis of knowledge about management and an expanded network of contacts to consult with on management challenges.

In most entrepreneurial ecosystems, informal peer advice and formal management training coexist. Formal training could interact with peer advice in several ways. The impact of advice will depend on the extent to which entrepreneurs use their formal management knowledge to process new information. Under some conditions, formal training may enhance the value of advice. Entrepreneurs might use management frameworks they have learned in school or in an incubator or accelerator to interpret and calibrate the experiences of others before applying new management practices to their own firm. An entrepreneur with an MBA may be able to glean the actionable insights from a story told by an adviser, having seen numerous case studies in business school. Or she might initiate a new activity in her organization, 360 performance reviews for example, based on her business school training, but then use the insights of her peers to improve implementation. If formal training is a complement to peer advice, we would expect to see a positive interaction between MBA and incubator/accelerator experience and receiving advice from a manager with a formal style.

Of course, formal training could be a substitute for peer advice. In this case, their existing knowledge base might make these entrepreneurs more skeptical of any advice, especially when it does not conform to their frameworks. This dynamic would make any given advisor, good or bad, less influential. Conversely, entrepreneurs lacking formal training from a university or an accelerator may respond the most to informal peer advice. Entrepreneurs without management knowledge will have a higher demand for external guidance, but also a weaker filter for "good" and "bad" advice. In this instance, we would expect any positive effect from advice to disappear for MBA or incubator/accelerator participants.

Finally, advice and formal training need not be complements or substitutes. They could represent two kinds of knowledge that pertain to different aspects of management. For example, formal management training may provide guidance about how to create organizational charts, structure the division of labor, and build product road maps. Peer advice, on the other hand, may be more useful for managing difficult employees, motivating star performers, and creating a desirable corporate culture. Under this scenario, advice and training could have independent rather than joint effects on performance.

Understanding whether advice and formal training are complements, substitutes, or neither is important not just for scholars, but also for policy and practice. Particularly in emerging markets, most entrepreneurs will never have access to formal management training, and it would be cost-

prohibitive for governments to provide on a large scale. If advice and formal training are substitutes, advice networks would present a low-cost, scalable option to disseminate management knowledge broadly. If they are complements or neither, we would expect management knowledge to diffuse much more slowly.

In the next section, we describe our field experiment and then go on to present our analysis and results. We aim to test the causal impact of advice on startup survival and growth, and explore any contingencies based on the existing knowledge of the founder, measured by whether she has a MBA or has participated in an incubator or accelerator program.

4 | RESEARCH SETTING: AN EXECUTIVE RETREAT FOR ENTREPRENEURS

To test the role of management advice on startup growth, we conducted a field experiment[1] in partnership with the Indian Software Product Industry Roundtable (iSPIRT).[2] The authors worked with iSPIRT to embed the field experiment in their flagship training program. The program, the Product Nation Growth (PNgrowth) retreat, is an annual multiday off-site retreat for growth-stage Indian startups. The program consists of peer learning and advising sessions, as well as case studies. Founders leave the retreat with a plan for growing their startup.

The PNgrowth retreat and experiment ran from January 8–10, 2016. Admission was selective. Over 500 founders applied from across India; just over 200 were accepted, and 173 attended the camp. The retreat was residential and held on the corporate campus of a major Indian technology company.

The formal experiment included 100 of the 173 founders in attendance. The remaining 73 founders were not part of the experiment and were advised separately by iSPIRT coaches. All the startups in our experimental sample were interested in growing their organization. The average firm in our study had 12.6 employees, was 3 years old, and had hired six people over the last year. The median funding for a firm in our experimental sample was $83,000 USD, a substantial sum in the Indian context. Forty-six firms had previously raised a round of angel or institutional financing. The median age of the founders was 37.

On the first day, the founders participated in case discussions on defining a strategic direction for their startup. All participants completed the same exercises on this day. On day 2, we commenced the randomized experiment. The 100 founders were randomly assigned to a peer (into 50 pairs) and spent the remaining 2 days working together on a series of modules focusing on managing people and growing their startup. Day 2 consisted of case discussion, individual worksheets, and peer-to-peer business advice. The founders discussed three topics: (a) managing people, (2) finding opportunities for growth, and (c) developing a competitive advantage.

On the final day, the founders completed a "strategic checklist" that listed their main objectives after the PNgrowth program. They worked in the same randomized pairs from the prior day, getting and giving advice on their checklists.

The retreat ended in the afternoon on the third day.

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[1]Section A1 of Appendix S1 describes the retreat setting, recruiting and selection criteria, and experimental procedures in more detail.
[2]iSPIRT's mission is to promote the growth and success of the Indian software-product ecosystem. It advocates for various Indian technology policies and provides training for entrepreneurs through programs, seminars, and retreats.

5 | EXPERIMENTAL DESIGN

5.1 | Basic research design

The goal of our experiment was to test how and when management advice matters for startup growth and survival. Our experimental objective builds on prior work that argues that although Indian startups have access to a healthy pool of technical knowledge and talent (Arora & Gambardella, 2005), they lack managerial capacity (Bloom & Van Reenen, 2010). Further, because formal business training is still emerging in India, peer advice remains a key channel for learning about management practices. Finally, the decisions of startup founders impact the entire organization directly. This fact increases our ability to detect the effect of advice on firm-level outcomes more readily than for larger or more established businesses (Bruhn, Karlan, & Schoar, 2018; Fischer & Karlan, 2015).

Our research uses the standard peer effects estimation approach. In this approach the researcher first measures participant characteristics. She then randomized participants into peer groups. Finally, she measures each participant's outcomes (Sacerdote, 2014). The researcher then estimates a reduced form regression of each focal participant i's outcome on her peer(s) j's lagged characteristics. Because peer characteristics are lagged, and pairs are randomly assigned, the peer effects design overcomes bias due to social reflection and selection (Manski, 1993). In our case, the lagged peer characteristic is how formal a peer j's management style is. We randomly paired founders and had them provide advice and feedback to each other during the retreat to generate exogenous peer groups. We then measured each focal founder i's startup growth and survival at two points in the future—10 and 24 months after the retreat.

Our approach also improves upon prior peer effects research, specifically the concerns raised by Angrist (2014) regarding observational peer effects studies with group-level peer effects. First, we randomized founders into pairs and not groups. This feature addresses two weaknesses in studies with peer-group randomizations: (a) the loss of variation in the treatment caused by averaging the characteristics of peers and (b) strong assumptions about the right functional form of the group peer effect (e.g., min, median, max, etc.) (Caeyers & Fafchamps, 2016). Second, because we have repeated measures both before and after the treatment (i.e., randomization of peers), we can leverage a differences-in-differences approach, a standard approach in the strategy literature. This approach increases our power by accounting for time-varying effects and allows us to visualize our treatment effects.[3]

5.2 | Sample size and outcome measures

Because we study firms in one industry over a 2-year span, we note two research constraints. First, our sample size of 100 growth-stage startups is smaller than many observational studies at the firm level, particularly studies of publicly traded firms across many industries. Nevertheless, the firms in our sample represent a substantial proportion of growth stage startups in India in 2016, capping our maximum size to a few hundred rather than thousands of firms. Our sample size is comparable to recent field experiments at the firm level (e.g., Bloom et al. (2013), 28 plants; and industry studies (e.g., Kapoor & Furr, 2015, 176 firms in the solar photovoltaic industry).

