SOCIAL NETWORK AND TEMPORAL MYOPIA

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ABSTRACT

This paper examines the link between the social networks surrounding business leaders and temporal myopia in strategic planning. Specifically, we hypothesize that processes characteristic of being embedded in a closed network are associated with a lack of foresight and a tendency to neglect long-run strategic planning. Using a probability sample of 700 CEOs in China, we show that network closure is associated with temporal myopia, which is evidenced in various measures of business planning. We show that managers embedded in closed networks are less experienced in long-run planning, and are also less successful in implementing long-run business plans. Our contribution to the literature is twofold: we add a network perspective to the literature on temporal myopia in strategic management; and more significantly, by grounding temporal myopia in the network surrounding a person, we separate temporal myopia from the person. Myopia emerges from the social situations we create, or in which we find ourselves.

There is no shortage of managers with a temporal bias toward the present—with consequences for strategic planning and intertemporal resource allocation. Typical symptoms include the neglect of long-run planning and investments, avoidance of long-run R&D strategies, and under-provision of training programs, each with potentially negative consequences for corporate value creation and business survival over time (Das, 1986, 1991; Ridge, Kern, & White, 2014; and for a review of the field, Laverty, 1996). But what exactly are the factors that steer managers toward the immediacy of the present? What type of decision-environment is required to set the stage for long-run value creation and business survival?[1]

In the search for explanations of managerial bias toward the present, two lines of inquiry have developed. One focuses on managerial short-termism, which we define in accordance with Laverty (1996: 828) as "decisions and outcomes that pursue a course of action that is best for the short term but suboptimal over the long run". This line of inquiry identifies factors that inadvertently favor maximizing short-term revenue over long-run performance. The other line of inquiry focuses on managerial myopia, variably described as a "tendency to ignore the long run" (Levinthal & March 1993: 10), a lack of "foresightfulness of management" (Miller, 2002: 693) or "difficulties in foresight" (Marginson & McAulay, 2008: 274), pathologies that are associated with a lack or neglect of long-run planning (Das, 1987; Ridge, Kern, & White, 2014).

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[1]The literature on temporal myopia is distinct from the temporal focus literature in psychology. The latter explores "the extent to which people characteristically devote their attention to perceptions of the past, present and future" (Shipp, Edwards, & Schurer Lambert, 2009: 1) but does not suggest or imply that individuals neglect the future or lack foresight. In fact, within the temporal focus literature, a high degree of attention to the present (rather than to the future) is consistent with the implementation of future oriented strategies such as the launch of new products. For an empirical application of the temporal focus approach in strategic management research see, for instance, Nadkarni & Chen (2014).

Research into the antecedents of short-termism has flourished. Drivers of short-termism, which are mostly systemic, include executive compensation schemes and manager incentives (Felstaed, 2018; Flammer & Bansal, 2010, 2017; Souder & Bromiley, 2012), corporate performance constraints (Souder & Shaver, 2010), and distinct types of company culture (Laverty, 2004). Drivers of temporal myopia, however, remain poorly understood, in spite of widely reported myopic tendencies among business managers. A common assumption is that managers vary in their cognitive abilities to plan and strategize. In psychology, the behavioral manifestation of temporal discounting is perceived as a type of cognitive bias, to which some people are more prone than others, generally attributed to a lack of self-control and traits such as impatience, immaturity, and self-indulgence (Ainslie, 1975; Kirby, Winston, & Santiesteban, 2005). In economics, the phenomenon is largely treated as a "discount factor" applicable across individuals due to opportunity costs or general human frailty (Frederick et al., 2002; Prelec & Loewenstein, 1997). Yet variable within-person differences over time (Falk et al., 2018) make clear that temporal myopia is not a robust individual trait. A situational explanation is needed (Laverty, 1996, 2004).

Drawing on insights from social network theory, we propose a contextual explanation for temporal myopia. The literatures on social networks and temporal myopia are linked by their understanding of the role of information. Access to information is considered to be of central importance in both literatures. Information diversity affects the quality of strategic planning (Levinthal & March, 1993; Kaplan & Orlikowski, 2012; Slawinski & Bansal, 2015). The social network literature in turn links information access with the network structure surrounding the decision-maker. Open networks provide managers with ready access to novel information and divergent opinions, nurturing a 'vision advantage' (Burt, 2005: 59) and the design of 'great

strategies' (Burt & Soda, 2017). Closed networks, in contrast, are associated with homogenous and redundant information. The social network literature does not make the association between network structure and planning horizon explicit; its focus is on the association between network structure and a variety of performance measures. However, variable planning horizons are implicit in the cumulative evidence provided by empirical work identifying the relative advantages associated with differences in network structure (Burt, Kilduff, & Tasselli, 2013).

Open networks are associated with new ideas, innovation, creativity, and organizational changes of a more radical nature (Battilana & Casciaro, 2012; Burt, 2004, 2005, 2020; Fleming, Mingo, & Chen, 2007; Perry-Smith, 2006; Perry-Smith & Manucci, 2017; Ruef, 2002). In brief, open networks excel at facilitating exploratory, forward-looking activities that promise rewards in future periods. Closed networks, in contrast, perform best in supporting the refinement and improvement of current knowledge, which is typically associated with immediate, relatively certain rewards (Burt & Soda, 2017). It is not too great a stretch to suspect that differences in network structure—associated with variable information access and business opportunities— privilege different planning horizons. Specifically, we hypothesize that network closure around a manager promotes a myopic focus on the present, and neglect of the long-run.

