Received: 30 September 2017 | Revised: 9 April 2019 | Accepted: 10 April 2019 | Published on: 18 June 2019

DOI: 10.1002/smj.3048

SPECIAL ISSUE ARTICLE

STRATEGIC MANAGEMENT JOURNAL WILEY

Centers of gravity: The effect of stable shared leadership in top management teams on firm growth and industry evolution

Rajshree Agarwal[1] | **Serguey Braguinsky**[1,2,3] | **Atsushi Ohyama**[4]

[1]Robert H Smith School of Business, University of Maryland, College Park, Maryland

[2]National Bureau of Economic Research, Cambridge, Massachusetts

[3]Institute of Social and Economic Research, Osaka University, Osaka, Japan

[4]Institute of Innovation Research, Hitotsubashi University, Tokyo, Japan

Correspondence
Rajshree Agarwal, Robert H Smith School of Business, University of Maryland, College Park, MD 20742.
Email: rajshree@umd.edu

Funding information
JSPS KAKENHI, Grant/Award Number: 15KK0078; National Science Foundation, Grant/Award Number: 1632833

Abstract

***Research Summary*:** We study the processes of firm growth in the evolution of the Japanese cotton spinning industry during 1883–1914 by integrating strategy and historical approaches and utilizing rich quantitative firm-level data and detailed business histories. The resultant conceptual model highlights growth outcomes of path dependencies as firms evolve across periods of single versus shared leadership, establish stability in shared leadership, or experience repeated discord-induced top management team (TMT) leader departures. While most firms do not experience smooth transitions to stable shared TMT leadership, a focus on value creation, in conjunction with talent recruitment and promotion, enabled some firms to achieve stable shared leadership despite discord-induced departures, engage in long-term expansion, and emerge as "centers of gravity" for output and talent in the industry.

***Managerial Summary*:** We demonstrate stable shared leadership is at root of firms who emerge as centers of gravity in an industry and account for the lion's share of output. Stable shared leadership enables growth strategies such as talent recruitment, product diversification, downstream integration, and acquisitions. Stable shared leadership, however, is extremely difficult to maintain. Most firms experience discord-induced departures in TMTs due to politics and power struggles. Firms that deviate from this norm to become industry leaders achieve stable shared

leadership by adhering to fundamental principles related to long-term value creation as opposed to short-term gain, adoption of merit-based promotion systems in defiance of stereotypes, sharing of power within TMT leadership to enable efficient division of labor, and honorable resolution of conflicts and ethical breaches.

KEYWORDS

entrepreneurial firm growth, historical methods, industry evolution, stable shared leadership, top management teams

1 | INTRODUCTION

A few firms often dominate as industries evolve from early stages of entrepreneurial entry through shakeouts and market consolidation (Gort & Klepper, 1982; Klepper, 1996). Firm characteristics such as first mover advantage, pre-entry experience, scale economies, and returns to innovation are often used to explain this dominance (Bayus & Agarwal, 2007; Klepper & Simons, 2000; Klepper, 1996). This led Felin, Foss, and Ployhart (2015) to note: "evolutionary arguments in strategy … are fundamentally silent about individuals" (p. 581). Our study answers calls for examining the micro-foundations of firm's managerial talent (Abell, Felin, & Foss, 2008) by addressing the questions: What characteristics of top management teams (TMTs) determine which firms are likely to grow and dominate in an industry? How do these characteristics impact the strategies undertaken by the firm, as they leverage opportunities or confront impediments to growth?

We answer the above questions in the historical context of the Japanese cotton spinning industry. This industry and time period are ideal for three reasons. One, the industry exhibits the classic patterns documented in industry evolution studies, and represents a context where some firms rose among seemingly identical others to become "centers of gravity," a term we use to denote those firms who represented the industry's leading share for talent and output, and thus dominance in an industry. Two, the time period represents the concurrent emergence of Japan's status as an industrialized nation and its educational system. Importantly, Japan's firm governance system during this period closely resembles what we observe in the West, then and now.[1] Three, rich firm and industry historical accounts documented *at the time of occurrence* enable triangulation of qualitative and quantitative data over entire firm and industry lifecycles, and uncover TMT transitions and evolution through entry and exit of members.

In undertaking the study, we depart from the typical hypothesis-testing used in strategic management studies, and also from the typical narrative approach used in historical research. Instead, we integrate both approaches, consistent with studies combining deep dives into phenomena over long periods with rigorous empirical methods (Braguinsky & Hounshell, 2016; Ingram, Rao, & Silverman, 2012). We first utilize rich historical data to inform the quantitative panel data analysis

[1]While Japanese firms are sometimes viewed to have a consensus decision-making culture (e.g., Aoki, 1990), the view applies (if at all) to much later periods, such as immediately pre- and post-World War II. During our study period, the Japanese economic system and its firm governance system closely resembled the West (Noguchi, 1998; Okazaki & Okuno-Fujiwara, 1993). This is reflected in corporate governance and decision making of firms included in our study; almost 90% were joint stock corporations with dispersed ownership and decision-making.

and adjudicate across plausible relationships among key variables of interest. Consistent patterns observed in the quantitative analysis across different empirical specifications and over different historical periods then serve as guiding lights for the historical narrative, and enable separating the wheat from the chaff. Together, these inform the path dependencies through which TMT characteristics manifest into growth implications, and uncover the mechanisms at play.

The quantitative analysis reveals a strong association between stable shared TMT leadership and *future* firm growth. Shared leadership is defined as the presence of two or more active TMT leaders at the helm. We leverage historical data to discern actual leaders within the TMT rather than simply rely on titular designations. Stability in TMT is defined as the *lack* of discord-induced departures (when one of the leaders is ousted or resigns due to a conflict within shared leadership teams). We find that periods of single leadership are associated with lower future growth, and periods following discord-induced departure events, especially repeated ones, are associated with even lower future firm growth. Importantly, firms with stable shared leadership accumulate more resources, most notably, they recruit and accumulate better engineering talent, and this eventually leads them to become "centers of gravity" in the industry.

The quantitative findings set the stage for an in-depth examination of business histories. A comparison of seemingly similar firms (early movers with similar size) reveals salient pathways of TMT evolution for growth consequences. Becoming a center of gravity through smooth transition to stable shared leadership was the exception rather than the norm. A few firms with single leadership all through their history experienced limited growth and exit. The majority of firms experienced discord-induced departures of TMT leaders. Regardless of whether the underlying reasons for the departure related to strategic, interpersonal, or ethical discords, these firms followed one of two distinct pathways. Some firms were able to establish stable shared leadership because they focused on value-creation in their resolution of discord-induced departures, and were willing to break from tradition by promoting talent to their TMT based on merit for human capital complementarities. In turn, stable shared leadership permitted these firms to become centers of gravity through long-term expansion strategies such as superior product choice, expansion of scale (including acquisition of less well managed firms), and downstream integration. In contrast, other firms failed to establish stable shared leadership. Their business histories reveal either multiple discord-induced departures stemming from politics and power struggles, or reversion to single leadership. These firms, hampered in their ability to pursue growth strategies, experienced limited growth, and ultimately exited the industry.

Taken together, our findings contribute to existing literature streams in entrepreneurship, TMTs, and evolutionary economics by uncovering path dependencies and embracing the endogeneity and feedback effects over time between managerial talent, firm, and industry evolution. Stable shared leadership is not something firms are endowed with exogenously. The in-depth examination of business histories allows us to open the black box of "higher-level" causality, revealing the fundamental factors that influence explanatory variables in the quantitative analysis. The combinations of quantitative analysis with historical methodology depict how firms evolve through virtuous spirals between stable shared leadership, accumulation of talent and physical capital, and growth for industry dominance. Across an industry census, we highlight that the growth of entrepreneurial firms is intricately related to founding teams developing stable shared leadership as they transition to TMTs over the firm lifecycle.

2 | THE EVOLUTION OF THE JAPANESE COTTON SPINNING INDUSTRY

The Industrial Revolution started with the mechanization of cotton spinning, which was also the starting point to Japan's status as the only industrialized nation in the East during much of the 20th

century (Saxonhouse, 1974). Emerging from feudalism and autarky in the 1860s, Japan's opening of the economy introduced imports which obliterated its pre-industrial cotton spinning manufacturing (Bernhofen & Brown, 2004), but also enabled the creation of an entirely new, mechanized cotton-spinning industry (Ohyama, Braguinsky, & Murphy, 2004). Figures 1 and 2 represent the industry's evolution between inception in the early 1880s and the start of World War I in 1914, divided into seven periods of roughly equal length corresponding to major industry evolution events (see Supporting Information Appendix A for data sources and compilation). The first period is characterized by heavy government involvement, although half of the industry output was produced by a private organization with no government support (Braguinsky & Hounshell, 2016). The second period of "firm take-off" occurred due to the first wave of entrepreneurial entrants after the government withdrew industry support. Periods 3 through 5 represent the growth, shakeout, and onset of the maturity stages, and periods 6 and 7 represent increased consolidation and subsequent stabilization.

Figure 1 depicts the now classic patterns in the evolution of the number of firms, along with the shares of the seven leading firms in industry output. These seven firms, in the order of their 1914 size, are: Kanebo, Mie, Settsu, Amabo, Godo, Fujibo, and Osaka (see Supporting Information Appendix C for full names and business histories). While the first two periods show high output shares for the leading firms, imports dominated the market and the few Japanese firms operated at a very small scale. Imports were exceeded by domestic production in the middle of Period 2 (1890) and became negligible toward the end of Period 3 (Braguinsky & Hounshell, 2015). Post-Period 3, the shares of the seven leading firms increased significantly, even as the number of firms remained

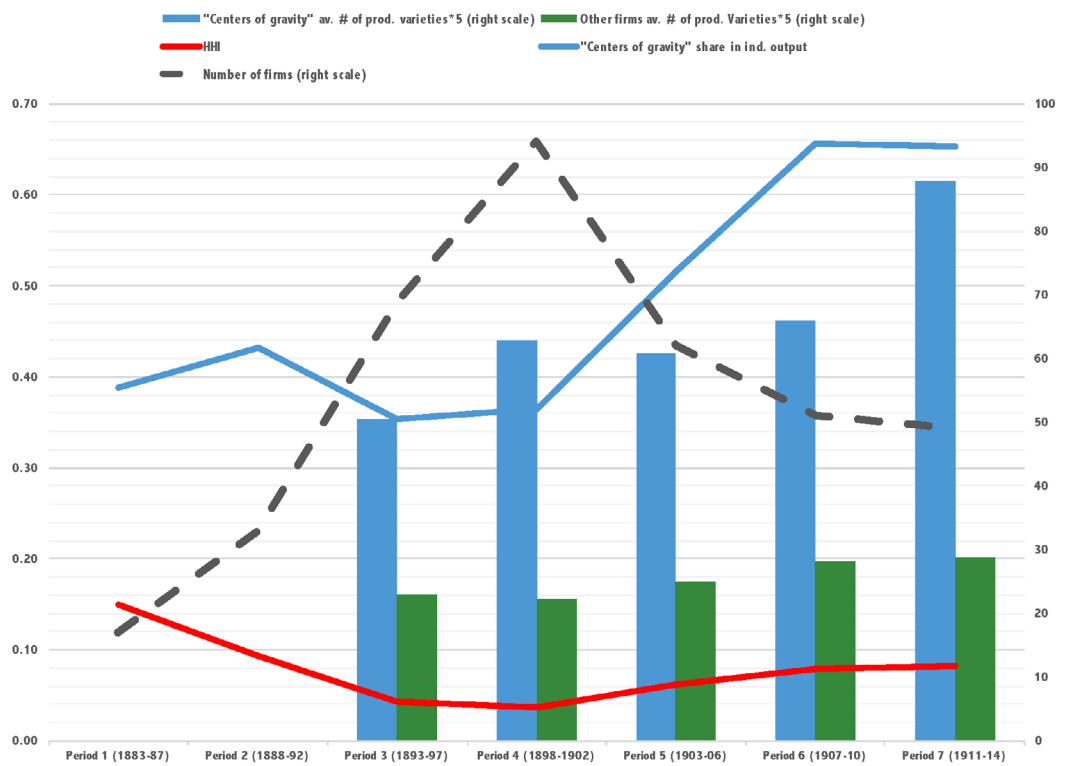

FIGURE 1 Number of firms and output concentration in the Japanese cotton spinning industry 1883–1914. *Source:* Our data, described in the text and in Supporting Information Appendix A. The number of product varieties has been multiplied by 5 to fit the right scale [Color figure can be viewed at wileyonlinelibrary.com]