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[3]Although we use difference-in-difference models, note that unlike the analysis of observational data, we need not rely on an additional parallel-trends assumption. The randomization of founders into pairs ensures that, at least in expectation, founders paired with formal or informal managers are equivalent on observables and unobservables in levels and trends.

5.3 | Data and variables

Our data come from three sources: (a) a baseline survey completed before the retreat in January 2016, (b) a postretreat survey conducted in September and October of 2016, and (c) data collection from secondary sources completed in January 2018. We describe each of these sources below in turn.

First, all founders completed a baseline survey in January 2016 asking about their education and experience, their startup's growth rate, and funding history, as well as a time-use survey of management activities.[4] Second, in September 2016, we contacted the 100 founders in our experimental sample, 90 of whom completed a phone interview. We asked about the changes they implemented postretreat, startup growth, and whether their company was still active. Finally, 2 years after the retreat in January 2018, we hired a team of research assistants (RAs) to collect firm-outcome data by checking company websites, tracking social media activity (Facebook, Twitter) and investigating social network platform profiles (LinkedIn, AngelList, Crunchbase) for all 100 startups in our sample.

5.4 | Dependent variables

5.4.1 | Firm size

We have a measure of firm size (including founders) for active firms at four points in time: (a) 1 year before the retreat, (b) at the retreat, (c) 10 months after, and (d) 2 years after. These measures derive from surveys and online data.

Our preretreat measures come from a baseline survey the founders completed before attending the retreat. We asked for the total number of employees and founders at the firm, and the number who were hired, fired, and or had quit over the last year. We use this information to calculate the number of employees who worked at the startup 1 year before the retreat and the number of employees who worked for the firm at the time of the retreat.

To measure firm size after the retreat, we conducted a phone survey that ran from September 2016 to October 2016. We again asked the founder to provide us with the total number of employees and founders currently at the firm, and the number of employees who had been hired, fired, or had quit since the retreat.

Finally, we measure startup size 2 years after the retreat using the startup's LinkedIn profiles as of January 2018. All the surviving startups had LinkedIn company profiles which listed current employees, allowing us to calculate the number of employees for all the companies in our sample. To ease exposition, we refer to the phone survey described above as our 1 year outcome data and our LinkedIn measures as our 2-year outcome data[5].

5.4.2 | Firm survival

We further analyze the effect of advice on *Survival 2 Years After Retreat* (e.g., by January 2018). RAs classified each of the 100 firms in our sample as "active" or "inactive." We classified firms as active if, as of January 2018, their (a) website still worked, (b) LinkedIn showed employees currently working at the company, and (c) AngelList, CrunchBase, and the company's social media profiles had no news of a shutdown. The RAs were blind to each startup's treatment condition and to our research hypothesis.

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[4]The survey interface, survey questions, and postretreat interview protocol are available upon request.
[5]Modeling firm size in months (e.g., −12, 0, 10, and 24 months) does not impact our findings.

TABLE 1 How often to founders engage in people-management tasks?

	Management Index	Median frequency	Sets shared goals	Conducts reviews	Provides feedback	Provides targets
1	−1.52	Never-yearly	Never	Yearly	Weekly	Never
2	−0.85	Yearly-monthly	Yearly	Monthly	Weekly	Never
3	−0.61	Monthly	Monthly	Monthly	Yearly	Monthly
4	0.16	Monthly-weekly	Weekly	Daily	Monthly	Never
5	0.67	Weekly	Weekly	Monthly	Weekly	Weekly
6	1.34	Weekly	Weekly	Weekly	Daily	Weekly
7	1.63	Weekly-daily	Daily	Weekly	Weekly	Daily

Note. Time-use data from seven founders.

5.5 | Independent variables

We use responses from our management time-use survey about managing people to compute our independent variables, *Management Index* and *Peer Management Index*. These measures are derived from questions in the World Management Survey (Bloom & Van Reenen, 2007). Our variables measure how often each peer founder conducts the following tasks at their firm:

- "...develop shared goals in your team?"
- "...measure employee performance using 360 reviews, interviews, or one-on-ones?"
- "...provide your employees with direct feedback about their performance?"
- "...set clear expectations around project outcomes and project scope?"

In the survey, founders indicated how frequently they engaged in each task by responding "Never," "Yearly," "Monthly," "Weekly," or "Daily." Every cell for each item has at least five responses, with most indicating "Monthly" engagement.

We aggregate responses into a *Management Index* that quantifies how formal each founder's management style is. Our aggregation follows Bloom and Van Reenen (2007). We code responses from 1 ("Never") to 5 ("Daily") and then standardize dimensions to have mean 0 and *SD* 1. These standardized dimensions are combined and restandardized to create our final variables *Management Index* (for the focal founder) and *Peer Management Index* (the index of the focal founder's randomized peer).[6] We interpret *Peer Management Index* as a proxy for the behaviors and experience of a peer founder. Like the majority of peer effects designs we conceptualize these behaviors as the source of the advice, insight, and perspective that a peer will share with her partner.

Table 1 shows responses from seven founders selected from across the *Management Index* distribution. How often founders engage in people-management tasks varies substantially. The difference between a score of −0.85 to 0.16 (about 1 *SD*) represents a shift in frequency from doing practices on a yearly–monthly level to a monthly–weekly level. Although some founders do conduct these activities on a weekly or daily basis, many rarely engage in any sort of people-management tasks.[7] Finally, in Appendix S1, section A3, we show that formal managers are more likely to run larger

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[6]Section A2 of Appendix S1 demonstrates that our results and the index itself are robust to other methods of construction.

[7]We find little evidence of overzealous and harmful "micro-management" in our sample. To test for the presence of micro-management, we split the Management Index into quartiles to test if the top-quartile manages too much. We find no evidence that especially formal managers work at smaller firms or are more likely to fail (results available upon request). Furthermore, the effect of *Peer Management Index* appears to be relatively linear, as can be seen graphically in Section A6 of Appendix S1.

startups, are more likely to have graduated from better MBA programs, and are generally from higher-quality incubator/accelerator programs.

5.5.1 | MBA and incubator/accelerator

We use baseline survey data to measure whether the focal founder has other sources of management knowledge. We create two variables, *Has MBA* and *In Incubator*, to indicate these two characteristics. Twenty-three founders in our sample graduated from MBA programs, ranging from Wharton to IMT Ghaziabad. Forty startups were affiliated with an incubator or accelerator.[8]

5.5.2 | Geographic effects

We also construct a variable called *Pair from Same Metropolitan Area* that indicates whether a founder-peer pair is based in the same Indian city. The majority are from the Bangalore metro-area (37), Mumbai (17), and Delhi (11). Twenty founders (10 pairs) are based in the same metro region. All startups were based in India.