To test this hypothesis, we use data from a survey of 700 managers operating private firms in China. This survey provides egocentric network data describing the structure of the networks surrounding each manager. Further, information is provided on the time horizon of firm strategies. Our results support the hypothesized association between network closure and temporal myopia. Managers surrounded by a cluster of close, interconnected contacts apply shorter strategic plans. These findings are robust to a number of alternative specifications. Our results also highlight how network closure correlates with the benefits associated with long-run

planning. Whereas long-run plans generally contribute to business success, this effect is smaller in contexts where managers are surrounded by closed networks.

Our findings contribute to two streams of literature that have had little prior interaction: the emergent literature on temporal myopia in strategic management and the literature on social network theory. The strategic management literature has pointed to the likely role of social influence in explaining the lack of information diversity and development of temporal myopia (Kaplan & Orlikowski, 2012; Laverty, 1996; Marginson & McAulay, 2008; Slawinski & Bansal, 2015), but has not identified a general social mechanism. The social network literature, in contrast, has produced reliable social measures explaining information diversity, but has not explored the relationship between social networks and temporal myopia. By linking both fields, we introduce a well-researched measure of social structure as a novel explanation of temporal myopia in strategic management. It is also the case that temporal myopia constitutes a novel entry onto a growing list of beliefs and preferences that the social network literature associates with life in different types of networks (Barr, Ensminger, & Johnson, 2009; Goeree, McConnell, Mitchell, Trop, & Yariv, 2010).

THEORETICAL BACKGROUND AND HYPOTHESES

Information diversity is at the heart of strategic planning, and has critical implications not only for the nature of the actions undertaken by managers, but also for the planning horizons that managers feel comfortable with (Das, 1987; Miller, 2002; Ridge, Kern, & White, 2014). Planning for the present and the immediate future requires little more than extrapolation from current data, and planning often consists of little more than incremental adjustments to a previous plan (Wildavsky, 1964). The longer the intended planning horizon, and the greater the environmental

and market uncertainties, the greater the risk of exogenous shocks. Planning for the long-run can be a complex task that requires a high level of abstraction and the ability to reflect different future scenarios (Frederick, 2005). Abstraction and the development of complex mental concepts in turn depend on social input — a mix of information on alternative viewpoints, ideas, and experiences (Borghi, Barca, Binkofski, & Tummolini, 2018). These insights from cognitive science are in line with conceptual (Laverty, 1996; Levinthal & March, 1993) and qualitative case studies (Kaplan & Orlikowski, 2012; Slawinski & Bansal, 2015) that support the view that social processes and information heterogeneity matter in long-run strategic planning. An open question, however, is *how*? What types of social situation are likely to steer decision-makers toward a myopic focus on the present? What decision environments are conducive to long-run planning?

Network Closure, Information, and Myopia

There are two central strategies for securing information diversity: one is to gather information from a broad set of independent sources; the other is to engage different subjective interpretations of the same data. The success of each strategy correlates with the social structure around the decision-maker. We focus on two correlates of network closure: information redundancy and social pressure to adopt majority views (Ruef, 2002).

Information Redundancy

We begin with the core network of approximately a half-dozen to a dozen key contacts surrounding the business manager. This network is closed around the manager (ego) to the extent that the network is: (1) small, in the sense that ego has few key contacts; (2) dense, in the sense that ego's key contacts are strongly connected with each other; or (3) hierarchical in the sense that contacts are connected indirectly through a central person (Burt, 1992: 50–65). An inevitable

by-product of network closure is that managers rarely encounter novel information inside their network. Information available to one contact is likely to be shared with other contacts, which leads to redundancy in the information that circulates within the network. With limited access to novel information, alternative or conflicting views, and knowledge about outside business opportunities, it is no surprise that network closure is associated with lower levels of creativity, innovation, and major organizational change (Battilana & Casciaro, 2012; Burt, 2004, 2005; Fleming, Mingo, & Chen, 2007; Perry-Smith & Mannucci, 2017; Ruef, 2002). Activities in closed networks tend to focus on the exploitation of current opportunities, rather than on exploration tasks that promise value in the long-run (Burt & Soda, 2017; March, 1991).

The documented association between network openness and a tendency to engage in long-run projects does not imply that innovation or long-run projects cannot happen in closed networks. People embedded in a closed network can equally benefit from information heterogeneity, when they can engage it (Aral & Van Alstyne, 2011). Tortoriello, McEvily & Krackhardt (2015) further suggest that network closure around team members inside an organization can even be beneficial, when accessing and utilizing external scientific or industrial knowledge (see also, Ter Wal et al. 2016 on alternative sources of information). Our point is merely that information heterogeneity is naturally found in open networks with likely consequences for the development of a 'vision advantage'. Information homogeneity, in contrast, is the likely condition within closed networks, a condition that requires special effort to rise above.