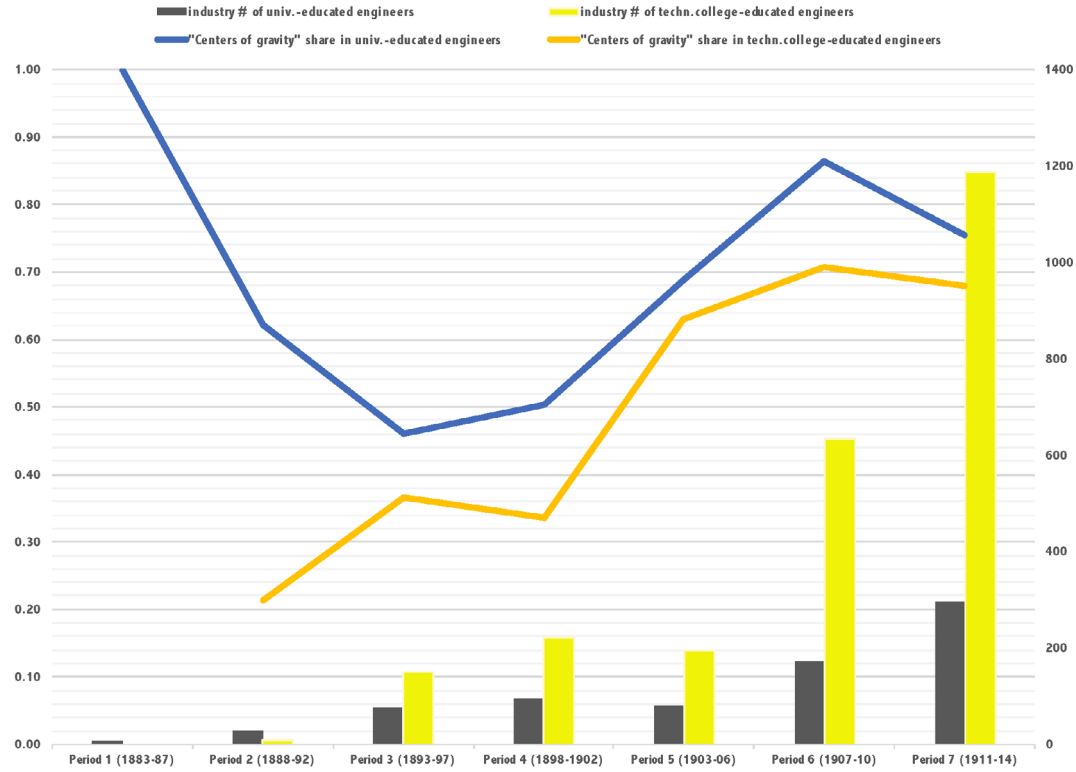

FIGURE 2 "Ultimate Centers of Gravity" shares in engineering talent, 1883–1914. *Source:* Our data, described in the text and in Supporting Information Appendix A [Color figure can be viewed at wileyonlinelibrary.com]

relatively large and the Herfindahl index was low.[2] A similar pattern is observed for product scope or variety. Post-Period 3 (when data on product varieties is available), the leading firms have significantly higher and growing average number of product varieties relative to all other firms.

In Figure 2, history affords a rare window of opportunity to examine human capital accumulation within an industry, given that Japan's industrialization was concurrent with its education system development. The first cohort of domestically educated mechanical engineers graduated in 1879 from what later became the Department of Engineering of the Imperial (Tokyo) University. There were a grand total of 57 such graduates in the whole country in 1892, the end of Period 2 in Figures 1 and 2 and only seven worked in cotton spinning. Given more university and technical school openings (such as the future Tokyo Institute of Technology) over the next two decades, the bars in Figure 2 show the dramatic growth in university and technical school educated mechanical engineers employed in cotton spinning in periods 3–7. Of particular note in Figure 2 is the seven leading firms' share of engineers: Their share of university and technical school educated mechanical engineers in the total number of such engineers employed by the industry grew from 45% to more than 75%, and from 33% to almost 70%, respectively.

Taken together, Figures 1 and 2 provide trends of product scale and scope, and of underlying talent. The increased concentration of educated engineers in the leading firms exceeds in magnitude the concentration in output, even as the total pool of educated engineers employed in the industry grew

[2]The Herfindahl index is well below the 0.15 lower bound threshold used to define "moderately concentrated" industry (see https://www.justice.gov/atr/herfindahl-hirschman-index)

exponentially. Hence, educated engineers increasingly "gravitated" to the seven leading firms as if those were some "centers of gravity." Figures 1 and 2 motivate our study, which at its core is interested in understanding the following fundamental question: At the early stages of the industry, how could one have predicted which of the seemingly identical startups would grow and develop into "centers of gravity" and which would fizzle?

3 | RESEARCH QUESTIONS AND DESIGN

Industry evolution scholars model *firm* or *environmental* characteristics as determinants of industry evolution (Malerba, Nelson, Orsenigo, & Winter, 1999; Klepper, 1996), and firm performance (Agarwal, Sarkar, & Echambadi, 2002). Missing is the role of individuals for shaping firm level factors such as technical and market experience, first mover advantage, economies of scale, and returns to innovation, and their effects on competitive dynamics of the environment (Felin et al., 2015). Even scholars examining individuals' knowledge and enterprise transform them to firm level constructs such as managerial routines (Zollo & Winter, 2002); managerial inertia (Tripsas & Gavetti, 2000); or technical, market, or complementary resources (Agarwal & Shah, 2014).

Separately, literature streams on founding and TMT link team characteristics and processes to firm performance, including growth (DeSantola & Gulati, 2017; Lazar et al., 2019). Here, scholars particularly highlight how *negative drivers* such as power dynamics and political jockeying may impact founder departure, firm strategy, and firm performance (Boeker & Karichalil, 2002; Eisenhardt & Bourgeois, 1988; Kaplan, 2008). However, this literature does not explicitly connect to firm and industry evolution by comparing firms that harness positively the "human element" in the creation of organizational capabilities (Chandler, 1977, 1990) to firms that fall prey to the negative drivers.

This is despite work by classical scholars whose insights underpin both literature streams. Schumpeter's (1949 [1911]) almost poetic description highlights an entrepreneur creating new combinations directly assembling, assigning, and commanding the necessary resources. For Penrose (1959), the limits to a firm's growth are not bound by a production function but by its (entrepreneurial) managerial talent and experience. Crucially, experience relates not only to each manager's individual knowledge, but also to the "working unit" of the TMT, such that the knowledge embodied in a TMT is intrinsically linked to the individuals and "cannot be separated from them." (Penrose, 1959, p. 53). Similarly, Chandler's emphasis on the "visible hand" for determining scale and scope underscores that "coordination … demanded the constant attention of a managerial team or hierarchy … and actual economies of scale and scope … depend on [their] knowledge, skills, experience and teamwork" (Chandler, 1992, p. 81). The classics point to the need for an in-depth examination of the leadership at the helm of firms, and how limits to firm growth may be addressed by sharing of leadership, and creation of stable working units.

Our research questions center on the characteristics of TMTs that determine which firms are likely to grow and dominate in an evolving industry, and how these characteristics impact the strategies undertaken by the firm. We note that studies of firm growth, particularly with a focus on managerial diseconomies and span of control (Penrose, 1959; Lucas, 1978) are not typically conducted with an industry evolution perspective. While Penrose explicitly and unapologetically stated her interest only in firms that do grow (Penrose, 1959, p. 33), there may be additional insights regarding which characteristics are most salient for firm and industry evolution through an inclusion of firms that do not grow into the analysis.

To examine the role of TMT and to explore the underlying mechanisms at play, we create and utilize unusually rich quantitative and qualitative data at multiple levels—individuals, teams, and firms—within the historical evolution of the Japanese cotton spinning industry. Our research design integrates the standard econometric analysis employed in strategic management studies with the historical approach that leverages rich information on events, strategies, and processes that transpire over time. Such triangulation enables a deeper understanding of both *why* and *how* the critical variables of interest influence outcomes such as firm performance. Specifically, we first rigorously test how shared and stable leadership at each given point in time affects *future* (3- and 5-year) growth rates of the firm. We use a rich set of controls, including firm fixed effects for unobservable time-invariant firm characteristics. We also conduct several robustness tests and examine potential mechanisms underlying these relationships. Second, we use historical data to "unravel" business histories of similar-looking early movers and uncover path-dependencies in the relationship between shared TMT leadership stability and growth. Such an analysis enables the identification of "higher order" causal factors that resulted in the evolution and emergence of some firms as centers of gravity, and other seemingly identical firms to experience limited growth and ultimate exit.

4 | DATA DESCRIPTION AND QUANTITATIVE ANALYSIS

We conduct our study of the Japanese cotton spinning industry in 1883–1914 by compiling a unique database through careful matching of information from various archival sources (see Supporting Information Appendix A). Information on industry, firms and TMT was obtained from (a) the monthly and semi-annual bulletins of the All-Japan Cotton Spinners Association (Geppo, 1889–1920 and Sankosho, 1903–1920), containing firm-level input–output, product varieties and financial information; (b) the seven-volume history of the industry with dedicated chapters for every firm (Kinugawa, 1964); and (c) semi-annual firm reports to shareholders and from company histories (Kōkajō, 1883-1914; Fuji Boseki, 1998; Kanebo, 1988; Toyo Boseki, 1986; Unitika, 1989). Additional biographical data on human capital—executives and engineers—were obtained from annual registries, including the "Zenkoku Shogaisha Yakuinroku" (All-Japan Registry of Firms Executives; Yakuinroku, 1893–1914), the "Nihon Zenkoku Shoko Jinmeiroku" (All-Japan Registry of Traders and Craftsmen; Jinmeiroku, 1892, 1898, 1907), and university/technical schools' alumni lists. We cross-checked the data across multiple sources (e.g., compared information across work affiliations in alumni lists and white-collar workers in "Yakuinroku," company reports ("Kōkajō"), and Kinugawa, 1964)

Together, these sources helped create a comprehensive, almost census panel on TMTs, engineers, and firms operating in the industry over all evolutionary stages. The unbalanced panel contains 1,350 observations on 125 firms from 1883 to 1914, all those operating in the industry during those years for at least 1 year. We excluded 28 firms that either entered right before the end of our sample, or exited almost immediately upon entry because we needed at least 3 years of data for meaningful analysis. Also, lack of systematic data on TMTs of seven small privately held firms resulted in their exclusion. The final dataset used for the quantitative analysis includes 90 firms (77 were chartered corporations) and 1,192 firm-year observations, with a firm on average observed for 13.2 years. Eighty-one (90%) firms were startups and nine were diversifying entrants, reflecting the early stage of industrialization in Japan. Of the 81 (nine) startups (diversifying entrants), 74 (three) were greenfield entrants that constructed their own plants, while seven (six) utilized production facilities of failed predecessors. The vast majority of entering firms thus built their own production facilities, bought their own machines, and recruited their own personnel.

4.1 | TMT characteristics and growth of firms

Based on received literature, we measure various TMT characteristics. These include founding team/TMT size and diversity (Delmar & Shane, 2006; Hambrick & Mason, 1984), the centralization of power (Eisenhardt & Bourgeois, 1988; Hambrick & Mason, 1984), and stability/lack of discord-induced departures (Boeker, 1992). Table 1 summarizes the variable definitions and their empirical operationalization. Several variables, such as output growth, TMT size, functional diversity, firm size, number of employees, have standard definitions and empirical operationalizations.[3] Here, we briefly define our focal TMT characteristics and describe their construction from the data (see Supporting Information Appendix A for details).

4.1.1 | Single versus shared leadership

Consistent with scholarly work (Carson, Tesluk & Marrone, 2007; Pearce, Conger & Locke, 2007; Eisenhardt & Bourgeois, 1988), we define single versus shared leadership in a given firm for a given year based on whether the authority for strategic decision making rests with a single person (*Single Leadership Dummy* = 1), or is shared by two or more key individuals (*Shared Leadership Dummy* = 1). Rich data in company reports and histories, including biographies, enable ascertaining of roles and responsibilities for each TMT member, beyond what is provided in their titles (see Supporting Information Appendix A). Sixty-six firms had shared leadership in at least 1 year, representing 512 firm-year observations. Conditional on being among the 66 firms with shared leadership episodes, an average firm had shared leadership in about 55% of observations.