5.5.3 | Control variables

Although our research design benefits from both peer randomization and a difference-and-differences estimation strategy, we also account for focal firm and peer-level variation with control variables. We include controls for financing (*Raised Angel/VC Funds*) and startup age (*Startup Age* and *Startup Age Squared*), as well as other information about peers, including financing, founder age, MBA status, and incubator/accelerator participation. Including these peer controls helps us account for other plausible mechanisms in addition to our hypothesized ones.

5.5.4 | Descriptive statistics for firms

Panel A in Table 2 reports summary statistics for the 100 firms in our sample. Two years after the retreat, 74 firms were operational. Surviving firms had an active website, employees on LinkedIn, and no news of a shutdown. For startups we classified as "inactive," we cross-checked our measure with the earlier survey in September and October 2017. All seven startups that were classified as inactive in the 2017 survey were also inactive as of January 2018. To our knowledge, only one of the firms that became inactive was acquired. Excluding this firm from our analysis does not affect our findings.

These measures yield a longitudinal data set with four measurements spaced approximately 1 year apart for the 90 firms for which we have complete data, including the survey.[9] Panels A and B in Table 2 provide descriptive statistics of firm size at the time of the retreat and for the panel. At the time of the retreat, the average firm had 12.6 employees (median 9). Our final dependent variable is *Log(Employees + 1)*, which accounts for the log-normal skew in the startup size distribution and the fact that nonsurviving startups have zero employees and for which *Log(Employees)* would be undefined.

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[8]We acknowledge that startup accelerators and incubators have differences, most notably that accelerators like Y-Combinator work with companies for a short and fixed duration while incubators do not traditionally have these constraints. However, these differences have blurred over time. Some accelerators allow companies to go through multiple cycles; some incubators have time limits. Our survey question asked the founder to "Please list the name(s) of any incubator/accelerator that the startup has participated in." Especially given that our interest is in the founder's access to formal management training, we think combining participation in incubation or accelerator programs into one variable is appropriate.

[9]Section A5 of Appendix S1 tests if the nonresponders differ from the responders on treatment status. We find no difference between the two groups. Furthermore, our results hold when we consider survival using all 100 firms in our sample. Excluding the 10 nonresponders from our panel does not alter our findings.

TABLE 2 Summary statistics

	Mean	**Median**	*SD*	**N**
Panel A: Cross-sectional data				
Management index	0.00	0.03	1.00	100
Peer management index	0.00	0.03	1.00	100
Startup age at retreat	3.46	2.78	2.77	100
Employees at retreat	12.62	9.00	10.83	100
Has MBA	0.25	0.00	0.44	100
In incubator	0.40	0.00	0.49	100
Raised angel/VC funds	0.48	0.00	0.50	100
Pair from same metropolitan area	0.20	0.00	0.40	100
Survival 2 years after retreat	0.74	1.00	0.44	100
Panel B: Panel data				
Management index	−0.03	0.03	1.02	360
Peer management index	−0.02	0.01	0.98	360
Startup age at retreat	3.63	2.90	2.83	360
Number employees	14.11	9.00	18.74	360
Has MBA	0.26	0.00	0.44	360
In incubator	0.40	0.00	0.49	360
Raised angel/VC funds	0.48	0.00	0.50	360
Pair from same metropolitan area	0.20	0.00	0.40	360

5.6 | Estimation strategy

We test the effect of peer advice on startup growth and survival. Because we observe our dependent variable multiple times both before and after the retreat, we adopt a difference-in-differences estimation strategy. Taking advantage of the panel structure of our data increases our statistical power,[10] allows us to plot growth for founders partnered with formal and informal managers, and to test whether the estimated peer effect only occurs postretreat.

We begin by estimating a particularly flexible differences-in-differences model of startup growth pre- and postretreat by fitting a log-linear model of the following form:

$$Log(Y_{it} + 1) = \alpha I_t + \beta_t M_i I_t + \gamma_t I_t M_{i's\ peer} + \delta C_i + U_i + \epsilon_{it} \tag{1}$$

In this model, our dependent variable is logged employees Y in firm i and period t. I_t is an indicator for each period. α_t captures time-period effects, β_t captures the effect of a founder's *Management Index* (M_i) in each period. γ_t is the effect of *Peer Management Index* ($M_{i's\ peer}$) in each period. δ represents the effect of time-invariant controls C_i including startup age, age squared, MBA, Incubator status, and Angel/VC funding. Finally, U_i are firm-level random effects.[11]

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[10]McKenzie (2012) demonstrates that more "T"(time periods) can often substantially increase experimental power. In Section A4 of Appendix S1, we present power calculations and show that for our effect size we have 95% power at the 5% level; for an effect half as large our power is still above 65%. By contrast, without panel data, our power drops to just above 33%.

[11]Because peers were randomly assigned, a fixed-effects specification is not needed to account for selection bias. Including fixed effects yields plots that look substantively similar, but with uninformative levels. Because fixed effects absorb variation in the average size between firms, estimating marginal effects from a fixed-effect model could hide important variation in the size of firms depending on the level of treatment.

We then plot the estimated marginal effects, and associated 95% confidence intervals, at each period for founders with peers with high- and low-scores on the *Peer Management Index*. If the advice matters, we should see startup size diverge after but not before the retreat.

To estimate the magnitude of the treatment effect, we then fit a more structured log-linear model:

$$Log(Y_{it} + 1) = \beta M_i + \beta_{post} M_i I_{post} + \gamma M_{i's\ peer} + \gamma_{post} I_{post} M_{i's\ peer}$$
$$+ \alpha_t T_t + \delta C_i + \delta_{post} I_{post} C_i + \zeta C_{i's\ peer} + \zeta_{post} I_{post} C_{i's\ peer} + U_i + \epsilon_{it} \tag{2}$$

In this pre/post difference-in-differences model, the estimated effect of *Management Index* and *Peer Management Index* depends on whether the period is before or after the retreat. Based on our hypothesis, γ should be close to zero (e.g., no treatment before retreat), and γ_{post} should be positive and significant. This specification also includes period fixed effects, random effects for each firm, firm controls, and pre- and postretreat controls for the focal founder and the founder's randomly assigned peer. In additional models, we replicate our results by replacing random effects U_i with fixed effects to control for both fixed observable and unobservable differences.

Our final approach adapts the specification above to analyze survival. Because the variation in *when* startups shutdown is minimal, we run cross-sectional logistic regressions with 2-year survival S_i as our dependent variable. Our interest is in the coefficient γ, the effect of the randomly assigned peer.

$$S_i = \beta M_i + \gamma M_{i's\ peer} + \delta C_i + \epsilon_{it} \tag{3}$$

For this analysis, we include all 100 firms because we have survival data for the entire sample at the 2-year mark.