Levinthal and March's (1993: 101ff) description of strategies of organizational learning supports the view that reaching out and looking for diversity is not a common organizational exercise. Their description of organizational learning resembles the image of life in a closed

network. In their account, it is the "programed exercise of prior capabilities", the reliance on "appropriate responses from a prior repertoire", and repeated referral to an established network of contacts and consultants that contribute to a myopic focus on the present. Simplification and specialization—processes designed to reduce complexity and facilitate organizational learning—gradually narrow down the range of information that managers consider in decision processes. Reliance on a trusted network of familiar colleagues and consultants and an inventory of standard solutions developed in response to past challenges reinforces the problem. Although an established advisory network and inventory of solutions that have proven effective in the past are helpful in accelerating decision processes and drafting quick organizational responses, they also limit information diversity. With an inherent focus on data and interpretations that have proved useful in the past, a temporal bias toward the present develops. Similarly, utilizing a network perspective, Burt & Soda (2017: 231) note that "individuals who share previous ties take as reference what they have done together in the past, develop more likely inertial attitudes towards the past, and are therefore less likely to push towards deviating from what has been done in the past." Levinthal & March's (1993) advice for organizations is to devote sufficient amounts of energy to exploration tasks, rather than relying on exploitation tasks. However, this suggests targeting the symptom rather than the cause of myopia. We assert instead that "vision advantage" (Burt, 2005; Burt & Soda, 2017; Soda & Bizzi, 2012) and exploratory tasks follow naturally from information diversity and easy access to information from a variety of specialty fields and disparate interpretations of shared and related concepts.

These reflections are corroborated by simulation models exploring the association between network structure and exploration respectively exploitation tasks. Lazer and Friedman (2007) find highly efficient network structures (characterized by high mutual connectivity) are

fast in reaching decisions, but the decisions made maximize the short-run performance of the system. They are inferior for long-run performance. The underlying reason for this is that efficient networks quickly reduce information diversity in the system, which facilitates the finding of local optima based on the best strategy that already exists.

Social Pressure

There is a history of work in social psychology examining social pressure in cohesive groups (closed networks), which is found to promote shared beliefs and behaviors, and to foster intolerance toward outside beliefs or behaviors. A touchstone work is Festinger, Schachter, and Back's (1950) study of the emergence of social groups and social influence within groups. Results analogous with those of this study are now commonplace in network studies: people in closed networks are more adamant in their opinions, less familiar with alternative opinions, more rigid in adhering to the accepted, and more fearful of novel alternatives (Burt, 2005: Chapter 5; 2010: Chapter 8, Appendix G, for the network argument and evidence). This is partly because social influence is so effective, and partly because decision-makers will not always register that it was the social situation around them that prompts some of their decisions and behaviors. Changes in wording and presentation are capable of dressing up the same or a closely related thought in a variety of ways that give the appearance of difference. Ultimately, decision-makers may feel that trusted advisors and consultants have independently arrived at the same conclusion, and for this reason may consider the conclusion to be well-founded (Pentland, 2013), whereas truly alternative views were quickly eliminated from the solution space. There is supportive empirical evidence for this assertion: following earlier work exploring the association between beliefs held by workgroups and those held by managers (Chattopadhyay, Glick, Miller, & Huber, 1999),

Marginson and McAulay (2008) find that managers are more likely to display short-termist beliefs if a majority of workgroup members display the same temporal bias. These findings are consistent with the view that social influence matters in temporal preferences. However, Marginson and McAulay make no structural argument; instead they refer to the influence of majority votes and homophily between managers and work-groups.

Theoretically, convergence of in-group opinions could steer managers toward either short-run or long-run plans. However, there are reasons to believe that social influence within closed networks has an inherent tendency to promote short-run perspectives over long-run plans. Qualitative studies suggest that controversial, open discussions, and also the involvement of a variety of different stakeholders, are key to developing visionary long-run strategies (Kaplan & Orlikowski, 2012; Slawinski & Bansal, 2015). Kaplan & Orlikowski's (2013) case study of a multidivisional communications equipment producer, conducted at the height of the internet crisis in 2002, highlights the importance of alternative views and different interpretations. Active disagreement and reconstruction of new perspectives appear to be crucial steps in efforts to produce visions for the future, rather than remaining trapped in myopic views of the present. Other studies support the idea that diversity in opinion is important for the development of long-run strategies. Slawinski and Bansal (2015) present a multi-case study of Canada's oil sands industry. Their comparison of five different companies and their respective involvement in long-run sustainability strategies highlights that bi-directional stakeholder engagement and cross-sector and industry collaborations facilitate the development of future-oriented strategies. In the absence of such outreach strategies, companies were more likely to focus on short-run efficiency goals and to develop a myopic focus on the present. Mechanisms associated with a neglect of long-run strategies include a reductionist view of the problem at hand and the narrowing of the

solution space. A related strand of economics literature argues that careful deliberation and the ability for cognitive reflection should, on average, favor earning larger and later rewards (Frederick, 2005). Controversial discourse, however, is less likely in closed networks than open networks, with group members seeking quick approval and confirmation of their opinions from others in the group. A search for common ground replaces open-ended discourse and common ground is established more easily in matters of the present than in terms of a distant future.

Results from laboratory experiments testing the relationship between social influence and individually raised opinions support the idea that social influence reduces the range of interpretations and opinions that are voiced. Lorenz et al. (2011) perform a laboratory experiment to track average and individual responses to a series of six knowledge questions. Social influence is simulated by informing their subjects after each round of play of the average group estimates. Compared to the control group that receives no feedback about other estimates, estimates by subjects in the social-influence condition converge in subsequent rounds toward the mean (without improving accuracy). The position of the correct response moves to the peripheral regions of the range of estimates given by the group, which makes a well-connected group a weaker advisor. Subjects also become more adamant in believing their opinion to be correct, even though there is no improvement in accuracy. The authors conclude, "From the perspective of decision-makers, it would be valuable to request multiple independent opinions and aggregate these as the basis for their judgements" (Lorenz et al., 2011: 924). The authors further reason that responses to problem sets with no predefined correct answers—such as predictions of the future—will converge even faster than responses to simple knowledge questions, which a certain part of the group may be able to answer correctly. These results invite a counterintuitive conclusion: the speed of conversion on a generally accepted answer in closed networks with

shared information is fastest if the answer is unknown and complex. In other words, agreement is most quickly reached if the problem is most deserving of a critical and deep discussion.