4.1.2 | Stability in TMT shared leadership (lack of discord-induced departure)

Shareholder reports of companies record all TMT changes and their ratification at shareholder meetings. Chapters dedicated to each firm in Kinugawa (1964) provide detailed information about the reasons for TMT leaders' departures. For each firm in a given year, we code departures due to discord—departures through ousting of a TMT leader or resignation for reasons other than death, illness or personal circumstances (*Discord-induced departure Dummy* = 1)—and we define stable shared leadership as the absence of such discord-induced departures. To distinguish between shared leadership firms experiencing single and multiple discord-induced departures within a 3-year period, we create dummies (*Shared Leadership with Single Discord-induced departure in Period* = 1; *Shared Leadership with Multiple Discord-induced departures in Period* = 1). Finally, we interact *Discord-induced departure* with shared leadership dummies to distinguish among shared leadership firms that experienced or did not experience these events (e.g., *Shared Leadership*Discord-induced departure* = 1; *Shared Leadership*No Discord-induced departure* = 1).

4.1.3 | Other TMT turnover variables

We also code TMT turnover not related to discord through two variables. We identify departure of a TMT leader for exogenous reasons such as death, retirement, or personal circumstances unrelated to

[3]There was no variance in TMT demographic characteristics: all were male and ethnically Japanese. Cotton spinning was Japan's first modern industry, so most firms had no pre-entry experience.

TABLE 1 Research variables

	Definitions
A. Main dependent variable	
Output growth rates	The growth rate of cotton yarns produced in physical units, measured as the difference between logged output at time $t + 1$ and that at time t. Weight units adjusted by thread count weights to account for varying thickness of different product varieties.
B. TMT characteristics variables	
Singe leadership dummy	Equals 1 if a firm was led by a single TMT leader, defined as a TMT member who actually ran the firm and made strategic decisions (not nominal heads), 0 otherwise
Shared leadership dummy	Equals 1 if a firm was led by two or more TMT leaders, 0 otherwise
Number of TMT members	The number of TMT members by title, including but not limited to TMT leaders
Number of TMT leaders	The number of TMT leaders
Functional diversity of TMT	Each TMT member is classified as a cotton yarn trader, a banker, ex-politician/bureaucrat, or entrepreneur in other business area. The share of each class filled by TMT members is calculated. The variable is 1 minus the sum of squared shares of these classes.
C. TMT turnover variables	
Discord-induced departure dummy	Equals 1 if a TMT member resigned or was ousted from the firm for reasons other than death, illness or personal circumstances unrelated to the firm, 0 otherwise
Shared leadership with single discord-induced departure in period	Equals 1 if a discord-induced departure occurred only once in three consecutive years, 0 otherwise
Shared leadership with multiple discord-induced departures in period	Equals 1 if a discord-induced departure occurred more than once in three consecutive years, 0 otherwise
Pre discord-induced departure period	Equals 1 in the 3-year period preceding the year of a discord-induced departure, 0 otherwise
Pre single discord-induced departure period	Equals 1 in the 3-year period preceding a single discord-induced departure, 0 otherwise
Pre multiple discord-induced departure period	Equals 1 in the 3-year period preceding multiple discord-induced departures, 0 otherwise
Not pre discord-induced departure period	Equals 1 if there is no discord-induced departure in the next 3-years, 0 otherwise
Exogenous departure dummy	Equals 1 if a TMT member departed for exogenous reasons, such as death, illness, or personal circumstances, 0 otherwise
Expansion of TMT dummy	Equals 1 if a new TMT member was added while no member was removed, 0 otherwise
D. Firm characteristics	
Firm age	The age of the firm since it was founded
Number of workers	Logged value of the number of floor workers employed
Number of engineers	Logged value of 1 plus the number of university educated and technical school educated engineers

TABLE 1 (Continued)

	Definitions
Market knowledge	Logged value of 1 plus the number of trading company executives and auditors or cotton traders who were also cotton spinning firms' board members in a given year
Financial knowledge	Logged value of 1 plus the number of bankers

Abbreviation: TMT, top management team.

the firm; for example, illness or family commitments (*Exogenous Departure Dummy* = 1), as well as additions to the TMT leadership (*Expansion of TMT Dummy* = 1).

4.2 | Results of analysis

We regress 3- and 5-year moving average firm growth rates on TMT characteristics using firm fixed-effects specification with robust standard errors. Our specifications mitigate potential reverse causality problems because we estimate effects of TMT leadership at time *t* on future output growth rates. The fixed effects absorb all time-invariant characteristics (e.g., first-mover advantage; founding team characteristics, pre-entry experience, and initial scale). Controls for time-variant characteristics include firm age, current output levels, numbers of university, and technical school educated engineers, and TMT market and financial ties. All regressions include year dummies to control for time-varying economy- and industry-wide conditions and shocks. Our estimation results are conditional on survival, but to the extent that exit is correlated with *lack of growth,* this should render conservative estimates of the effects.

Table 2 provides the estimation results. In Specification I, the coefficient of *Shared Leadership* is 0.058 for 3-year growth rates and 0.087 for 5-year growth rates, and the 90% confidence interval is [−0.015, 0.131] and [0.017, 0.156], respectively. Firms with shared leadership achieve 5.8% (8.7%) higher growth rates over a 3-year (5-year) span, relative to firms with a single leader. Given these high magnitudes, shared leadership alone is associated with about 20% output gap over a 10-year span, and 45% over the 20-year span. In Specification II, we replace TMT team size with the number of TMT leaders. The coefficient on shared leadership becomes larger, indicating a stronger relationship between growth rates and shared leadership. Firm age is economically and statistically positively associated with growth rates in all specifications, suggesting firms who entered earlier and/or had longer tenure had higher growth. Scale (logged current output) is negatively associated with future growth rates, consistent with findings in growth literature. Table 2 also shows the impact of the numbers of engineers and TMT members with market and financial ties. While the latter two have no discernable impact, doubling the number of educated engineers in a given year raises future 3-year growth rates of output by 19.3% and 5-year growth rates by about 16.5%.

Though Table 2 provides evidence that a firm grows faster when it has shared leadership than when it has a single leader, firms with shared leadership are also at risk of developing conflicts, due to either strategic disagreements or power struggles. Table 3 (Panel A) provides the number of times such discords resulted in a TMT leader's departure, and Table 3 (Panel B) tabulates frequencies of firm-year observations with single or shared leadership, and the periods of time where shared leadership firms experienced discord-induced departures. Seventy-seven percent of the firms with shared leadership experienced at least one such event, suggesting stability in TMT is not easy to achieve, and may be critical for firm growth. At the firm-year level, discord-induced departures of TMT leaders constitute about 25% of the observations of firms with shared leadership.

TABLE 2 Relationship between the size of top management team (TMT) and firm growth

	DV: Output growth rates			
	I		II	
Variables	**3 year**	**5 year**	**3 year**	**5 year**
Shared leadership dummy	0.058	0.087	0.105	0.125
	(0.044)	(0.042)	(0.049)	(0.066)
Number of TMT leaders			−0.022	−0.010
			(0.026)	(0.049)
Number of TMT members	0.030	0.038		
	(0.027)	(0.024)		
Functional diversity of TMT	0.023	0.039	0.028	0.042
	(0.056)	(0.057)	(0.056)	(0.058)
Firm age	0.075	0.076	0.070	0.077
	(0.023)	(0.022)	(0.024)	(0.023)
Number of engineers	0.193	0.165	0.193	0.164
	(0.032)	(0.037)	(0.032)	(0.036)
Market knowledge index	−0.039	0.006	−0.042	0.006
	(0.048)	(0.047)	(0.048)	(0.047)
Financial knowledge index	−0.003	0.005	−0.033	−0.023
	(0.053)	(0.053)	(0.048)	(0.061)
Current output	−0.707	−0.706	−0.837	−0.836
	(0.033)	(0.034)	(0.031)	(0.031)
Constant	5.972	7.527	6.010	7.597
	(0.373)	(0.381)	(0.378)	(0.389)
Observations	831	679	831	679
R^2	0.819	0.881	0.818	0.880

Note: (a) Panel estimation with firm fixed effects. (b) The omitted category is Single Leadership. (c) Robust standard errors in parentheses.

We next explore the effects of TMT changes, along with single and shared leadership, on growth rates. Once again, we conduct panel data estimation with firm fixed effects, so that growth effects are identified through within-firm variation (see Table A5 in Supporting Information Appendix B for alternative estimations). In Specification (I) of Table 4, we focus on discord-induced departures. The baseline growth rate is for single leadership firms, and the variables of interest are the interaction terms *Shared Leadership*Discord-induced departure* and *Shared Leadership*No Discord-induced departure*. Relative to single leadership firms, when firms with shared leadership experience a discord-induced departure, their 3-year growth rates are lower by 5.7%, and 5-year growth rates are lower by 4.2%, with the 90% confidence intervals of [−0.149, 0.035] and [−0.132, 0.048], respectively. In contrast, the 3-year growth rates for firms with shared leadership that experience no discord-induced departure are higher by 4.6% while 5-year growth rates are higher by 10.3%, with the 90% confidence interval [−0.029, 0.120] and [0.032, 0.174], respectively. Tests confirm that the coefficients of shared leadership with and without discord-induced departures are significantly

TABLE 3 Frequency of top management team (TMT) discord-induced departure

A. Firm-level observations		
Number of TMT discord-induced departures	**Frequency**	**%**
0	15	22.73
1	23	34.85
2	15	22.73
3	4	6.06
4	6	9.09
5	1	1.52
6	2	3.03
Total	66	

B. Firm-year level observations		
	TMT discord-induced departure	**No TMT discord-induced departure**
Single leadership	NA	765
Shared leadership	106	425

different (with *p*-values of .07 and .01 for 3-year and 5-year growth rates, respectively). Once again, educated engineers have an independent and large positive contribution to output growth, but there is no discernible impact of market and financial ties.

In Specifications (II) and (III) of Table 4, we examine exogenous departures of a TMT leader, and expansions respectively. This permits comparisons of growth rates due to different changes, and the examination of potential endogeneity concerns stemming from joint determinants of growth prospects and TMT leadership departures. The coefficients on the interaction terms of *Shared Leadership*Exogenous Departure* and *Shared Leadership*No Exogenous Departure* are not statistically different in Specification (II). Similarly, there is no statistical difference in Specification (III) across the interaction terms of *Shared Leadership*TMT Expansion* and *Shared Leadership*No TMT Expansion.* Thus, while discord-induced departures (Specification I) reduce future growth rates, the same is not true for either exogenous departures, or TMT expansions.

Overall, the results suggest future growth rates of firms that maintain stable shared leadership exceed those of both single-leader firms and firms with shared leadership who lack stability. Interestingly, coefficients of TMT functional diversity in Tables 2 and 4 do not have statistical significance in explaining firm growth. Also, comparisons across specifications in Table 4 suggest disruptions of the TMT through discord-induced departures are costliest and result in biggest differences in future firm growth. We probe this deeper by examining one-time versus repeated TMT leader discord-induced departures. Repeated events are indicative of more systemic leadership problems, and pose greater disruptions to the firm than one-off departures and subsequent quick stabilization. This bears out in Table 5. The coefficient on *Shared Leadership with Single Discord-induced departure in Period* exhibits no statistically significant difference from the coefficient on *Shared Leadership with No TMT departure* (*p*-value for test 1 is .80 and .63 for 3- and 5-year growth rates, respectively). But, relative to the single leader firm baseline, firms with *Shared Leadership with Multiple Discord-induced departures in Period* have 16.7% and 22.6% lower growth rates, with 90% confidence

TABLE 4 Relationship between top management team (TMT) departures and growth rates

	DV: Output growth rates					
	I. Discord-induced departure		II. Exogenous departure		III. TMT expansion	
Variables	**3 year**	**5 year**	**3 year**	**5 year**	**3 year**	**5 year**
Shared leadership with TMT change	−0.057	−0.042	0.062	0.044	0.065	0.015
	(0.056)	(0.054)	(0.066)	(0.064)	(0.065)	(0.071)
Shared leadership without TMT change	0.046	0.103	0.070	0.069	0.071	0.070
	(0.045)	(0.043)	(0.039)	(0.039)	(0.039)	(0.038)
Number of TMT members	0.044	0.044	0.031	0.048	0.031	0.054
	(0.026)	(0.023)	(0.026)	(0.023)	(0.027)	(0.023)
Functional diversity of TMT	0.035	0.053	0.028	0.035	0.029	0.040
	(0.057)	(0.057)	(0.056)	(0.058)	(0.056)	(0.058)
Number of engineers	0.188	0.162	0.195	0.167	0.196	0.169
	(0.032)	(0.037)	(0.032)	(0.037)	(0.032)	(0.037)
Market knowledge index	−0.043	−0.010	−0.039	0.005	−0.039	0.002
	(0.048)	(0.048)	(0.048)	(0.047)	(0.048)	(0.047)
Financial knowledge index	−0.001	−0.037	−0.004	−0.033	−0.005	−0.038
	(0.052)	(0.060)	(0.053)	(0.061)	(0.053)	(0.062)
Firm age	0.078	0.080	0.077	0.082	0.077	0.078
	(0.022)	(0.026)	(0.022)	(0.022)	(0.022)	(0.022)
Logged current output	−0.709	−0.840	−0.706	−0.836	−0.706	−0.835
	(0.034)	(0.031)	(0.033)	(0.031)	(0.033)	(0.031)
Constant	5.968	7.546	5.945	7.507	5.942	7.478
	(0.369)	(0.378)	(0.377)	(0.384)	(0.378)	(0.384)
p-Value for test 1	0.068	0.010	0.893	0.660	0.915	0.403
Observations	831	679	831	679	831	679
R^2	0.820	0.882	0.819	0.881	0.819	0.881

Note: (a) Panel estimation with firm fixed effects. (b) The omitted category is Single Leadership. (c) Robust standard errors in parentheses. (d) Test 1 tests the null hypothesis that Shared Leadership with TMT change = Shared Leadership without TMT change.

intervals of [−0.308, −0.026] and [−0.393, −0.059] for 3- and 5-year spans, respectively. A null of no significant differences between these firms and stable shared leadership firms is rejected at *p* values of .002 and .001, respectively.