6 | RESULTS

We present our results in five parts. We begin with balance tests for our randomization. Next, we provide evidence for our primary claim that management advice affects the growth and the survival of startups. We then show evidence that our advice effects are contingent on whether a focal founder has prior management training. Finally, we present robustness checks to rule out alternative mechanisms and explanations.

6.1 | Balance checks

To formally check that the randomization is balanced, we regress *Peer Management Index* on nine preretreat startup characteristics. The results are presented in section A5 of Appendix S1. We find no evidence of imbalance for startup age, the size of the firm 1 year before the retreat, the size of the firm at the time of the retreat, if the founder has an MBA, if the founders are from the same metropolitan region, or if they have raised VC or Angel funding. We do find imbalance on one of the nine variables. Startups that are part of an incubator are more likely to get advice from a formal manager. Even with perfect randomization, some imbalance is expected. Simulations described in Appendix S1 reveal that one-third of the time at least one of our nine variables will be significant at the 5% level.[12]

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[12]Even if our sample size increased by order of magnitude to 1,000 startups, we would still expect imbalance on at least one variable a third of the time. Please see Section A5 of Appendix S1 for further discussion.

Fortunately, the singular imbalance does not create significant sample divergence. Incubated startups are assigned to both formal (25 to *Peer Management Index* > 0) and informal managers (15 to *Peer Management Index* ≤ 0). A straightforward way to account for this imbalance is to include incubation status in our models and see if it alters the magnitude of the *Peer Management Index* coefficient. Including this variable does not alter our results (Imai, King, & Stuart, 2008).

6.2 | Peer management advice and firm growth

Next, we provide visual evidence for an effect of peer management advice on startup growth after the retreat. Our estimates control for both observed and unobserved heterogeneity in the characteristics of the focal, as well as peer, firms and founders.

We estimate Equation (1), which leverages the longitudinal data structure and incorporates controls. We use GLS with random-effects for startups to estimate the treatment effect of peers in each of the four time periods separately. We robustly cluster standard errors at the randomized founder-pair level, which is the most conservative clustering possible in peer effects designs. Based on these estimates, we plot estimated firm size before and after the retreat with corresponding 95% confidence intervals for two parts of the *Peer Management Index* distribution: formal managers (*Peer Management Index* = 1) and informal managers ([*Peer Management Index* = −1]). To account for imbalance, models include controls for incubation status and for startup age, age squared, Angel/VC funding, and if the founder has an MBA.

We present the estimation described above in Figure 1. The solid black line is the estimated startup size for a founder partnered with a formal manager; the dashed gray line is the estimated startup size for a founder paired with an informal manager. Before the treatment, the estimates overlap, as expected, and startup size and the startup growth trajectory are the same for both groups of founders.
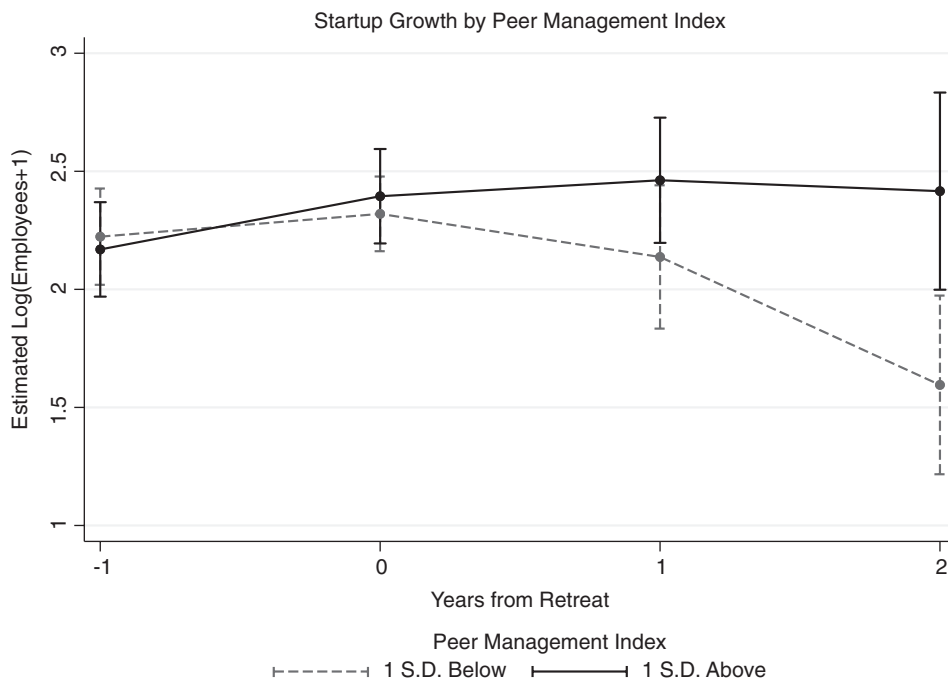

FIGURE 1   The impact of management advice on startup growth

After the retreat, the estimates show that founders paired with a formal manager grow to about 11 employees on average. Founders who received advice from informal managers see their startups shrink to eight employees after 1 year and four employees after 2 years. Advice from informal managers increases employee attrition and exit. Figure 1 provides visual evidence that who entrepreneurs get advice from affects their startup's growth. As a further check that our treatment influenced growth postretreat, in section A6 of Appendix S1 we plot startup size 1 year before the retreat and 2 years after the retreat against the *Peer Management Index*. We see the same pattern as in Figure 1. Before the retreat, no relationship exists between size and the peer management index. Two years after the retreat, we see that founders partnered with a peer who is a formal manager have more employees and are less likely to shut down.

We now turn to further estimates that assess the size of our treatment effect and its robustness to different model specifications and outliers. In Table 3, we report coefficients from models estimated using Equation 3. We begin by describing Model 1, which uses the difference-in-differences approach. We find evidence of a treatment effect of peer advice. In this model, *Peer Management Index*, which captures any time-invariant effect of peer advice prior to the retreat, is small and statistically insignificant. By contrast, the coefficient on *Peer Management Index × Post-Retreat* is positive and statistically significant. A 1-*SD* increase in a peer's management index causes a startup to be 28% larger ($p = 0.007; se = 0.10$) postretreat. The median startup has nine employees, so the treatment effect implies an increase of 2.5 employees.

In Model 2, we include startup-level controls. We find that the *Peer Management Index × Post-Retreat* remains positive and significant.

In interpreting our control variables, their estimated effects are consistent with prior work on startup growth. We find that firms run by MBAs are about 50% larger than those run by non-MBAs ($p = 0.03; se = 0.21$). Startups that raised Angel or VC funds are about 19% larger than the average firm. In addition, we find that older firms are also larger. However, incubated startups appear somewhat smaller than the average firm.

Model 3 accounts for additional peer and temporal heterogeneity that may affect our coefficient of interest, *Peer Management Index × Post-Retreat*. The control variables in Model 2 increase our certainty that the peer effect is not the result of founder heterogeneity in experience and training (e.g., has an MBA) or other firm characteristics (e.g., firm age). Further, we account for alternative channels of peer effects by including in Model 3 variables that account for other dimensions on which peers vary besides their *Peer Management Index*. To test if these peer controls have a treatment effect, we include both the peer controls and their interactions with our *Post-Retreat* variable.[13] If receiving advice from a founder with a MBA drives our effect, and not necessarily advice from an formal or informal manager, *Peer Has MBA × Post-Retreat* will mediate the peer management effect.