Piecing together mutually supportive evidence from network research on information diversity and insights from qualitative case studies, laboratory experiments, and simulation studies on the association between network structure and social influence, we predict:

H1. The more closed the network around a business leader, the shorter the leader's planning horizon in business strategy.

Burt (2017) presents initial results offering tentative support for our hypothesis. Executive M.B.A. students in closed networks are more likely to discount the future, which suggests shorter planning horizons. Future tense is less likely to be present in the language of managers in closed networks, which is consistent with those managers having a myopic focus on the present. These findings are encouraging, but the key evidence for management research is to associate temporal myopia in business planning with closed networks.

Network Closure, Temporal Myopia, and Business Performance

We argue that network closure is not only associated with a tendency to favor short-run planning, but also influences the quality of planning. Even managers with a myopic focus on the present and limited foresight can occasionally implement long-run plans. Strategic plans may be drafted in response to normative pressure from co-owners, creditors, suppliers, and key customers, or any other stakeholder who has an interest in the long-run development of the business. Also, exposure to ideas discussed in education programs, business associations, and the local media may inspire leaders with a temporal preference for the present to engage in medium or long-run planning. Das (1991), for instance, obtains evidence from a small sample showing that managers who rely on alternative forms of information such as trade journals or conferences plan for longer periods

than those neglecting external sources of information. If we are correct that network closure comes with a lack of future vision, then closure should also be associated with less effective long-run strategies.

Accumulated evidence in network research shows a strong negative association between network closure and performance (Burt, Kilduff, & Tasselli, 2013). Open networks are associated with greater creativity, innovation, and change dynamics. In sum, open networks are associated with success in exploration tasks that typically require longer gestation periods than tasks associated with the improvement of the operational efficiency of existing and established technologies. It would be difficult to argue that exploratory tasks are not at the same time associated with a higher level of organizational foresight. Introducing new technologies requires orchestrated effort and collaboration across various organizational groups, involving technology, marketing, sales, and legal departments. Such activities depend on long-run planning of human capital and technology needs and require the accurate prediction of future market development. In the absence of knowledge—or at least a good grasp—of relevant future dimensions, "the futurity of all present decisions would amount to routine extrapolations of present knowledge into an unknown future period", as Das (1987: 204) notes. Briefly, successful strategic planning for the future hinges on knowledge of relevant future dimensions that managers in closed networks are less likely to possess. Thus, we form our second hypothesis as follows:

> *H2. Longer planning horizons are associated with greater success in business, but with lesser levels of success for managers embedded in a closed network.*

DATA

To test our predictions, we draw on a 2012 survey of 700 CEOs operating private firms in China's extended Yangtze Delta region. Respondents are a stratified probability sample based on

city, industry, and company size. The goal was to sample 100 companies in each of seven

municipalities (Shanghai, Hangzhou, Wenzhou, Ningbo, Nanjing, Changzhou, and Nantong)

located in and on the margin of the Yangtze Delta region, on China's eastern coast. All firms are

active in one of five of the region's thriving manufacturing industries: textile, machinery,

automobile and vehicle parts, pharmaceutical products, and communication technologies.

Further, the sample was stratified by size in order to avoid an over-representation of managers in

charge of small and marginal companies, medium (> 100 employees) and large size (> 300

employees) enterprises were over-sampled, and newly founded firms (younger than 3 years) were

excluded from the sampling frame.

The sample was drawn from official records of firm registrations in each of the

municipalities. In total, the local survey organization invited 1,148 CEOs of private firms to

participate in face to face interviews. The voluntary nature of the survey was emphasized and

confidentiality guaranteed. Ex ante information was limited to a short description of the purpose

and nature of the survey. In total, 700 (60.97%) of the invited managers participated in and

completed the survey.[2] All interviews were conducted between August 2012 and January 2013.

The final sector representation in the survey is as follows: 24.3% textiles, 11%

pharmaceutical and medical, 25.7% mechanical manufacturing, 24.4% automobile and vehicle

parts, and 14.6% communication and electronic equipment. Firms represented in the survey had

an average staff of 133 employees (compared to the national mean for China of 121 employees),

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[2]For a review of survey response rates for managerial samples see, for instance, Baruch (1999), who reviewed 175 different studies published in top-tier journals in management and behavioral studies identifying a response rate of 35.5% +/-13.3. Mellahi and Harris (2016) offer a more recent review of the literature and calculate an average response rate of 37.4% for managerial populations.

fixed assets of 22.8 million CNY (compared to the national mean of 20.66 million CNY), and after-tax profits of 4.23 million CNY (compared to the national mean of 5.5 million CNY). Our sample companies in the Yangtze region are therefore slightly larger, yet slightly less profitable, than the national average (see China Statistical Yearbook 2011).

In addition to being the senior managers in their organizations, most of the respondents are owners of the sample organization they represent, and founded the organization, either alone or in collaboration with others (556, or 79.4%). Most of the sample organizations were started from scratch as new private enterprises (492, or 70.3%); the core businesses of the other organizations existed in some form before the respective organizations were formally created. There are no statistically significant interactions between CEO role and organization origin other than a slight tendency for CEO owners and founders not to be running former state-owned enterprises (-2.23 z-score), and a strong tendency for respondents to be owners and founders of their organization (3.55 z-score). In short, the respondents are CEOs who appear to be deeply involved in their organizations. This is fortunate for the present study because it indicates that we can be relatively sure that the respondents generally have a direct influence on strategic planning and business practice. In contrast, for a sample of professional managers who answer to shareholders and the board of directors, such an association may not be as strong (Miller & Toulouse, 1986).