4.3 | Robustness tests and preliminary examination of possible mechanisms

Our rich set of controls and fixed-effects specification already absorb multiple unobserved characteristics that may create heterogeneity across firms to provide within-firm explanations for growth. The results are additionally robust to alternative specifications (details in Supporting Information

TABLE 5 Single discord-induced departures versus multiple discord-induced departures

	DV: Output growth rates	
Variables	**3 year**	**5 year**
Shared leadership with single discord-induced departure	0.083	0.106
	(0.063)	(0.058)
Shared leadership with multiple discord-induced departures	−0.167	−0.226
	(0.086)	(0.101)
Shared leadership without discord-induced departures	0.098	0.134
	(0.048)	(0.047)
Number of TMT members	0.035	0.040
	(0.027)	(0.023)
Logged number of engineers	0.172	0.133
	(0.032)	(0.036)
p-Value for test 1	0.803	0.629
p-Value for test 2	0.002	0.001
Observations	799	653
R^2	0.808	0.878

Note: (a) Panel estimation with firm fixed effects. (b) The omitted category is Single Leadership. (c) Robust standard errors in parentheses. (d) Test 1 tests the null hypothesis that Shared leadership with single discord-induced departure = Shared leadership without discord-induced departures. (e) Test 2 tests the null hypothesis that Shared leadership with multiple discord-induced departures = Shared leadership without discord-induced departures. (f) Functional diversity of TMT, Market knowledge index, Financial knowledge index, Firm age, Logged current output, and the constant term are included but coefficients not reported. See Table A3 in Supporting Information Appendix B for full results.
Abbreviation: TMT, top management team.

Appendix B). Random-effects and Arellano-Bond estimation yield similar results (Supporting Information Appendix B, Table A5), and the Oster diagnostic test reveals that selection on unobservables is not likely to overturn the estimation results (Table A6).

We also quantitatively explore potential underlying mechanisms and set the stage for the qualitative section below. Based on results in Supporting Information Appendix B, Table A7, it appears that discord-induced departures have a negative impact on growth rate due to adjustment costs (incurred *after* the departure as the firm deals with the disruptions and adjusts to the loss of a prior leader), rather than due to disagreement costs (incurred *prior* to the departure due to ongoing conflicts and disagreements among TMT members). Importantly, stable shared leadership is strongly associated with accumulation of both talent and physical capital (Supporting Information Appendix B, Table A8). It also has a strong association with growth through diversification—in terms of both product scope and downstream integration (Table A9). However, stable shared leadership does not seem to proxy for underlying ownership structure or corporate governance. The majority of firms in the industry were joint stock, limited liability corporations with diffused and fluid ownership. Supporting Information Appendix B, Table A10 additionally provides summary statistics which show very small differences, if any, between stable shared leadership and the fraction of shares held by the top 5 shareholders, or by board members (executives and auditors). Finally, in Supporting Information Appendix B, Table A11, the random-effects specification depicts that first mover advantage and pre-entry experience are not statistically significant in explaining growth. We note,

however, that this may likely be because many first-movers in the industry were government supported rather than private enterprises, and very few of the entrants in this historical time period had pre-entry experience.

5 | QUALITATIVE ANALYSES OF FIRM BUSINESS HISTORIES

The quantitative analyses of all firms in the industry produced three important insights. One, shared leadership enabled higher growth than single leadership. Two, the advantages of shared leadership tended to dissipate in periods following discord-induced departures, and became strongly negative in case of repeated departures. Three, accumulation of engineering talent positively contributed to growth, and was itself facilitated by stable shared leadership. We now turn to a deeper examination of the factors underlying firms who experienced such high growth that they emerged as "centers of gravity" in the industry. Historical data replete with qualitative information captured *at the time of occurrence* enable us to directly examine mechanisms underlying the observed relationships, rather than rely on indirect inferences from quantitative analysis.

We begin by revisiting the output trends in Figure 1 (note that five center of gravity firms entered by Period 2, and two entered later). The average output of the centers of gravity firms grew by 13.1% per year, compared to 8% per year for all other firms. This almost tripled the size gap between the two groups, from 3.57 in 1893 to 9.13 in 1914. Figure 3 depicts shared leadership (lines) and

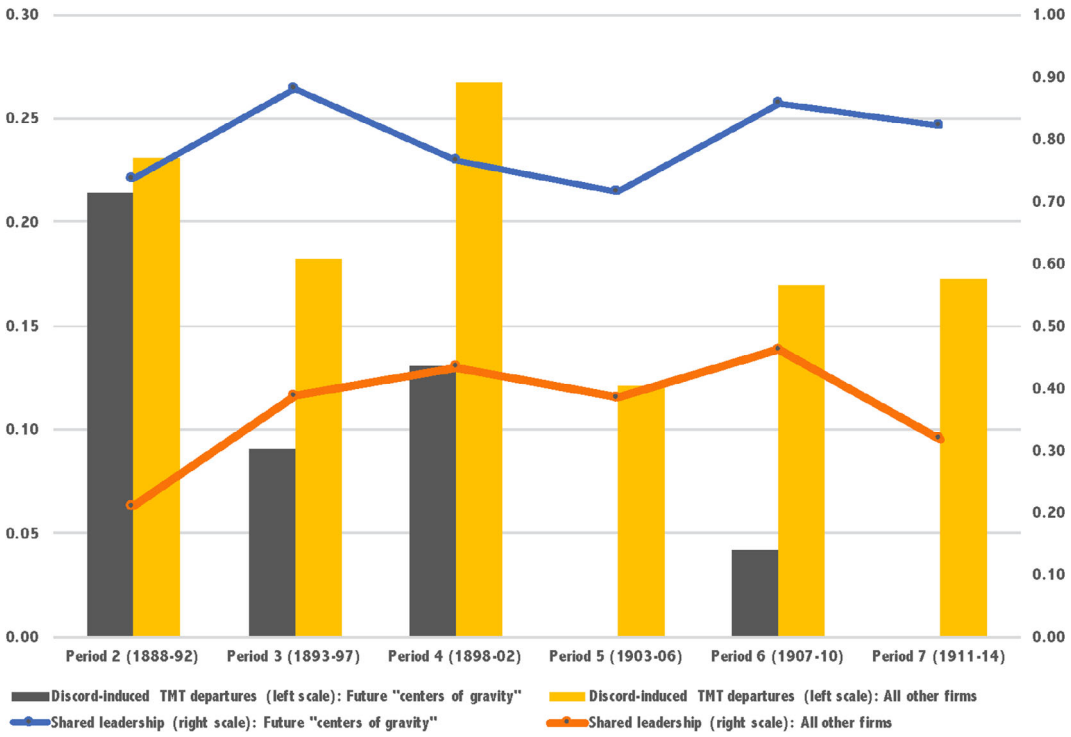

FIGURE 3 Shared leadership and discord-induced departures: Eventual "centers of gravity" and other firms. *Source:* Our data, described in the text and in Supporting Information Appendix A [Color figure can be viewed at wileyonlinelibrary.com]

discord-induced departures (bars) for the two groups. Centers of gravity firms exhibited shared leadership in 74% of observations in Period 2, compared to little over 20% for other firms in the same period. The number of firm-year observations with shared leadership in centers of gravity increases on average to almost 90% in the next period and stays high, while other firms on average never cross the 50% threshold. For discord-induced departures, the dynamics reveal that the two groups are not different in the earliest period (both have discord-induced departures on average once every 5 years), but TMTs in centers of gravity become more stable over time.

Figure 4 provides the evolution of TMT composition in the centers of gravity versus other firms in three types of human capital: university-educated TMT leaders (including but not limited to engineers), "traders" (cotton yarn and garments merchants), and "bankers" (bank executives). Of important note is that having recently emerged from feudalism, Japan still had a "glass ceiling" against ascension for anyone not from a reputable merchant family, or without financial wealth. Promoting a university-educated engineer or manager (who were generally not rich) to the TMT thus required breaking with strong cultural/traditional norms. In this light, the most striking aspect of Figure 4 is the big divergence, starting in Period 3, between centers of gravity and other firms in terms of the fraction of TMT leaders with university education. In contrast, while a greater fraction of centers of gravity than other firms had at least one TMT leader with bank ties initially (enabling entry at a larger size), bankers on center of gravity TMTs sharply declined with time and became largely absent by the mid-1900s (Figure 4). This is indicative of centers of gravity having accumulated resources and access to internal finance, with less need for bank ties. Consistent with the regression results,

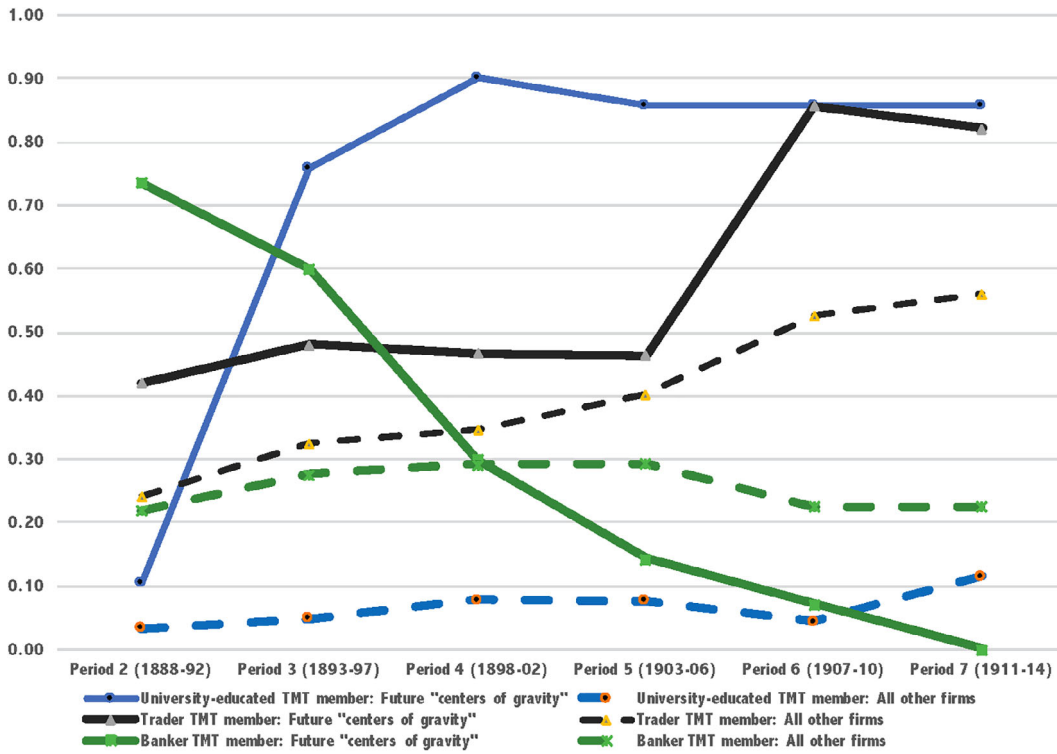

FIGURE 4 TMT composition dynamics: Eventual "centers of gravity" and other firms. *Source:* Our data, described in the text and in Supporting Information Appendix A [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 6 Shared leadership and acquisitions

	Shared leadership (a)	Discord-induced TMT departures (b)	Ratio: (b)/(a)
Serial acquirers (from Braguinsky et al., 2015; Centers of Gravity in Table 7)	0.852	0.049	0.058
Firms acquired by serial acquirers	0.424	0.062	0.146
Other acquiring firms	0.380	0.055	0.144

Source: Braguinsky et al. (2015), matched with our data, described in the text and in Supporting Information Appendix A.

there is thus little association between bank ties and firm growth on average as the industry evolved. Centers of gravity were also more likely to have at least one trader in TMT at time of founding relative to other firms, though the gap was smaller relative to university-educated engineers or bankers. Also, both centers of gravity *and* other firms show increases in the number of traders as TMT leaders through time. The trends are almost parallel (Figure 4), which may be why the regression analysis did not find significance of market ties.