Including these variables in Model 3 has no meaningful impact on our independent variable of interest, which remains positive and statistically significant. We find little evidence that the *Peer Management Index* is a proxy for a peer's experience or training, nor is it a proxy for the age of the startup. Furthermore, in Section A7 in Appendix S1, we find no evidence that these other peer characteristics have any independent effects on growth as well. For example, getting advice from a founder who has gone to business school does not appear to have any effect on postretreat growth. We return to this issue of alternative peer effect channels when we discuss our robustness checks.

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[13]To provide a parallel for the peer controls, we also include the interaction of the focal founder controls with our *Post-Retreat* variable. Thus, Model 3 also accounts for potential temporal heterogeneity in the effect of the controls. For example, imagine the funding environment worsens post-retreat, then perhaps having raised funds will only matter in the last two time periods. By including the interactions we reduce concerns that changes in the ecosystem account for our findings.

TABLE 3 The impact of management advice on startup growth

	Log(Employees + 1)			
	(1)	**(2)**	**(3)**	**(4)**
Management index	0.126	0.157	0.157	
	(0.088)	(0.068)	(0.066)	
Management index × Post-retreat	0.010	0.010	−0.013	−0.013
	(0.090)	(0.091)	(0.092)	(0.091)
Peer management index	0.033	0.005	0.019	
	(0.079)	(0.063)	(0.063)	
Peer management index × Post-retreat	0.281	0.281	0.287	0.287
	(0.104)	(0.104)	(0.106)	(0.104)
Startup age		0.274	0.335	
		(0.065)	(0.059)	
Startup age squared		−0.012	−0.015	
		(0.004)	(0.004)	
Raised angel/VC funds		0.188	0.309	
		(0.143)	(0.123)	
Has MBA		0.465	0.197	
		(0.212)	(0.172)	
In incubator		−0.169	−0.211	
		(0.187)	(0.127)	
Observations	360	360	360	360
Number of firms	90	90	90	90
Time period FE	Yes	Yes	Yes	Yes
Controls × Post-retreat	No	No	Yes	Yes
Peer controls	No	No	Yes	-
Peer controls × Post-retreat	No	No	Yes	Yes
Startup random or FE	RE	RE	RE	FE

Note. FE: Fixed Effects. Significance asterisk are omitted and robust standard errors clustered at the pair level in parentheses.

Model 4 includes startup fixed-effects rather than random-effects. This model accounts for all time-invariant differences across startups, but prevent us from estimating our control variables. Nevertheless, the interactions of the self and peer control variables with our postretreat dummy are still included. The primary coefficient on *Peer Management Index × Post-Retreat* remains unaffected by this rigorous specification. We also ran a multilevel model that included a random effect for each firm which allowed the effect of each time period to differ across firms (i.e., random slopes). Our pattern of results continues to hold. This consistency in results is not surprising since the randomization embedded in our study already creates balance across conditions on both fixed and time-varying attributes of the firms.

In contrast to the *Peer Management Index* results, a founder's own baseline *Management Index* is positively associated with startup size (marginally in model 1, but significantly so in models 2 and 3 at $p \leq 0.02$). However, unlike *Peer Management Index*, the coefficient on *Management Index × Post-Retreat* is small and insignificant in all our models, indicating no posttreatment increase in the effect, just as we would expect.

To summarize, getting advice from a peer founder with more formal people-management practices—for example, someone who provides feedback or sets goals once a week as opposed to once a month—leads to a 28% larger startup 2 years later. On average, these treated firms grow from nine employees to just over 11. This effect is robust to a wide range of estimation techniques and methods that account for observed and unobserved heterogeneity across founders and peers.

6.3 | Peer management advice and startup survival

We also test whether peer advice affects firm survival. Here, we simplify the estimation and use all 100 firms in our sample. Model 1 in Table 4 regresses survival on *Management Index* and *Peer Management Index*, and Model 2 includes our controls. The primary effect of peer management advice is positive and statistically significant ($p = 0.01$) in both models. Survival increases by 10%, from 75% to 85%, if a founder gets advice from a peer who is 1 *SD* above the mean on *Peer Management Index*.[14]

Much like the growth results, founders' own formal and informal styles affect the survival of their startup. *Management Index* is positive and significant (though at the $p \leq 0.1$ level) in both Models 1 and 2. The magnitude corresponds to an increase in survival of 75–81%.

6.4 | Peer management advice and formal management training

We now test whether the effect of peer management advice is contingent on whether a focal founder has formal management training. We begin by estimating and plotting the results of Equation 1 for two sets of conditions: if the founder has an MBA and if the founder is part of an incubator/accelerator. In both cases, we allow the peer management effect in Equation 1 to vary by time period, if the founder has an MBA, and by incubation status.

First, we examine whether the effect of *Peer Management Index* is affected by whether the focal founder has an MBA. Figure 2 shows that founders with MBAs, while having larger firms, are less affected by whether or not they get advice from a formal or informal manager. MBA founders appear to ignore or do not implement the advice they receive.

Second, we examine whether the effect of *Peer Management Index* is affected by whether the focal founder is part of a formal incubator or accelerator program. Figure 3 shows that founders not in incubator/accelerator programs are most affected by their peers' advice. Those founders who have participated in incubator programs are unaffected by advice.[15]

In Table 5, we formally test for these two contingent effects. Model 1 includes *Has MBA X (Peer Management Index × Post-Retreat)* along with fixed effects for each firm, period fixed effects, and the interactions between the postretreat indicator, the controls and peer controls.

Critically, we interact our treatment effect, *Peer Management Index X Post-Retreat*, with whether a founder has an MBA or is part of an incubator. If MBAs are unaffected by peer advice, the coefficient on the interaction term should be negative and similar in size to *Peer Management Index × Post-Retreat*. The coefficient for *Peer Management Index × Post-Retreat* is 0.42 ($p \leq 0.001$), but for

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[14]Results are nearly identical when we use a linear probability model. See Table A8.1 of Appendix S1.

[15]One potential concern with Figure 3 is that nonincubated startups paired with formal managers appear to be larger to start with than non-incubated startups paired with informal managers. Nevertheless, the slopes are not statistically different from one another before the retreat. Thus, by including fixed effects we can control for this pre-retreat-level difference, which is related to the problem of imbalance on our incubator variable. When we include fixed effects, we still find that advice matters for non-incubated startups.