Dependent Variables: Planning and Performance

The survey instrument collected data for a range of socio-demographic attributes, company characteristics, and strategic decisions. There are diverse ways to measure "time" in strategic planning horizons (Laverty, 1996; Marginson & McAulay, 2008). Our focus on networks as an

explanatory variable complicates matters further. Two conditions must be in place. First, because firm strategies differ with different business models, any outcome variable must be meaningful for all firms in our sample. Second, the strategy measure may not in itself imply the existence of a certain network type. This rules out a number of measures commonly used in the strategic management literature, such as strategic partnerships in the form of joint-venture agreements, mergers and acquisitions, R&D collaborations, and new product introductions (Nadkarni & Chen, 2014; Shi, Sun, & Prescott, 2012). All of these strategies are also associated with the existence of broker networks (Burt & Soda, 2017). We select a set of four measures to span dimensions of time horizon when testing our first hypothesis.

Planning Horizon.

Survey respondents were asked: "In general, for how many years do you try to plan in advance in terms of strategic/organizational development of your firm?" Five response categories were offered: No development plan, 1-4 months, 4 months to 1 year, 1 to 3 years, and 3 years or longer. Respondents avoided the extreme categories; only two CEOs said they planned for the next 3 years or longer, so these two are combined with the 175 who responded "1 to 3 years" to define a long-run planning category. Only 13 CEOs said that they had no development plan, so these are combined with the 174 who said they planned only for the next 1 to 4 months to define a short-run planning category. The remaining 336 CEOs fall into a mid-range planning category, in that they planned for more than the next four months, but less than one year.

One can be skeptical about whether self-reported planning horizons are consistent with actual behavior. We therefore complement this horizon measure with three specific variables that signal long-run commitment and pro-active planning for the future.

Long-run Management Contracts.

China's labor market is characterized by an abundance of unskilled and low-skilled labor.

Qualified managerial staff is in short supply. Providing managers with attractive contracts is

important for realizing long-run goals. Respondents were asked to specify the percentage of their

management staff who are employed under each of the following contract-terms: 1 year contract;

2 year contract; 3-5 year contract; or other. "Other" is the response selected by CEOs who do not

have written contracts with their managers.[3] We refer to the percentage of management staff

employed under 3-5 year contracts as the percentage employed under "long-term" contracts. On

average, 37.6% of management staff are employed under such contracts, but the distribution is

concentrated at the extremes; the majority of CEOs (54.0%) either employ their managers under

contracts shorter than 3 years or do not use contracts. The next most likely response is the

substantial minority of CEOs who exclusively use 3-5 year employment contracts for their

managers (26.3%). In our analysis, we measure long-run planning by the proportion of

management employed under long-term 3-5 year contracts. Table 1 shows how the percentage of

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[3]Of the 700 respondents, 73 reported that they had managers in the "other" contract category. The majority of these respondents had 100% of their managers in the category (76.7%). We checked for instances of the category being used to describe managers who are family members. For example, four of the 73 CEOs with managers in the "other" category said that they had indefinite or lifelong contracts with their managers and all four operated family firms (using a common definition of 'owner operated' in which either the spouse or children of the CEO are employed, e.g., Miller, Le Breton-Miller, Lester, & Canella, 2007). However, only two CEOs explicitly mentioned "family," one of whom said he only had one manager who was a family member, although his was not a family firm, and a second who said that one should not use contracts with friends and family, and his too was not a family firm. More generally, the proportion of family in a CEO's network has no correlation with the use of the "other" category (0.38 t-test). The primary predictor of use of this category is size: none of the sample firms in the "large" category said they had managers in the "other" category of contracts, and the "other" category is used disproportionately by CEOs of small firms in the sample (8.09 chi-square, 2 degrees of freedom, P ~ 0.02). The most common explanation given for use of the "other" category is that the CEO does not use formal contracts (78.1%).

long-term management contracts changes across the categories of short-run, average, and long-run planning horizons. Managers are most likely to be employed on long-term contracts in companies run by CEOs who say they operate under long-run business plans (41.1%).

Percent Long-run Contracts for Technical Staff.

Analogous to the long-run management contracts measure described above, we look at the proportion of technical staff who have 3-5 year contracts. The same question and answer categories as used for managerial staff were used for technical staff. The mean value for the proportion of technical staff employed under these contracts is 34.6% percent, with a bi-modal distribution that is similar to that for management contracts: 51.8% of the respondents do not use any 3-5 year contracts for technical staff, and at the other extreme, 20.86% only use 3-5 year contracts. Table 1 shows that technical staff are least likely to have long-run 3-5 year contracts in companies that are run by a CEO who only plans ahead for the next few months (29.1%).

Employee Training.

Many of the sample companies invest in some form of employee training to enhance their staff for current and future tasks, but the provision of training is not ubiquitous, and in its own way, signals future planning by the company (see, for instead, Felstead, 2018, on the association between short-termism and training provision). Respondents were asked whether their company provided any in-house training for their employees during the last three years. About two thirds responded that their companies had (67.7%). Table 1 shows that provision of employee training is particularly unlikely in companies run by a CEO who operates under short-run planning (0.56 probability).