Lastly, Table 6 relates shared leadership and discord-induced TMT departures in center of gravity firms (the large serial acquirers), their acquisition target firms, and all other acquiring firms. Relating Braguinsky et al.'s (2015) findings of acquisition of higher-productivity fixed assets by better managed firms, centers of gravity had shared leadership twice as often as the firms they acquired. In contrast, discord-induced TMT departures were 2.5 times more likely to occur in the future acquired firms than center of gravity firms. Interestingly, as seen in the last row of Table 6, other acquiring firms were not much different from the target firms in these two dimensions, and almost half of them ended up eventually being acquired themselves.

In conjunction, the quantitative analysis, Figures 3 and 4, and Table 6 indicate a causal relationship from stable shared leadership to higher firm growth and eventual emergence of seven firms as centers of gravity. These firms additionally broke with tradition by promoting educated talent, and were serial acquirers of other firms for physical assets. We now turn to the questions of *how* and *why* this is the case.

5.1 | Qualitative comparison of seemingly similar startups

We use historical data to reveal path dependencies in how and why some, but not all, of the initially similar firms transitioned to stable shared leadership. This allows verifying the quantitative analysis' causal interpretations by examining *why* TMT leadership evolved the way it did, *what* reasons led to critical TMT leadership choices, and *how* these choices led to differences in both TMT characteristics and outcomes of competitive strategies and growth. Put differently, by presenting the whole sequence of key events in the evolution of firms and their TMTs starting from firm inception, we shed light on endogenous processes that enabled stable shared TMT leadership and propelled their firms toward becoming centers of gravity.

We ensure an appropriate comparison set of initially similar startups (and draw on other firms as relevant). We focus on first movers (firms entering prior to 1892, the year of firm take-off), with minimum efficient scale of at least 10,000 spindles either at or shortly after entry (and prior to 1892), who survived for at least 10 years. Sixteen of 35 firms that entered prior to 1892 meet these criteria. The firms include five centers of gravity firms (Kanebo, Mie, Settsu, Amabo, and Osaka), and

TABLE 7 Comparisons across similar-sized 16 early startups

Explanatory variables		# in each category	Initial size (# of spindles)	10-year capacity growth rate (%)	Number to become centers of gravity	10-year change in number of educated engineers (%)
Shared leadership at entry	Yes	9	15,702	163	4	13%
	No	7	11,371	191	1	50
TMT stability at or above median	Yes	8	15,276	206	5	43
	No	6	13,811	103	0	−33
University-educated engineer at entry	Yes	10	15,426	183	5	10
	No	6	11,622	139	0	

Notes: Centers of Gravity: Kanebo, Mie, Settsu, Amabo, Osaka. Other startups: Tenma, Naniwa, Hirano, Senshu, Miike, Nagoya, Okayama, Owari, Calico, Tokyo, Tamashima.

Abbreviation: TMT, top management team.

Source: Our data described in the main text and Supporting Information Appendix A.

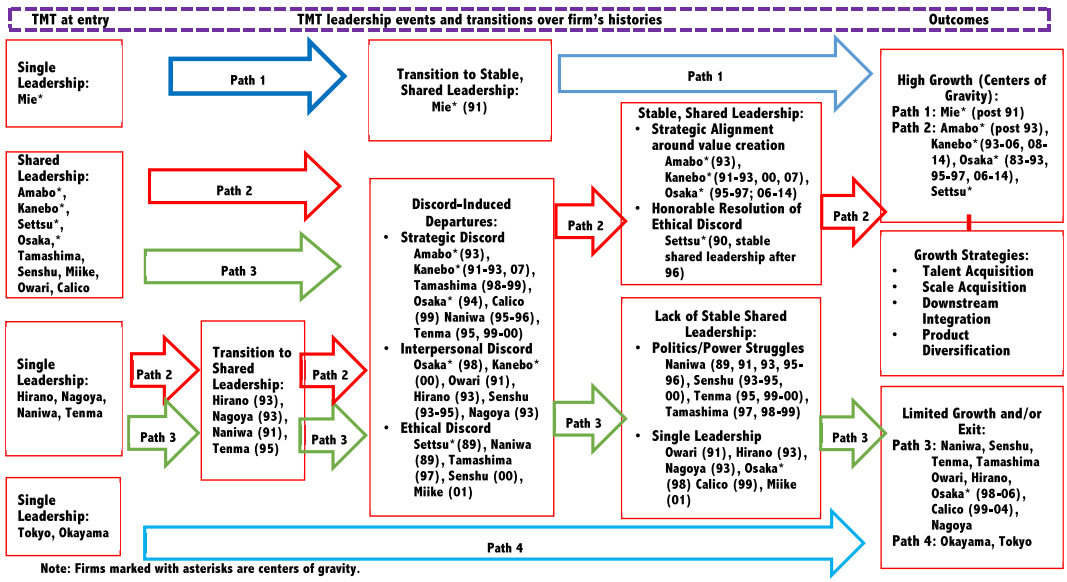

FIGURE 5 Evolutionary paths of 16 startups from entry to 1914 [Color figure can be viewed at wileyonlinelibrary.com]

11 other firms (Tenma, Naniwa, Hirano, Sensu, Miike, Nagoya, Okayama, Owari, Calico, Tamashima, and Tokyo).[4]

Table 7 and Figure 5 provide a summary of insights from the qualitative comparisons, and their connection to the explanatory variables highlighted from the quantitative analysis above. In Table 7, we group the 16 startups by explanatory variables used in the quantitative analysis: (i) shared leadership at founding, (ii) stability of shared leadership, and (iii) presence of a university-educated

[4]We excluded post-period 3 entrants due to significant differences in starting conditions (e.g. leverage of later technology generations). Of the 35 pre-period 3 entrants, we excluded 13 smaller former government-promoted mills and six private startups who did not have resources to enter at the minimum efficient scale of 10,000 spindles.

engineer at founding.[5] The table provides differences in outcomes as a function of each of the explanatory variables (i)-(iii). In Figure 5, we depict *four* distinct evolutionary paths of firms from initial starting conditions through their ultimate fate by 1914. While all five firms who became centers of gravity experienced high growth, the other 11 exited by 1914 (six during the first shakeout in Period 4). The boxes in Figure 5 elaborate on the explanatory variables identified in the quantitative analysis (single vs. shared leadership; stability vs. discord-induced departure), and additionally illustrate the postdeparture governance changes, and their implications for growth outcomes. The pathways distill insights from the examination of business histories, and identify underlying causal factors that contributed to a virtuous or negative spiral between the firm's leadership, strategies, and growth. Detailed descriptions of episodes represented in Figure 5 are provided in Supporting Information Appendix C.1–C.4.

5.2 | Initial single versus shared leadership

The Commercial Code in Japan at the time (see Supporting Information Appendix A) required commitment by multiple investors to begin the process of chartering a corporation, thus creating the potential for shared leadership at the outset. All 16 startups in Table 7 were incorporated at founding, or (in cases of Mie, Okayama, Nagoya, and Tamashima who had small former government-promoted mills as their precursors) re-born through incorporation during Period 2 (in these cases, we consider the incorporation year to be the entry year). Thus, the first critical decision firms faced was whether to start with single or shared leadership.

Many founders-investors had other primary businesses, and did not dedicate themselves full-time to governing cotton spinning firms, although they may have remained board members or auditors to exercise control. Recall that we empirically identify single or shared leadership by individuals who were actually responsible for strategic decision making or/and managing the firm. Table 7 shows that among the 16 startups, nine (56%) had shared leadership at entry. Shared leadership at entry seems to be positively associated with the likelihood of becoming a center of gravity. However, by itself, shared leadership at entry was not associated with higher growth rates or increases in employment of educated engineers in the first 10 years. The lack of such a clear-cut relationship is in large part due to inability to maintain stability of shared leadership. Once TMT stability is taken into account, the differences are strikingly sharp. The second row in Table 7 shows the eight firms with shared leadership with above median TMT stability grew twice as fast as the other six firms. They also increased their employment of educated engineers by 43% over the first 10 years, in contrast to firms with unstable shared leadership, who lost a third of their initial educated engineers. Thus, a firm's ability to not merely start with shared leadership, but also to maintain its stability was the key factor in subsequent growth.

5.3 | Smooth TMT transition to stable shared leadership (Path 1 in Figure 5)

Path 1 (smooth transition to stable shared leadership) was an exception rather than the rule. Among the 16 startups, only one firm, Mie, was able to follow this path. This underscores the inherent difficulty in maintaining stable shared leadership over the long term, despite its benefits for firm outcomes.

[5]Criteria (i) and (iii) are zero–one. In criterion (ii), we divide the sample based on the median of the TMT stability in the first 10 years, measured as the number of discord-induced departures divided by the number of years under shared leadership. Two firms under single leadership throughout are dropped from this sample and discussed separately below.

Mie had a locational disadvantage. It was the only future center of gravity firm not located in Osaka or Tokyo areas, and even relative to other firms located in the same region of Central Japan, Mie was more distant from the center hub of Nagoya. However, this was more than compensated for by Mie's stable shared leadership, comprised of the firm founder Denshichi Ito and Imperial University-educated engineer Tsunezo Saito. The stability of shared leadership between Ito (with entrepreneurial vision and managerial talent) and Saito (with technological expertise) represented not only complementary knowledge, but also best-in-class talent complementarities within their domains (see several examples detailed in Supporting Information Appendix C.1).

The "human element" of stable shared TMT leadership enabled Mie to pursue all growth strategies leading to a center of gravity noted in Figure 5: talent and scale acquisition, diversification, and downstream integration (see Supporting Information Appendix C.1 for details). For example, Saito's access to engineering alumni networks, coupled with Ito and Saito's willingness to promote engineering talent enabled Mie to overcome its location disadvantage for attracting talent. Saito and Ito also added scale through acquisitions—Mie was the most prolific among the serial acquirers depicted in Table 6, acquiring nine weaker firms (including Nagoya and Owari in better locations in the same region, who as discussed below, could not maintain stable shared leadership) to account for 13% of total industry output by 1914. The firm engaged in both product diversification and downstream integration because stable shared leadership enabled periods when either Saito or Ito embarked on extensive travel to engage in technology or market exploration, leaving the other person at the helm. For instance, downstream integration into lucrative garment production was facilitated by Saito's repeated travel to Europe and the United States to discern across the latest of loom technologies while Ito managed mills at home. In terms of product diversification, including for export, by the 1910s, Mie produced 20 different product varieties, compared to the industry average of eight. This was in part made possible by Ito's investment in demand development and market research in China and Korea while Saito took charge of the mills. The time-line of events leaves no doubt that shared leadership emerged first, *before* the firm began to grow, and its stability enabled pursuit of various expansion strategies for Mie's growth to eventually become the second largest center of gravity. Thus, Mie presents an exemplar showcasing the advantages of stable shared leadership and how the "human element" of TMT leadership enabled the pursuit of growth strategies: talent acquisition, scale acquisition, product expansion, and downstream integration. The firm still survives today under the name of Toyo Boseki (Toyo Spinning Company).

5.4 | Single leadership in TMT (Path 4 in Figure 5)

Single leadership throughout represented almost as rare an occasion as perpetual stable shared leadership. The paths of two of the 16 startups that followed this path, Okayama and Tokyo are in stark contrast to Mie, depicting managerial limits to growth, and leading ultimately to exit.