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TABLE 4 The impact of management advice on startup survival

	Survival 2 years after retreat		
	(1)	**(2)**	**(3)**
Management index	0.415	0.481	0.411
	(0.242)	(0.252)	(0.291)
Peer management index	0.632	0.678	1.120
	(0.254)	(0.276)	(0.494)
Startup age		0.249	0.263
		(0.229)	(0.249)
Startup age squared		−0.010	−0.011
		(0.014)	(0.014)
Has MBA		1.998	2.382
		(0.998)	(1.052)
Has MBA × Peer management index			−2.164
			(0.675)
In incubator		0.398	0.546
		(0.514)	(0.554)
In incubator × Peer management index			−0.742
			(0.543)
Raised angel/VC funds		−0.544	−0.553
		(0.484)	(0.505)
Raised angel/VC × Peer management index			−0.064
			(0.526)
Pair from same metropolitan area			−0.234
			(0.422)
Same metro × Peer management index			1.477
			(0.612)
Constant	1.155	0.296	0.336
	(0.211)	(0.628)	(0.729)
Observations	100	100	100

Note. Significance asterisk are omitted and robust standard errors clustered at the pair level in parentheses.

Has MBA × (Peer Management Index × Post-Retreat), the coefficient is −0.52 ($p = 0.05$). Founders with MBA degrees appear unaffected by the advice of their peers.[16]

Model 2 tests if the impact of advice is smaller for incubator/accelerator startups. The coefficient for *In Incubator × (Peer Management Index × Post-Retreat)* is negative and relatively large, −0.30, but we do not find statistical significance at conventional levels ($p = 0.10$). In Model 3, we include both moderators and the estimates and *SE*s are essentially unchanged. In Model 4, when we include a moderator for whether the pair is from the same metro area, we find negative interaction effects for both incubated startups −0.41($p = 0.02$) and MBA-run companies −0.51($p = 0.04$). Concordant

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[16]In Section A12 of Appendix S1, we test if MBA program quality matters and find little evidence that founders from higher-tier or lower-tier MBA programs responded differently to their randomly assigned peer. Management training appears to inoculate founders from management advice, no matter the quality of the training. Intriguingly, the results in Table A3 suggest MBAs from higher-ranked schools are better managers.
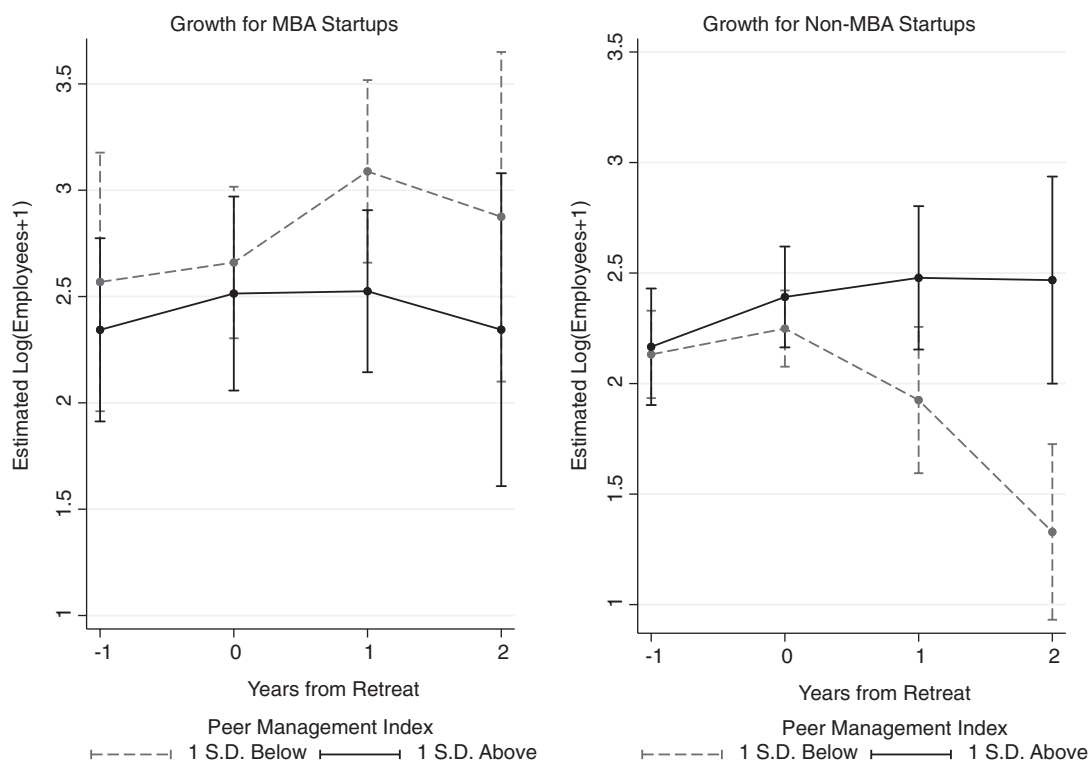
FIGURE 2   Estimated startup size by treatment status for startups with MBA founders (23 startups) and for non-MBA founders (67 startups)

findings for both MBA-run (on average, larger) and incubator/accelerator startups (on average, smaller) suggest the absence of advice effects for MBA-run startups is not a consequence of their larger size.

Turning to the effect of geographic proximity, we find that *Same Metro × (Peer Management Index × Post-Retreat)* is positive and statistically significant ($p \leq 0.001$). The effect of advice is stronger for pairs located in the same city. The effect is substantial, roughly doubling the impact of peer advice on startup growth. This finding is consistent with work on geography and startups (e.g., Dahl & Sorenson, 2012) and indicates that when it is easier to get advice, our treatment effect is stronger.

Finally, Model 3 in Table 4 examines whether there are also contingent effects on survival. The interaction between *Peer Management Index* and MBA status is similarly negative and significant ($p = 0.001$). The interaction between *Peer Management Index* and incubator status is also negative, but not statistically significant. However, the effect of being in the same region nearly doubles the effect of advice on firm survival ($p = 0.01$).

Both of these results suggest that past management training and support limits the influence of peer advice, both good and bad. Moreover, the effect of advice is strongest for founders located in the same region.