——— Table 1 About Here ———

All three of the specific indicators detailed in Table 1 show a larger difference between firms that engage in short-run and mid-range planning than between firms that engage in mid-range and long-run planning (e.g., for provision of employee training, the former difference is sixteen percentage points, 0.56 compared to 0.72, whereas there is no difference between the later categories, 0.72 and 0.72).[4] This is a qualitative distinction that we include in the analysis by incorporating a dependent variable that distinguishes CEOs in the "short-run" planning category versus the two longer-term planning categories in Table 1.

Business Success.

For hypothesis two, we follow Burt and Burzynska (2017) in measuring business success by attributes that might be of personal interest to a self-made man in China during the period of rapid economic growth covered by the survey: (1) a lot of money passes through his hands (annual sales); (2) jobs are generated (total employment); and (3) the company shows evidence of its technological sophistication by holding its own patents. Our measure of business success is a principal component analysis z-score aggregating the value of annual sales, number of full-time employees, and number of patents at the time of the survey (see Burt & Burzynska, 2017: 229). The principal component describes a large proportion of variance in the indicators (65%), and all three indicators have the expected negative association with closed networks.

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[4] Predicting the three planning indicators from a dummy variable distinguishing "short-run" planning from the two longer planning categories, all three test statistics are negative and statistically significant (-2.09, -2.12, and -4.09 for the three rows in Table 1, respectively). If we make the same prediction using a dummy variable distinguishing "long-run" planning from the two shorter planning categories, all three test statistics are positive but not statistically significant (1.20, 0.70, and 1.33 for the three rows in Table 1, respectively).

Business Network

The business network around each CEO is measured in the usual way by asking for the key contacts (people helpful in building and operating the business), then asking about the substance of the CEO's relationship with each contact, and the strength of connections between the contacts. Such survey questions are routine in network survey research (Marsden, 2011; Perry, Pescosollido, & Borgatti, 2018) and in network surveys of management populations in particular (Burt, 2010: 281ff.), and have visible precedent in China (the 2003 Chinese General Social Survey, Batjargal et al., 2013; Bian & Li, 2012; Burt, 2019; Ruan, 1998; Xiao & Tsui, 2007).

Figure 1A displays a relatively open business network: the CEO (square in the center of the figure) founded his business 12 years ago, and had grown it to 467 employees by the time of the survey. He named nine key business contacts. His named contacts were largely interconnected by close rather than especially-close relations (thin lines), with a few especially close relations (bold lines). Contacts are located close together in the figure to the extent that the relationships between them are strong, and their relationships with others are similar (spring embedding, see Borgatti, 2002).

——— Figure 1 About Here ——

Business contacts were identified with six name generators. To stretch the network data back into a respondent's history, we asked about contacts associated with significant business events dating back to the firm's founding. All CEOs named the contact most valuable to them when the business was founded, then most named five subsequent events, and a person whose help was most valued during the event. We refer to people named in association with significant events as "event contacts" (Burt & Opper, 2017). The significant events cited by the CEO in Figure 1A are listed on a time line shown in the lower-left of the figure. Contact 1 was cited as

the most valued person associated with the founding of the business. Securing the first overseas customer was a significant event in the second year of the business, and contact 2 was cited as most valued in that event. Significant events continue across the time line, and for each the contact most valued during the event is provided. Some CEOs cite the same people for multiple events (especially family, as in Figure 1B), but the respondent in Figure 1A named a different person for each event.

To identify "current" contacts, CEOs were asked to name the "three or four people who have been most valuable to your business activities this year," "the most difficult person this year," "the most valuable employee this year," and any individuals who were "particularly significant" for the business who had not been yet named. The elicitation of difficult contacts is not part of standard name generators asking for close or helpful contacts. However, difficult contacts can be an important source of diversity (Brennecke, 2019). The CEO in Figure 1A cited five current contacts. A contact can be cited on more than one name generator, and it was often the case that a current contact was also named as an event contact (of 4,464 different people named as contacts, 65% are named as event contacts, 70% are named as current contacts, and 35% are named as both). Combining event contacts and current contacts, the sample networks vary from three to 12 contacts, around a median of six.

Note that the exact definitions of a "significant event in the business history" and of being currently "valuable" were left to the respondent to decide. We wanted to be sure that respondents refer to what has been important to *them* and *their* firm. Further, note that with the exception of the question asking for a valuable employee, cited contacts can be individuals who are either inside or outside the firm. Providing such open questions has the important advantage that we limit the risk of influencing network recall by guiding the respondent to think in one direction or

another. This freedom of response is important because entrepreneurial networks and their underlying functions are likely to change with the development of the firm (Hite & Hesterly, 2001).

Name interpreters are survey questions that ask the CEO to describe relations with and among the cited contacts. We asked how long a CEO had known each contact, how often they meet with each contact, gender and role relations with each contact (family, neighbor, etc.). To scale relations, we asked CEOs whether their relation with each contact was "especially close," "close," "less close," or "distant," and asked them to describe connections between each pair of named contacts as "especially close," "distant," or "neither distant nor especially close." One concern is whether respondents have sufficient knowledge to assess connections between cited contacts. A closer look at the contact attributes in our sample, however, should alleviate this concern. In total, the 700 respondents cited 4463 different contacts, with an average network size of six contacts. Among these contacts, 90% were known for at least three years. Only 1.57% (70) were known for one year or less. On average, cited contacts were known for about 10.5 years. Contact frequency is relatively high. The respondents talk to 84% of contacts either daily or weekly. Communication less than monthly was only reported for 8.6% of the cited contacts. Due to the relatively small network sizes, the long-term nature of acquaintances, and the high frequency of exchange with each contact, respondents seem very likely to have accurate knowledge of the quality of the ties between contacts.