The single leaders of both Okayama (Tatsumi Tanigawa) and Tokyo (Rishichi Tamura) were competent founder-entrepreneurs, but nonetheless, each firm grew at a much more constrained rate than Mie. The limits to growth can be traced to an inability to aggressively pursue expansion strategies, as detailed in Supporting Information Appendix C.2. For instance, neither firm had an educated engineer at the helm, and several recruitment efforts failed in follow-on retention. High demand for scarce engineering talent within and outside cotton spinning implied better career opportunities in other firms than what each of these slow-growing, one person-led firms could offer. Similarly, both

firms lagged Mie across the board in scale expansion, acquisitions, diversification, and downstream integration.

Tokyo's ultimate failure provides additional important insights. In late 1907, Tamura undertook an ambitious expansion project that eventually tripled capacity and enabled product upgrading, diversification, and downstream integration. By 1910, he finally realized the need to expand TMT leadership. In contrast to Mie, however, transition to shared TMT leadership *followed*, rather than preceded the adoption of the growth strategy, and a hostile acquisition bid targeting the new state-of-the-art production facility put the firm out of business only 4 years later (see Supporting Information Appendix C.2 for details). Firms in Path 4 thus represent able, but not shared leadership, and exemplify Penrosian managerial diseconomies of scale.[6]

5.5 | Shared leadership with discord-induced departures

Thirteen of the 16 startups in our comparison set—the vast majority—either started with or transitioned to shared leadership, but had spells of single leadership and experienced discord-induced departures under shared leadership. This highlights both how common attempts were to establish shared leadership, *and* how difficult it was to prevent discord-induced departures. We categorize each firm (year) discord-induced departures in Figure 5 into three types: strategic, interpersonal, and ethical. Importantly, all three departure types were observed among firms following Path 2 (eventual establishment of stable shared leadership) and Path 3 (lack of stable shared leadership). Here, we focus on each type of discord-induced departure, and the next two subsections distill how differences in their resolution led firms to divergent growth paths. Supporting Information Appendices C.3 and C.4 provide business histories of each firm in Paths 2 and 3 respectively, including details on each firm (year) case depicted in Figure 5, and their resolution.

5.5.1 | Strategic discord-induced departures

These discord-induced departures were genuine disagreements about future growth strategies, with little evidence that past performance may have played a role. In Amabo (1893), a discord-induced departure occurred due to a disagreement between company president Chubei Kihara and actively engaged board member Motonosuke Fukumoto who (with help from chief engineer Kyozo Kikuchi), proposed a plan for new plant construction for entry into the 42's count doubled yarn (a high-end market segment). Similar disagreements over expansion plans within TMT leadership and among shareholders led to departures in Tamashima (1898–1899) and Naniwa (1895–1896). In Tenma (1895) case, a strategic discord-induced departure followed on the heels of a violent labor strike (a rare occurrence in Japan at the time), prompting government inquiry. Two more discord-induced departures in 1899–1900 were directly related to the 1895 shakeup.

For Kanebo, among its two strategic discord-induced departures, we focus here on the 1907 case because its exogenous (to growth) nature stands out starkly. Between 1893 and 1906, Kanebo represented a rare case in the industry where a large block of shares was owned by a single investor (the Mitsui financial group, one of the largest "zaibatsu" in Japan). For reasons unrelated to Kanebo,

[6]A notable exception is Godo (a later *spinout* entrant and not in our comparison set), the only center of gravity firm spearheaded by a single leader, Fusazo Taniguchi, whose prior experiences (yarn-trading, board membership in other cotton spinning firms, and an earlier attempt in entrepreneurship) enabled a "within-person" integration of market and operational knowledge. Rather than creating new in-house production facilities (which would have required complementary engineering talent), Taniguchi grew Godo through superior management of acquired, underperforming mills. Godo's case is discussed in more detail in Supporting Information Appendix C.5.

Mitsui sold its shares, and these were acquired by a stock market speculator, Hisagoro Suzuki. Incumbent shared leaders—Eichi Asabuki, a Mitsui financial representative, and Sanji Muto, the general manager—sharply disagreed with Suzuki about the proposed strategic changes and offered their resignations. Strategic disagreements in shared leadership resulted in spinouts too: Both Osaka (1894) and Calico (1899) lost a TMT leader to employee entrepreneurship. In Osaka's case, Rihei Kawamura, a highly touted professional manager and TMT leader in charge of marketing and sales, left to found his own venture. In Calico's case, professional manager and TMT leader, Masahiro Tamura, left to join the founding team of Fujibo.

5.5.2 | Interpersonal discord-induced departures

While often morphed with strategic differences (Amason, 1996; Eisenhardt and Bourgeois, 1988), discord-induced departures driven by interpersonal differences represent a class of its own. Interpersonal differences in attitudes toward engineers were at the root of Hirano (1893) and Osaka (1898). While the discord-induced departure in Amabo (1893) above was mostly about strategy, Hirano (1893) serves as a great foil, if only because the same individual, Kyozo Kikuchi, was involved. Hirano (who entered 2 years prior to Amabo) was the first to recruit Kikuchi upon his graduation from Imperial University, and sponsored his trip to England to acquire state-of-the-art technical knowledge. When Settsu and Amabo entered the industry, they each negotiated with Hirano for Kikuchi's appointment as a shared chief engineer. Such sharing of scarce engineering talent was common in the early Japanese cotton spinning industry. In 1893, though Kikuchi seemed to have support for promotion to Hirano's TMT from the just-installed shared leadership, the company president vetoed the promotion because Kikuchi was not a wealthy investor. The discord led to the departure of the other TMT leaders, and shelving of Kikuchi's promotion (see Supporting Information Appendix C.4).

Other interpersonal differences stemmed from struggles for power and control. In Osaka (1898), an interpersonal rift between the recently promoted chief engineer Takeo Yamanobe and company president Jutaro Matsumoto led to "blame games." The inability to resolve these conflicts resulted in the ousting of Matsumoto. Interpersonal conflict also occurred in the second tier of expanded TMT shared leadership in the Kanebo (1900) case. Two young university-educated managers, Toyoji Wada (the general manager) and Sanji Muto (who managed the newly established Hyogo mill in the Osaka area) were competing for de facto control. After unsuccessfully trying to resolve their conflict, the Mitsui group owners decided to remove Wada and give Muto authority over both firm branches.[7]

The quest for power also occurred between management and shareholders, and among competing investor groups fighting for firm control. In Nagoya's (1893) case, interpersonal discord occurred when Jubei Sofue, a major shareholder, pushed through the election of a new TMT leader with government ties. This led to hiring of mid-level managerial personnel with little industry knowledge from the prefectural government, and the resignation of the incumbent TMT leader and long-serving company president. Similar discords erupted in the case of Owari (1891) and Senshu (multiple discord-induced departures over 1893–1895).

5.5.3 | Ethical discord-induced departures

The final category of ethical discord-induced departures consists of financial fraud or misappropriation. Two firms, Settsu and Naniwa developed very similar ethical discords in 1889, shortly after

[7]Fujibo (later entrant) promptly hired Wada to create stable shared leadership and become another center of gravity.

their founding. The company president (in Naniwa's case) and a founding board member (in Settsu's case) misappropriated shareholders' money for their own private businesses and were dismissed. The ethical discord-induced departure in Tamashima in 1897 was also following misappropriation of company money for private use by the firm's general manager. In two additional cases—Senshu, 1900, and Miike, 1901—mid-level managers who were protégés of shared TMT leadership members gambled with company money and lost. These events led to the resignations of the TMT leaders responsible for the mid-managers' supervision.

5.6 | Post discord-induced departure transition to stable shared leadership (Path 2 in Figure 5)

Among the 13 startups experiencing discord-induced departures, only four were able to follow this path to become a center of gravity. Their business histories reveal these firms focused on different underlying *principles* than the others when undertaking governance changes after discord-induced departures.

5.6.1 | Strategic alignment on value creation (for strategic and interpersonal discords)

In Amabo (1893), the discord-induced departure was resolved based on the value creation potential of Fukumoto's expansion strategy. When the board rejected his ambitious plan, Fukumoto called a shareholders meeting. This resulted in Kihara's (the incumbent president) resignation and Fukumoto's appointment as the new company president. Immediately, Fukumoto proposed promoting chief engineer Kikuchi to a TMT leader position. In contrast to Mie above, Fukumoto's proposal ran into initial opposition from more conservative, traditionalist board members.[8] Fukumoto prevailed though, due to strategic alignment—the shareholders had already approved the ambitious and potentially risky expansion plan, and the necessary capital was being raised through new shares issued and allocated to incumbent shareholders in proportion to their existing shareholdings. This commitment ensured eventual agreement of shareholders on the crucial role of Kikuchi's talent for the firm's company success. Notwithstanding a short-term cost to growth from Kihara's discord-induced departure (Figure A3, Supporting Information Appendix D), Amabo experienced spectacularly high long-term growth, due to its subsequent long period of stable shared leadership.

For Kanebo, the above 1907 "exogenous-shock-caused" discord-induced departure was resolved by long-standing shareholders, concerned about the company's future, creating a strategic coalition that blocked Suzuki (the speculator majority shareholder)'s election to the board. Instead, an independent TMT leadership was elected, consisting of a respected investor Heizaemon Hibiya and Narazo Takatsuji, a university-educated engineer with prior industry experience. The new TMT leadership kept Muto in an advisory role. Later that year, a stock market crash led to seizure of Suzuki's Kanebo shares by a creditor bank, and in January 1908, Muto triumphantly returned to (re-)join the shared TMT leadership as the new executive director. Supporting Information Appendix D Figure A2 shows that, once again, the postdeparture impact on growth was short-lived and robust growth resumed in 1908.

[8]The complete absence of such "glass ceilings" in Mie above can be traced to the involvement of Eiichi Shibusawa, the founder of the pioneering Osaka Spinning Company (and a guiding force behind Mie's incorporation), who introduced to the industry the practice of placing educated engineers at the helm (see Braguinsky & Hounshell, 2015). As can be seen in Figure 4, all future centers of gravity eventually followed this practice, but not many other startups.

Finally, Osaka (1894) strategic disagreement discord-induced departure was swiftly resolved to restore shared leadership. It promoted its educated chief engineer Yamanobe to a TMT leader position to follow Path 2; however, the shared leadership lasted only till 1898 given the above interpersonal conflict between Matsumoto and Yamanobe from TMT. As we discuss below, Osaka was in Path 3 under single leadership until the acquisition of Calico in 1906 enabled it to develop shared leadership again.

Aligned with the quantitative analysis findings, common in all three firms is both the short-run negative impact of a discord-induced departure and the long-term positive impact of post-departure resolution based on strategic alignment on value creation (see also other resolutions in Supporting Information Appendix C.3).

5.6.2 | Honorable resolution of ethical conflict

Among the five ethical discord-induced departure cases in Figure 5, only Settsu's (1890) case was resolved honorably, with long-term value creation in mind. The remaining TMT leaders took both personal and financial responsibility for the embezzlement. All members offered their resignations. At the same time, they proposed and received approval from shareholders to issue new shares to cover half the misappropriated amount, all to be purchased by themselves. (The remaining half was put on the balance sheet as a long-term loan to be repaid by the culprit.) A new shared TMT leadership was elected, comprised of one of the founders, Heibei Hirano, and Chuemon Takeo, a respected businessman from outside of the founding team. After Hirano's passing in 1896, Settsu's shared leadership continued through the promotion of chief engineer Kikuchi. The early honorable resolution of an ethical breach enabled smooth transition to stable shared leadership and ensured Settsu maintained Path 2 to become a center of gravity.

5.6.3 | Growth strategies enabled by value-creating postdeparture resolution and transition to stable shared leadership

Though Path 2 for the four center of gravity firms was not as smooth as Path 1 above for Mie, these cases reinforce insights from Figure 3. While discord-induced departures were frequent in the firms' early years, their swift resolution in favor of value creation both reduced the potential for follow-on departures, and ensured longer periods of stable shared leadership. Hence, similar to Mie, all four firms were able to pursue one or more growth strategies when under stable shared leadership.

Figure 2 already depicts the disproportionate acquisition of talented university educated engineers by the center of gravity firms. In all cases, the presence of educated (engineer) managers in the stable shared leadership (Kikuchi in Amabo and Settsu; Yamanobe in Osaka, Muto—the only nonengineer—in Kanebo) was critical to their ability to attract talent. Similar to Saito in Mie, each of these TMT leaders recruited through their alumni network, and served as beacons of future potential to the engineering graduates. These graduates were also able to realize more successful careers in center of gravity firms, through their growth from scale expansion (and acquisitions), downstream integration and product diversification.