Taken together, the results suggest that those managers paired with peers with a more formal management style perform better. Given that startups fail at very high rates (Audretsch & Mahmood, 1995; Birley & Westhead, 1990), it appears that our treatment is a positive one, slowing the typical tendency toward failure among nascent firms.
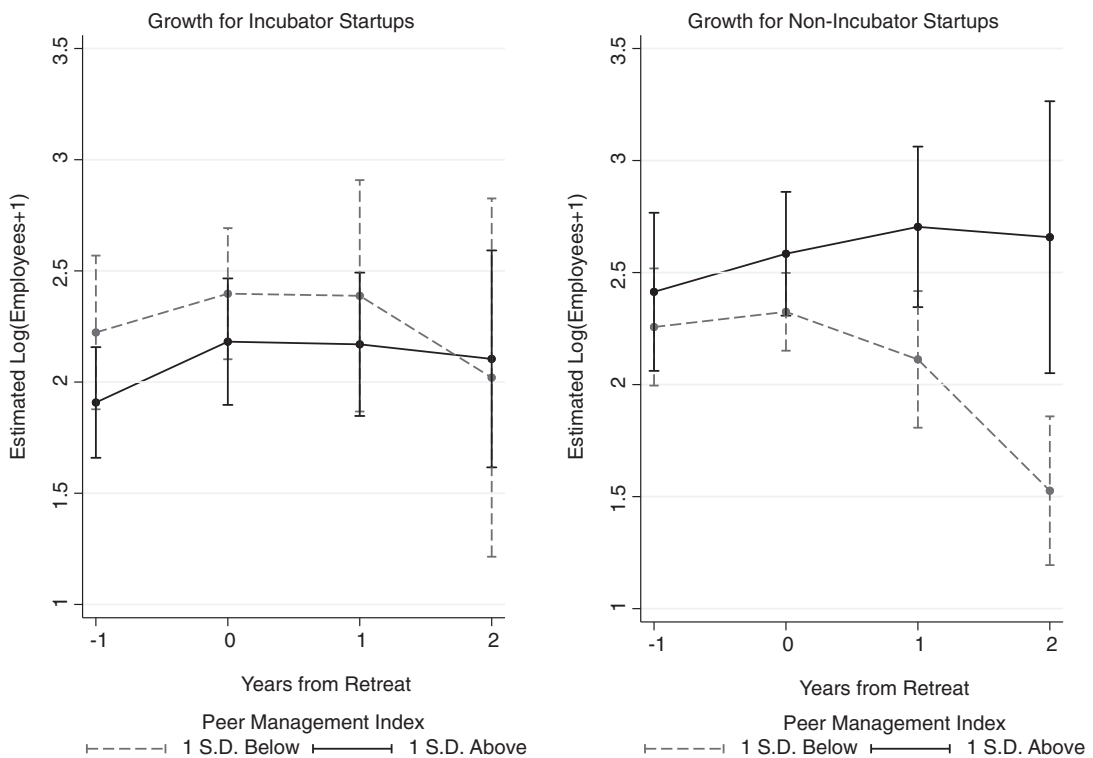
FIGURE 3 Estimated startup size by treatment status for startups that are a part of an incubator/accelerator (36 startups) and those that are not (54 startups)

6.5 | Peer management advice and management language

To further validate our results and proposed mechanisms, we ask whether *Peer Management Index* relates to *how* founders talk about the changes they made in the post-retreat phone survey conducting in September and October 2017. As part of this postretreat survey, founders described the most significant changes they made after PNGrowth and whether they made any changes outlined in their end-of-retreat checklist. The interviewer typed up these conversations, which consisted of approximately one paragraph of text for each founder.[17] We used natural language processing to test how often founders used "management" words relative to words describing the product, technology or customer, after being assigned to managers with formal or informal styles.

In Table A11.2 in Appendix S1 section, we regress the number and percent of management words on the founder and peer's management index using two methods: negative binomial and fractional probit regressions. The number and percentage of management words used is positively related to *Peer Management Index.* The effect sizes indicate advice from a more formal manager (with an index score of 1 vs. 0) increases the number of management words used by a founder by 13.1%. Relatedly, a more formal focal founder (1 *SD* above average) uses 17.4% more words than a founder at the mean of our index. Together with results from Table 3 and the findings in Table A7, we find support for the idea that our treatment effect reflects differences in advice from peers about management, as opposed to alternative channels.

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[17]A full description of the the survey and interview procedures are described in subsection "Survey procedures" in Section 1 of Appendix S1.

TABLE 5 The impact of management advice on startup growth for founders with an MBA, who are part of incubator, or are located in the same metropolitan area

	Log(Employees+1)			
	(1)	**(2)**	**(3)**	**(4)**
Management index × Post-retreat	−0.026	0.054	−0.036	−0.140
	(0.085)	(0.103)	(0.087)	(0.087)
Peer management index × Post-retreat	0.418	0.435	0.524	0.426
	(0.104)	(0.122)	(0.099)	(0.105)
Has MBA × Post-retreat	0.382		0.395	0.360
	(0.191)		(0.192)	(0.181)
Has MBA × (Peer management index × Post-retreat)	−0.518		−0.559	−0.515
	(0.239)		(0.232)	(0.244)
In incubator × Post-retreat		−0.008	0.130	0.120
		(0.204)	(0.182)	(0.180)
In Incubator × (Peer management index × Postretreat)		−0.302	−0.284	−0.414
		(0.180)	(0.177)	(0.171)
Same metro × Posttreat				0.030
				(0.147)
Same metro × (Peer management index × Postretreat)				0.702
				(0.167)
Observations	360	360	360	360
Number of firms	90	90	90	90
Time period FE	Yes	Yes	Yes	Yes
Controls × Postretreat	Yes	Yes	Yes	Yes
Peer controls × Postretreat	Yes	Yes	Yes	Yes
Startup random or FE	FE	FE	FE	FE

Note. FE: Fixed Effects. Significance asterisk are omitted and robust standard errors clustered at the pair level in parentheses.

6.6 | Robustness checks and alternative peer mechanisms

We also conducted more robustness checks to validate our results and our effect sizes. These results are reported in sections A9 and A10 in Appendix S1. In section A9, we replicate Table 3 using negative binomial models. We find no meaningful differences between the two approaches. Table A10 provides further checks on our assumptions. Model 1 in this table tests for the effect of outliers and finds no difference in results if we exclude firms with *Peer Management Index* less than −2 and the one firm with more than 100 employees. Model 2 includes a lagged size measure to account for growth dynamics and finds no difference in our results.

6.7 | Accounting for alternative mechanisms

In this section, we explore whether our peer effect can be linked back to other dimensions on which founders vary. To summarize, the principal claim in our paper is that our estimated peer effect arises due to differences in the management advice a founder received from her more or less formal peer. Given our research design, we are confident that selection or environmental effects do not bias our estimates. However, it is possible that peers have developed a formal or informal management style

either because of their human capital investments or through experience that is driving our observed peer effect.

In this context, variation in a peer's business education, their experience running a large firm, or raising institutional capital may affect how formal their management style is, and thus the type of advice they provide. We test whether these characteristics drive our results by including these factors in our model and seeing whether their inclusion weakens our estimated peer effect. We begin by accounting for whether our peer effect is a consequence of differences in human capital. As the results in Model 3 of Table 3 show, we find the effect of *Peer Management Index* holds if we include controls for whether a peer has an MBA and has participated in an incubator.

Next, we test whether our effects are driven by differences in the stage of a peer's startup or their resources. Model 3 of Table 3 also includes controls for a peer's startup age, age squared, and whether he or she has raised Angel or VC funds. Again, our main effects hold. In Model 3, in Table A10.1 of Appendix S1, we include a control for the size of a peer's startup to reflect whether founders who have larger startups are more likely to be the ones who provide advice regarding formal versus informal management. We find little evidence that a peer's firm size affects a focal founder's growth, but the *Peer Management Index* effect remains.

A second alternative explanation is that personality or behavioral differences among peers drive our effects (Astebro, Herz, Nanda, & Weber, 2014). These personality differences may also affect how the advice is delivered, whether advice is heeded, or how well a peer connects with her partner.