Each CEO's network is a matrix of symmetric connections with and among contacts, with connections scaled to vary from zero to one (Burt & Burzynska, 2017: Appendix). From these values we compute *network constraint* as a summary measure of network closure. Values are multiplied by 100 to facilitate discussion in terms of points of constraint; a constraint score of

100 indicates that a respondent's contacts are strongly connected with one another (no access to structural holes). The constraint score decreases toward zero with the extent to which a CEO has many contacts (network size or degree), increases with the extent to which the CEO's network is closed by strong direct connections between contacts (network density), and increases with the extent to which the CEO's network is closed by an individual through whom contacts are strongly connected indirectly through a central person (network hierarchy or centralization). With a network constraint score of 37 points, the network in Figure 1A is relatively open (-1.38 z-score). Consistent with our hypotheses, the open-network CEO in Figure 1A falls into the Table 1 category of "long-run" planning, and the business has been relatively successful (2.50 z-score on success factor).

At the other extreme, Figure 1B displays a relatively closed network. The CEO founded his business 13 years ago and has grown it to 21 employees. He named five business contacts, who are largely interconnected by relations described as close (thin lines) or especially close (bold lines). Contact one, the CEO's uncle, is the most central contact in the network, in the sense that he has the strongest connections with everyone. Notice how dependent the CEO is on his uncle, citing him as the person most valuable in founding the business, the person most valuable in locating someone to replace the operations manager, and the person most valuable in helping the CEO to replace a major supplier. The CEO meets his uncle daily, and has known him all of his life (the respondent has known his uncle for 41 years). The CEO's two sons are the next most central contacts in the network: both are valued current contacts met weekly, and each is cited as being the most valued contact during a significant event in the history of the business. There is one other person cited as a current valued contact, and a fifth person cited as the respondent's most difficult contact that year (a friend of his uncle who left a job in the business and took some

customers with him). The network in Figure 1B is relatively closed by direct connections between the contacts and indirect connections via the respondent's uncle. Consistent with our hypotheses, the closed-network CEO in Figure 1B falls into the Table 1 category of "short-run" planning, and has been comparatively unsuccessful with his business (-1.24 z-score on success factor).

While we are the first to use these network data to explore strategic preferences and biases in business management, we benefit from the fact that certain aspects of the data have been used before. Previous work reports a negative association between network closure and performance as well as business survival (Burt & Burzynska, 2017; Burt & Opper, 2017; Zhao & Burt, 2018), insignificant differences of network structure across gender (Burt, 2019), the importance of structure for inter-personal trust (Burt, Bian, & Opper, 2018) and distrust/character assassination (Burt & Luo, 2020), and has explored the way network structure interacts with political ties (Burt & Opper, 2020). Based on these studies, the validity of the data appears high. Also, we note there is no evidence that social networks in our sample follow different mechanisms than elsewhere. Whereas network composition may vary across different national and cultural contexts, network behavior and outcomes appear strikingly consistent. [5]

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[5]Proponents of cultural contingency with respect to networks in China often justify their view with reference to Xiao and Tsui (2007), who do not find broker advantages in the Chinese organizations they examine. The problem is the number of low-rank employees that are included in Xiao and Tsui's (2007) otherwise excellent network data. Low-rank employees rarely have the social standing to be accepted as network brokers, in China or elsewhere. For similar results on low-rank managers in the West, see Burt (2005: 156–162). Burt and Batjargal (2019) discuss cultural contingency with respect to China (pp. 17-18 discuss Xiao & Tsui's analysis).

Control Variables.

In order to reduce confounding effects, we include a set of control variables capturing personal attributes, firm characteristics, and environmental factors that previous studies have found to be associated with strategic decisions and network structure.

Personal characteristics include age, gender, and education (years of schooling), which are associated with strategic preferences and leadership styles (Hambrick & Mason, 1984), time preferences (Falk, Becker, Dohmen, Enke, Huffman, & Sunde, 2018), and network structures (Lin, 1999; Marsden, 1987). We also control for founder CEOs (79.9% of our sample respondents) versus hired CEOs and co-owners, because the behavioral preferences of founders are likely to have a stronger bearing on strategic choices than those of hired CEOs and co-owners who report and respond to other shareholders and members of the board of directors. Founders may also differ from their peers with respect to self-monitoring and the Big Five personality traits (for review, see Brandstätter, 2011; Zhao & Seibert, 2006), which have also been associated with distinct network structures (see Fang et al. 2015 for review). Whereas meta-analyses reviewing both lines of inquiry generally only find modest differences between these groups (Brandstätter, 2011; Fang et al., 2015), we hold constant the "founder effect" when testing for associations with network structure. Finally, we include a measure of self-reported unhappiness, which the literature associates with trust in social networks (Burt, Bian, & Opper, 2018) and with time preferences elicited in laboratory games (Ifcher & Zarghamee, 2011). Based on the General Social Survey happiness item (Smith, Marsden, Hout, & Kim, 2013), we use a binary "unhappy" variable to control for differences between CEOs who report themselves to be either "very happy" or "rather happy," and those who report lower levels of happiness.