Indeed, complementarity in TMT human capital within all four firms enabled them to grow through both acquisitions and new plant construction. Kanebo is a striking example of how stable shared leadership enabled eight acquisitions over the period from 1898–1911 (second to Mie in terms of numbers, but greater in terms of added scale). In his narrative (Kanebo, 1988), Muto credited Asabuki for financial management in their stable shared leadership prior to 1907; this enabled Muto

to focus on consummating acquisitions and managing the production process complexities across multiple plants. When Muto returned to the helm (as noted above), the later shared leadership team embarked on the construction of a new big plant to produce state-of-the-art high-end yarn. The successful execution over the next 5 years doubled the firm total capacity (Supporting Information Appendix D Figure A6). Combined with a tripling of engineering talent, this enabled Kanebo's rise by 1914 as the largest center of gravity.

Scale expansion enabled product diversification in Amabo and Settsu (with Kikuchi as part of the stable shared leadership in both firms), and later downstream integration in Amabo. Implementing Amabo's high-end product strategy required adding a marketing champion to Fukumoto's entrepreneurial vision and Kikuchi's engineering talent. Fukumoto and Kikuchi jointly searched for and recruited Juemon Tashiro as a TMT leader for sales. The effective division of labor among the three of them (see Supporting Information Appendix C.3 for details) was similar to that of Ito and Saito in Mie. By 1899, these dedicated efforts had borne fruit: the domestic output of 42's count doubled yarn exceeded imports for the first time, with Amabo producing 70% of this lucrative segment. Once again, the chain of events clearly indicates that the establishment of complementary shared leadership *preceded* the success in product upgrading. Amabo became the most profitable firm in the industry; its profits kept increasing even during the shakeout when profits of other firms (even those of other centers of gravity) nose-dived (Figure A5 in Supporting Information Appendix D). Similarly, within Settsu, Kikuchi shared TMT leadership with Takeo, who also founded and presided over a large import–export firm. They leveraged their complementary human capital to implement a growth strategy focused on scale expansion through targeting product varieties for exports and acquiring scale.

Osaka represents a unique case among the center of gravities, as its business history reveals both Path 2 and Path 3. Osaka was the industry pioneer, created through Shibusawa's entrepreneurial energy and with shared leadership that included Osaka business community leaders Denzaburo Fujita and Matsumoto, as well as Rihei Kawamura for procurement/sales, and Yamanobe for technology. The initial stable shared leadership enabled Osaka to expand its scale sixfold in the first 7 years and to engage in many pioneering experiments. Kawamura was key to initiating cotton imports from India, and Yamanobe integrated it into the production technology. Together, they reconfigured Osaka's capabilities, enabling increased efficiency and expansion into higher-grade product varieties and propelling not just Osaka, but the entire industry to high growth. Similarly, when Osaka regained stable shared leadership in 1906 (following limited growth period while in Path 3 discussed below), it invested in expansion to triple its overall capacity by 1914.

5.7 | Lack of stable shared leadership leading to exit or limited growth (Path 3 in Figure 5)

For firms that followed Path 3 to limited growth and eventual exit, a unifying theme is their *lack* of transition to stable shared leadership. In four instances, this was due to focus on (broadly defined) value appropriation, while in the remaining instances (including Osaka, a center of gravity firm), the reversion to single leadership limited growth due to managerial diseconomies.

5.7.1 | Politics and power struggles leading to firm exit

Lack of strategic alignment over expansion proposals similar to that of Amabo (1893) within TMT leaders and among the shareholders caused discord-induced departures in Tamashima (1898–1899) and Naniwa (1895–1896). In both cases (see Supporting Information Appendix C.4), rather than

creating alignment and ensuring shareholder buy-in, TMT leadership chose the highly risky strategy of financing the expansion through raising new capital through corporate bonds and bank borrowing. The situation was further exacerbated by ethical breaches stemming from focus on short-term personal interests, rather than on long-term growth and survival of the firm. For example, in Naniwa, the ethical discord-induced departure due to financial misappropriation was handled in stark contrast to Settsu. The newly elected president, Masatoshi Murakami, chose to skip the shareholders meeting called to discuss the issue, and things quickly went from bad to worse, with another embezzlement surfacing in the following year. The firm underwent six TMT changes and went bankrupt after just 10 years in business. The stories of Tamashima and Tenma are very similar (Supporting Information Appendix C.4).

As mentioned, politics and power struggles plagued Senshu, where TMT leadership was fractured along competing business networks, each pursuing their individual interests and positions in quests for power. Even though Senshu employed a university-educated engineer at founding, it lost him before long and the lack of TMT stability also led to an ethical breach that triggered even more TMT departures (the firm exited in late 1902). Tenma's case following labor unrest-related TMT shakeup noted above also created an exodus of engineering talent, causing the firm to become bankrupt in 1900.

In each of these cases, power struggles and politics led to repeated discord-induced departures, lack of growth, and eventual exit. These cases stand in stark contrast to the virtuous circle of proper resolution leading to stable shared leadership and high growth in future centers of gravity.

5.7.2 | Reversion to single leadership leading to limited growth

Histories of several firms illuminate diseconomies of scale due to single leadership stemming from an inability to maintain stability of shared leadership (see Supporting Information Appendix C.3 and C.4). In the cases of Nagoya and Miike, outside business and/or political interests led to the implosion of shared leadership, reversion to single leadership and eventual exit. In Hirano's 1893 case, shared leadership fell apart after Kikuchi's promotion was shelved. Jinsaku Kanazawa, the president's brother-in-law, became the single leader, while Kikuchi retreated to an advisory role, and then cut ties completely in 1898. Subsequently, Hirano had difficulty retaining other engineers. An attempt to gain scale by acquiring another firm in 1898 backfired given single leadership and instability in the engineering pool. In 1902 Hirano was acquired by Settsu (ironically, Kikuchi was at Settsu's helm by that time). Similarly, when Calico lost a TMT leader to a competitor in 1899, its reversion to single leadership was due to unwillingness to promote its university-educated engineer and resulted in no growth over the ensuing 5 years and eventually being acquired.

The above two cases might suggest that the glass ceiling for promoting engineers to TMT leadership was the root problem, rather than the lack of stable shared leadership per se. However, the examples of Owari and Osaka show that this was not the case. Owari (see Supporting Information Appendix C.4 for details) had no glass ceiling—its university-educated chief engineer, Shunichi Hattori, was promoted to shared TMT leadership. However, interpersonal discord with shareholders led to the departure of the two other TMT leaders (an experienced trader in charge of sales and a manager with prior experience at a government "model" mill). The firm could not implement either diversification or downstream integration strategies given lack of complementary marketing and management TMT talent, and despite Hattori's undisputed talent and competence, it was acquired by Mie in 1905 due to lack of growth. Similarly, when Osaka reverted to single leadership following Matsumoto's resignation in 1898, Yamanobe, an educated engineer, led it for 8 years. While other

centers of gravity such as Mie and Kanebo leveraged stable shared leadership to take full advantage of acquisition-related expansions during industry shakeout, Osaka was unable to make a single acquisition, and stagnated with the average annual growth rate of output of less than 1%, also losing some engineers during this period (Supporting Information Appendix D Figure A6). Though it regained growth momentum post 1906 in Path 2 under stable shared leadership after acquiring Calico, Osaka's extended Path 3 experience damaged its eventual position. Despite pioneering the industry and accounting for almost 50% of industry output in the 1880s, Osaka barely retained its position as the smallest among center of gravity firms in 1914, with little over 6% of industry output.

6 | DISCUSSION AND CONCLUSION

The insights derived from this historical study are not limited to the specific context of Japan, or for firms and industries of yesteryear. While leadership is often conceptualized around an individual's behavior, mindset, and actions, micro scholars have begun to focus (and debate) on leadership as an *activity* to be shared among team members (Carson, Tesluk & Marrone, 2007; Pearce et al., 2007).[9] This resonates with modern day organizations: increased specialization of knowledge and scope of activities have resulted in 85% of new venture creation by founding teams rather than lone entrepreneurs (Wasserman, 2012), making shared leadership the norm rather than exception from the outset. The imperative to grow within a global context further fuels the need for shared leadership, for entrepreneurial and established firms alike (Adner & Helfat, 2003; Williams, Chen & Agarwal, 2017; Penrose, 1959). However, shifting leadership from individuals to team activity implies not only that *each* individual embodies leadership behaviors, mindset and actions, but that the team is aligned in these regards. This creates significant additional complexities in shared leadership teams. Paradoxes in cognitive and affective conflict impact the quality and pace of decision making (Amason, 1996). Power struggles, political coalition building, scapegoating and framing contests among TMTs may well be the norm rather than exception (Boeker, 1992; Eisenhardt and Bourgeois, 1988; Kaplan, 2008).

Critical to growth then is not merely the establishment of shared leadership among individuals who have complementary human capital, but also its continued stability. In studying the linkages between stable shared leadership and growth across a census of firms, we provide several key insights for the microfoundations of firm and industry evolution (cf. Abell et al., 2008; Felin et al. 2015). First, and consistent with complementarities in human capital, growth results from the creation of *stable* shared leadership in TMTs, because firms with single leaders at their helm face managerial constraints to their expansion efforts. Absent stability though, shared leadership may actually be worse than single leadership.

Second, firms face significant *challenges* of maintaining shared leadership in the face of strategic, interpersonal, and ethical conflicts. Here, our study harks back to the classics' focus on entrepreneurial/managerial embodiment of firm capabilities and resources (Schumpeter, 1949[1911]; Penrose, 1959; Lucas, 1978). The ability to keep highly talented TMTs together as a Penrosian "working unit" is by itself a scarce resource capable of generating Marshallian quasi-rents.

[9]We note here the distinction between shared leadership and consensus decision making, particularly because Japanese firms are often characterized as the latter. Notwithstanding the fact that consensus decision making was not characteristic of Japanese firms in our study period (see footnote 1), shared leadership does not require consensus on all decisions. Leaders may follow collaborative decision-making processes, with a shared understanding of what decisions are within the authority of which leader, and what decisions require constructive conflict and/or consensus building across not only leaders, but other important stakeholders (c.f., review in Kocolowski, 2010).

Schumpeter (1987 [1943]) emphasized how such quasi-rents *induce entry* and lead to industry growth. Our historical study of the evolution of the whole industry over several decades, covering the universe of all firms and tracing their historical origins (even before the shaping of their leadership and initial successes), elucidates the process of *emergence and consolidation* of relatively small number of firms, who earn such quasi-rents through stable shared leadership.

Third, stable shared leadership is not endowed exogenously in some firms versus others. It results from adherence to fundamental principles that then become positive drivers for a virtuous spiral between stable shared leadership and growth. These include strategic alignment on long-term value creation as opposed to short-term gain, adoption of merit-based promotion systems in defiance of stereotypes, sharing of power within TMT leadership to enable efficient division of labor, and honorable resolution of conflicts and ethical breaches. Thus, our study complements the above work examining negative drivers in TMT such as politics and power struggles by showing how positive drivers can help align not only leaders within TMTs, but also TMTs and shareholders. These principles may permeate from the outset, but even more critical is their early and consistent adoption. The resulting positive organizational capital/culture enables firms to both grow in periods of stability because of increased managerial span of control, division of labor, and successful talent recruitment and retention, and recover more quickly from discord-induced departures.

The findings in this paper extend insights from past studies examining the Japanese cotton spinning industry in Meiji era to provide microfoundations contributions to the strategic management literature. Braguinsky & Hounshell (2016) showed the importance of superior human capital (including but not limited to promoting educated engineers to TMTs) to long-term firm success. Our study corroborates these results and goes one level deeper by tying superior human capital to the fundamental principles outlined above that enabled stable shared leadership (see Figure 5, in particular). Noteworthy here is that both the first import of Indian cotton, and the introduction of ring spinning frames—the two critical innovations with industry-wide consequences (Ohyama et al., 2004; Braguinsky et al., 2015)—were implemented in the late 1880s by Osaka, Mie, and Owari, all of whom had stable shared leadership at the time. While Owari could not restore stable shared leadership after the early 1890s, the other firms continued to grow and became centers of gravity.