Although we do not have direct measures of these constructs, we can account for some additional behavioral differences across peers. First, we consider founder age. Prior work has shown that older founders have higher opportunity costs and exit their firms faster (Arora & Nandkumar, 2011). As a result, these founders may be less optimistic about growth prospects, and this attribute may affect the nature of advice or its tone. Second, we consider the argument that the size of a founder's social network reflects his or her social skill and so the likelihood that his or her advice is heeded. In Model 4, we include controls for peer age and social network size, using the number of connections the peers have on LinkedIn just before the retreat. Again, our main results remain consistent and robust.

In Model 5, we include all pairwise interactions between the peer controls to further test the robustness of our *Peer Management Index × Post-Retreat* effect (e.g., we control for the peer having an MBA *and* having raised Angel/VC funds). In this demanding specification, our primary estimates remain positive and statistically significant. Moreover, if other potential omitted peer variables in this model change the size or magnitude of *Peer Management Index × Post-Retreat*, they must be uncorrelated with the large suite of controls we have already included.

These results lend further support to our proposed mechanism: differences in advice based on a peer's experience managing her employees leads to divergent startup performance. Further, it is unlikely based on the estimates above that the other differences in peer backgrounds could also account for the heterogeneous treatment effects for focal founders with MBAs and Incubator/Accelerator experience.

7 | CONCLUSION

Why do some entrepreneurs thrive, while others struggle to scale their companies? In this article, we propose that differences in the advice entrepreneurs receive about managing people can affect the growth and survival outcomes of their companies. We run a field experiment to evaluate the impact of peer advice on the 2-year growth and survival outcomes of 100 high-growth technology startups.

We find that entrepreneurs who received advice from peers with a formal approach to managing people—instituting regular meetings, setting goals consistently, and providing frequent feedback to employees—grew 28% larger and were 10 percentage points less likely to fail than those who got advice from peers with an informal people-management approach. Moreover, founders located in the same metropolitan area are more responsive to the advice of their peers, suggesting the localized nature of peer-to-peer advising. However, not all founders respond to advice in the same way. We find that founders with a MBA degree or incubator/accelerator experience, are significantly less affected by peer advice—from either formal or informal managers. These results suggest that formal training may be a substitute for informal peer counsel. Formal management training, while independently improving startup outcomes, may also make founders resistant to learning from others' experience.

Our article contributes to three themes in strategy research. First, our results provide insights for the growing literature on improving the management capabilities of startup founders (Bloom & Van Reenen, 2007; Teece, 2007). Strikingly, our results suggest that advice can help to diffuse evidence-based management practices that have been highlighted in prior work (e.g., Vissa & Chacar, 2009), but also that advice may hinder performance by spreading poor managerial practices. While a significant recent literature has focused on formal training (Bryan et al., 2017; Camuffo et al., 2018; Fairlie et al., 2015; Howell, 2017; Lyons & Zhang, 2018) as a mechanism for disseminating management knowledge, we provide causal evidence that less formal advice from peers (Lerner & Malmendier, 2013; Nanda & Sørensen, 2010) can be just as crucial for firm performance. Further, we document that formal training can limit the effect of advice, for better or worse.

Second, our paper links to prior literature on how strategy influences startup performance. This work has documented the role of business-model choices (Zott & Amit, 2007), alliance networks (Baum et al., 2000; Shan, Walker, & Kogut, 1994; Stuart, Hoang, & Hybels, 1999), commercialization strategies (Aggarwal & Hsu, 2009; Marx, Gans, & Hsu, 2014), patenting (Hsu & Ziedonis, 2013), firm names (Belenzon, Chatterji, & Daley, 2017), location (Stuart & Sorenson, 2003), and equity splits (Hellmann & Wasserman, 2016) in determining firm performance. Within this domain, our paper is particularly germane for the literature on how human-capital practices develop inside startups (Baron, Diane Burton, & Hannan, 1996) and how these decisions impact performance (e.g., Baron & Hannan, 2002; Cardon & Stevens, 2004).

Third, our results are particularly relevant for the burgeoning literature on entrepreneurship in emerging markets. The lack of management capabilities is especially acute in emerging economies where formal business training and incubator/accelerator programs are relatively nascent compared to robust ecosystems such as Silicon Valley, London or Tel Aviv (Dutt et al., 2016; Mair & Marti, 2009). In these environments, many entrepreneurs turn to informal business advice from peers and mentors as a primary source to learn about management and improve their company's performance (Peng & Heath, 1996; Vissa & Chacar, 2009). Our results demonstrate that good advice is available but is ultimately a limited resource. A key challenge for emerging economies will be to scale high-quality advice for entrepreneurs.

Finally, while our treatment is at the founder-level, our field experiment is one of the few in strategic management that explores the outcomes of high-growth startups (Chatterji, Findley, Jensen, Meier, & Nielson, 2016). The work most similar to our own, Cai and Szeidl (2018) and Fafchamps and Quinn (2015), studies the impact of larger peer groups (see Angrist, 2014) on the diffusion of management knowledge across traditional small- and medium-sized enterprises. Since strategy and entrepreneurship scholars increasingly study high-growth startups, and inter-firm spillovers are

crucial for organizational learning, we believe our empirical context is a particularly advantageous feature of our study.

We also acknowledge important limitations in our approach. Although comparable to many published experimental studies and even those with secondary data, our sample size is modest. Our limited sample constrains the conclusions we draw, particularly about contingencies and mechanisms. Further, because we cannot observe the day-to-day changes to management practice inside all of the firms in our sample, our ability to pinpoint a specific mechanism is limited. Despite our modest sample size, however, we capture a meaningful proportion of early-stage Indian software firms. We believe that our results have strong external validity vis-a-vis this population and for similar high-growth startups around the world. Future research would be needed to generalize these results to other sectors where human capital might be less important or to more traditional small businesses.

Furthermore, this article narrowly focuses on the role of advice in learning because it is an important channel through which knowledge flows in our setting (Hallen et al., 2014). Argote, Ingram, Levine, and Moreland (2000) refer to as vicarious learning or learning from other people's experience. However, advice is still only one of many channels through which founders and their firms learn. Future research should understand how our findings relate to other kinds of learning such as learning from one's own experience, actively searching for new knowledge and experimentation (Argote, 2013; Gavetti & Rivkin, 2007; McDonald & Eisenhardt, 2014; McGrath & MacMillan, 1995).

In addition, our current study is unique in that we demonstrate a causal effect of an important real-world phenomenon, namely advice, 2 years after the initial intervention. Yet, we cannot fully uncover all the mechanisms through which advice impacts growth and survival. Specifically, with our data we cannot disentangle the effect of the advice given during the retreat and any follow-on advice between randomly assigned peers. Since we find that founders from same region experienced a stronger advice effect, we believe that follow-on advice may be strengthening our treatment effect.

We hope these results encourage new research on what entrepreneurs can learn from advice and the conditions under which peer advice is most important. Research exploring the value of advice has great potential to inform policy and practice, especially in emerging markets where formal training is hard to access.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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