Braguinsky et al. (2015) and Karakaplan & Kutlu (2017) examine the relationship between technical efficiency and industry concentration in the evolving industry. Our study highlights the critical role of stable shared leadership in *both* improving technical efficiency and increasing industry concentration. As noted above, although the Herfindahl index remained low, the considerable increase in industry concentration is attributable to the share of center of gravity firms in industry output and talent (Figures 1 and 2 above). In particular, Table 6 provides the underlying link between stable shared leadership in the center of gravity firms and the serial acquirers in Braguinsky et al. (2015) that contribute to improved production efficiency of the cotton spinning plants. Thus, we show how endogenous concentration of output and valuable resources in center of gravity firms and improvements in technical efficiency were enabled by growth strategies made possible by stable shared leadership of those firms (including but not limited to acquisitions).

While we only examined one industry in this paper, we hope its insights will spark future research for the microfoundations of strategy and evolutionary studies. Research adopting historical approaches to examine antecedents, processes and pathways may shed additional light on the role of (self)-selection of talented individuals into founding and TMTs, and the endogenous processes through which teams align their expertise, behavior, mindset, and actions toward a common organizational purpose and sustained performance. Our study's insights highlight the need to embrace human agency and aspiration, in addition to the traditional focus on human capital (Becker, 1962).

The ability of organizations to align human agency, aspiration and capital through a common purpose is not only important for the stable shared leadership among highly talented TMT members, but also for attracting and retaining other talented people in these firms. Often, this may require leaders to engage in daring and difficult action. While some of the strategies (e.g., ambitious expansion plans, downstream integration) may be economically risky, others may require additional moral courage to confront value-laden cultural norms and break with tradition. For example, Japan's glass ceilings against engineers in our study are akin to glass ceilings based on gender, race and ethnicity pervasive in many cultures. Thus, discrimination can be reduced over time due to enterprising action within well-functioning labor markets (Becker, 1971). However, we need additional studies examining factors that accelerate or impede both elements at play. In our context, in addition to the upward mobility of engineers, the opening of markets in the Meiji era enabled enterprising individuals to create new ventures. Among these, those whose focus was on talent and value creation became the best incumbent firms: the "centers of gravity" that attracted more and more talent (and other complementary resources) into their orbit, in a process that can be likened to that of planet formation (with industry organization being similar to the organization of a planetary system). Their leadership represented (and recruited) the "best in class" talent, and possessed a willingness to break with tradition in the face of opposition.

We hope our study sparks future research examining human enterprise as the fountainhead of individual, firm, and industry growth. This will entail our own willingness to question disciplinary and methodological silos, and undertake multi-method and interdisciplinary studies that shed light on the confluence of psychological, economic, and philosophical drivers of human action.

ACKNOWLEDGEMENTS

This research was supported by the NSF (Grant No. 1632833) and JSPS KAKENHI (Grant No. 15KK0078). We thank Tetsuji Okazaki and Takenobu Yuki for helpful advice and data sharing; Gakushikai (the Association of University Graduates) for permission to use their restricted-use alumni lists; and Hiroko Ohga, Tomohiro Hara, Kohei Yamagata, Jun Sakamoto, and Takao Takasago for able research assistance. The manuscript has benefited from comments from two anonymous reviewers, editor Nicolai Foss, and seminars given at Erasmus, HEC Paris, Maryland, Queens University, and UT Austin. S.B. thanks Osaka University Institute of Social and Economic Research and A.O. thanks the University of Maryland Robert H. Smith of Business for their hospitality when conducting research on this project. All errors are ours.

ORCID

Rajshree Agarwal https://orcid.org/0000-0002-7272-314X

REFERENCES

Abell, P., Felin, T., & Foss, N. (2008). Building micro-foundations for the routines, capabilities, and performance links. *Managerial and Decision Economics*, *29*, 489–502.

Adner, R., & Helfat, C. E. (2003). Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, *24*(10), 1011–1025.

Agarwal, R., Sarkar, M. B., & Echambadi, R. (2002). The conditioning effect of time on firm survival: An industry life cycle approach. *Academy of Management Journal*, *45*(5), 971–994.

Agarwal, R., & Shah, S. K. (2014). Knowledge sources of entrepreneurship: Firm formation by academic, user and employee innovators. *Research Policy*, *43*(7), 1109–1133.

Amason, A. C. (1996). Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: Resolving a paradox for top management teams. *Academy of Management Journal*, *39*(1), 123–148.

Aoki, M. (1990). *Information, incentives and bargaining in the Japanese economy*. Cambridge, MA: Cambridge University Press.

Bayus, B., & Agarwal, R. (2007). The role of pre-entry experience, entry timing, and product technology strategies in explaining firm survival. *Management Science*, *53*(12), 1887–1902.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, *70*(5.2), 9–49.

Becker, G. S. (1971). *The economics of discrimination*. Chicago, IL: University of Chicago Press.

Bernhofen, D. M., & Brown, J. C. (2004). A direct test of the theory of comparative advantage: The case of Japan. *Journal of Political Economy*, *112*(1), 48–67.

Boeker, W. (1992). Power and managerial dismissal: Scapegoating at the top. *Administrative Science Quarterly*, *37*(3), 400–421.

Boeker, W., & Karichalil, R. (2002). Entrepreneurial transitions: Factors influencing founder departure. *Academy of Management Journal*, *45*(4), 818–826.

Fuji Boseki. (1998). *Fuji Boseki Hyakunenshi [100 years of Fuji Boseki]*. Tokyo, Japan: Fuji Boseki (in Japanese).

Braguinsky, S. (2015). Knowledge diffusion and industry growth: The case of Japan's early cotton spinning industry. *Industrial and Corporate Change*, *24*(4), 769–790.

Braguinsky, S., & Hounshell, D. A. (2015). Spinning tales about Japanese cotton spinning: Saxonhouse (1974) and lessons from new data. *Journal of Economic History*, *75*(2), 364–404.

Braguinsky, S., & Hounshell, D. A. (2016). History and nanoeconomics in strategy and industry evolution research: Lessons from the Meiji-Era Japanese cotton spinning industry. *Strategic Management Journal*, *37*(1), 45–65.

Braguinsky, S., Ohyama, A., Okazaki, T., & Syverson, C. (2015). Acquisitions, productivity, and profitability: Evidence from the Japanese cotton spinning industry. *American Economic Review*, *105*(7), 2086–2119.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. *Academy of Management Journal*, *50*(5), 1217–1234.

Chandler, A. D. (1977). *The visible hand. The managerial revolution in American business*. Cambridge, MA: Harvard University Press.

Chandler, A. D. (1990). *Scale and scope. The dynamics of industrial capitalism*. Cambridge, MA: Harvard University Press.

Chandler, A. D. (1992). Organizational capabilities and the economic history of the industrial enterprise. *Journal of Economic Perspectives*, *6*(3), 79–100.

Delmar, F., & Shane, S. (2006). Does experience matter: The effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization*, *4*(3), 215–247.

DeSantola, A., & Gulati, R. (2017). Scaling: Organizing and growth in entrepreneurial ventures. *Academy of Management Annals*, *11*(2), 640–668.

Eisenhardt, K. M., & Bourgeois, L. J. (1988). Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal*, *31*(4), 737–770.

Felin, T., Foss, N. J., & Ployhart, R. E. (2015). The microfoundations movement in strategy and organization theory. *Academy of Management Annals*, *9*(1), 575–632.

Geppo. (1889–1920). *Monthly Bulletin of the Japanese Cotton Spinners' Association*. Osaka, Japan: Dainihon Boseki Rengokai (in Japanese).

Gort, M., & Klepper, S. (1982). Time paths in the diffusion of product innovations. *Economic Journal*, *92*(367), 630–654.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, *9*(2), 193–206.

Ingram, P., Rao, H., & Silverman, B. S. (2012). History in strategy research: What, why, and how? In S. J. Kahl, B. S. Silverman, & M. A. Cusumano (Eds.), *Advances in strategic management* (Vol. 29, pp. 241–273). Bingley, UK: Emerald publishing.

Jinmeiroku. (1892, 1898, 1907). *Nihon Zenkoku Shoko Jinmeiroku [All-Japan registry of traders and craftsmen]* (in Japanese). Retrieved from http://dl.ndl.go.jp/search/searchResult?featureCode=all&searchWord=&viewRestricted=0

Kanebo. (1988). *Kanebo Hakunen-shi [100 years of Kanebo]*. Osaka, Japan: Kanebo Kabushiki Gaisha (in Japanese).

Kaplan, S. (2008). Framing contests: Strategy making under uncertainty. *Organization Science*, *19*(5), 729–752.

Karakaplan, M., & Kutlu, L. (2017). Endogeneity in panel stochastic frontier models: And application to Japanese cotton spinning industry. *Applied Economics*, *49*(59), 5935–5939.

Kinugawa, T. (1964). *Hompo Menshi Boseki Shi [History of the Japanese Cotton Spinning Industry]* (in 7 volumes). Tokyo, Japan: Hara Shobo (in Japanese).

Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *American Economic Review*, *85*(3), 562–583.

Klepper, S., & Simons, K. L. (2000). Dominance by birthright: Entry of prior radio producers and competitive ramifications in the U.S. television receiver industry. *Strategic Management Journal*, *21*, 997–1016.

Kocolowski, M. D. (2010). Shared leadership: Is it time for a change. *Emerging Leadership Journeys*, *3*(1), 22–32.

Kōkajō. (1883–1914). *Company reports*. Osaka, Japan: Osaka University Library (in Japanese).

Lazar, M., Miron-Spektor, E., Agarwal, R., Erez, M., Goldfarb, B., & Chen, G. (2019). *Entrepreneurial team formation*. College Park, MD: University of Maryland Working Paper.

Lucas, R. E. (1978). On the size distribution of business firms. *Bell Journal of Economics*, *9*(2), 508–523.

Malerba, F., Nelson, R., Orsenigo, L., & Winter, S. (1999). "History-friendly" models of industry evolution: The computer industry. *Industrial and Corporate Change*, *8*(1), 3–40.

Noguchi, Y. (1998). The 1940 system: Japan under wartime economy. *American Economic Review*, *88*(2), 404–407.

Ohyama, A., Braguinsky, S., & Murphy, K. M. (2004). Entrepreneurial ability and market selection in an infant industry: Evidence from the Japanese cotton spining industry. *Review of Economic Dynamics*, *7*(2), 354–381.

Okazaki, T., & Okuno-Fujiwara, M. (Eds.). (1993). *Gendai Nihon Keizai Shisutemu-no Genryo [The source of the modern Japanese economic system]*. Tokyo, Japan: Nihon Keizai Shimbunhsa (in Japanese).

Pearce, C. L., Conger, J. A., & Locke, E. A. (2007). Shared leadership theory. *The Leadership Quarterly*, *18*(3), 281–288.

Penrose, E. (1959). *The theory of the growth of the firm*. Oxford, England: Blackwell.

Sankosho. (1903–1920). *Menshi Boseki Jijo Sankosho [Reference materials on the state of the spinning industry]*. Osaka, Japan: Dainihon Boseki Rengokai (in Japanese).

Saxonhouse, G. R. (1974). A tale of Japanese technological diffusion in the Meiji period. *Journal of Economic History*, *34*(1), 149–165.

Schumpeter, J. A. (1949 (first published in 1911)). *Theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA: Harvard University Press.

Schumpeter, J. A. (1987 (first published in 1943)). *Capitalism, socialism and democracy*. New York, NY: Counterpoint.

Toyo Boseki. (1986). *Toyoboseki hyakunenshi [One hundred years of Toyo Boseki]*. Osaka, Japan: Toyobo (in Japanese).

Tripsas, M., & Gavetti, G. (2000). Capabilities, cognition, and inertia: Evidence from digital imaging. *Strategic Management Journal*, *21*, 1147–1161.

Unitika. (1989). *Unitika hyakunenshi [100 years of Unitika]* (in Japanese). Retrieved from http://www.unitika.co.jp/company/archive/history/

Wasserman, N. (2012). *The Founder's dilemmas*. Princeton, NJ: Princeton University Press.

Williams, C., Chen, P. L., & Agarwal, R. (2017). Rookies and seasoned recruits: How experience in different levels, firms, and industries shapes strategic renewal in top management. *Strategic Management Journal*, *38*(7), 1391–1415.

Yakuinroku. (1893–1914). *Zenkoku shogaisha yakuinroku* [*All-Japan registry of firms executives]* (in Japanese). Retrieved from http://dl.ndl.go.jp/search/searchResult?featureCode=all&searchWord=&viewRestricted=0

Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, *13*(3), 339–351.

SUPPORTING INFORMATION

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

How to cite this article: Agarwal R, Braguinsky S, Ohyama A. Centers of gravity: The effect of stable shared leadership in top management teams on firm growth and industry evolution. *Strat Mgmt J*. 2020;41:467–498. https://doi.org/10.1002/smj.3048