Long-run strategic plans can be expected to vary with *firm characteristics* such as the company's maturity, technological position, and status in the market, which in turn correlate with the network structure surrounding the CEO (Burt & Opper, 2017; Hite & Hesterly, 2001). To disentangle these effects, we control for firm age and firm size (measured by book value of the company's assets). Further, we include a binary variable to identify family firms, defined as owner-operated firms in which either the spouse or children of the CEO are employed (a common definition, as used in, for example, Miller et al., 2007). Family firms tend to eschew formal planning processes, but also display distinct network styles (Kelly, Athanassiou, & Crittenden, 2000). In our sample, family firms are likely to be associated with network closure (Burt, 2019). A further control employed is company technological sophistication (in-house R&D activities), which is expected to correlate with the ability and necessity to develop longer-term firm strategies. Finally, we control for initial business success using a principal component of full-time employees and sales revenue in the first year from the date the company was registered (Burt & Opper, 2017:520). Initial success after founding is a strong market signal that may facilitate and shape the way managers build their networks and plan for the future.

We include sample-specific controls for fieldwork procedures and the broader business environment firms are located in. Our sample is geographically concentrated in China's extended Yangtze river delta. Although the region has long been rated as relatively homogenous in its institutional development (IMD, 2005), we include seven city dummies to control for remaining differences in local policies and administrations. Five dummy variables control for industries (at a two-digit level, following China's national industry classification). Because network structure and strategic responses may also reflect the market situation, we apply more fine-grained classifications at the four-digit level (77 different sectors) for a number of robustness exercises.

To get a sense of the perceived competition in respondents' specific product niches, we have also asked respondents to give their opinion on how much their sales would drop if they increased their product price by 10%. Respondents who believe their sales would decrease by less than the 10% price increase perceive demand to be price inelastic. On average, the sampled CEOs expect sales volumes to drop by 10.1% in response to a 10% price increase. Individually, however, the CEOs' perceptions vary from extreme price inelasticity (price increase has zero effect on sales) to substantial price elasticity (one person predicted that sales would drop 60% if the product price increased by 10%). Finally, while all interviewers participated in a training workshop to standardize the implementation of the survey, we include dummy variables to control for the identity of the main interviewer in order to hold constant any remaining inter-personal differences.

RESULTS FOR HYPOTHESIS ONE: PLANNING HORIZON

Figure 2 illustrates the strong empirical support for hypothesis one: closed networks are associated with short planning horizons. The plotted data are mean values of the vertical and horizonal axes within five-point intervals of network constraint on the horizontal axis. There are few networks more constrained than 85 points, so scores higher than 80 are combined at 85 on the horizontal axis. Similarly, there are few networks less constrained than 35 points, so scores lower than 35 are combined at 35 on the horizontal axis. Table 2 reports mean values, standard deviations, and correlations. Regression results in Table 3 show that the zero-order associations in Figure 2 are robust to controls. Each of the four regression models in Table 3 includes fixed effects for five industries, seven cities, and 22 primary interviewers.

——— Figure 2, Table 2 and Table 3 About Here ———

Each graph in Figure 2 shows shorter time horizons as a CEO's network becomes more closed. Figure 2A shows how the percentage of CEOs that rely on long term plans decreases with network constraint (-0.76 correlation, -2.89 logit test statistic in the first row of Table 3). Figure 2B and Figure 2C show the lower percentages of long-run contracts for managers and technical staff employed by CEOs in more closed networks (correlations of -0.93 and -0.91 respectively, -4.51 and -4.15 t-tests in Table 3, respectively). Figure 2D shows the tendency for CEOs in closed networks not to invest in employee training. As network constraint increases, the percentage of CEOs providing employee training decreases (Figure 2D, -0.87 correlation and -5.73 logit test statistic in Table 3).

There are two qualifications to the evidence. First, we see a difference between what respondents say they do, and what they actually do: the negative associations between closure and long-run planning are very strong in the three columns for actual business practices (long-term contracts for managers, M2; long-term contracts for technical staff, M3; and investing in employee training, M4). However, when asked about their planning horizon (M1), the statistical significance of the association between open networks and long-run planning is not as strong as for the association between closed networks and short-run planning. The first two columns in Table 3, model M1, are based on a multinomial logic model predicting which of the three planning categories in Table 1 is likely for a respondent. Mid-range planning is the reference category. The first column in Table 3 shows which respondents are more likely to be short-run rather than mid-range planners. The second column in Table 3 shows which respondents are more likely to be long-run rather than mid-range planners. CEOs in closed networks are significantly more likely than those in open networks to be short-run planners (2.89 test statistic) but they are no less likely to be long-run planners (1.18 test statistic). This accords with the pattern in Table 1

showing that mid- and long-run planning was much less different from one another than either is to short-run planning, but there are also implications for hypothesis one: CEOs in closed networks do not engage in long-run business practice, and think of themselves as focused on the next quarter (categorized as short-run planners in Table 1 and Table 3). CEOs in low-constraint open networks, also known as network brokers, are more likely to engage in long-run business practices, but do not think of themselves as planning beyond a year or so into the future (categorized as long-run planners in Table 1 and Table 3). Our suspicion is that network brokers are flexible in the time horizon used for their planning, but it is clear from Table 3 that they do not limit their planning to the next few months.

The second qualification is that most of the controls in Table 3 have negligible associations with the planning horizon variables, with two exceptions: CEO emotional state, and family. Unhappy CEOs are particularly unlikely to engage in long-run business practice. They tend not to invest in employee training (-2.48 test statistic). We make no claim of causality here. A CEO could be unhappy because the business is not doing well, so managers and staff are hired on a contingency basis, or it may be the case that unhappy CEOs have too little energy to attend to more than day to day survival. Regardless, the result is consistent with a parallel literature emphasizing the link between emotional state and time preference (Ifcher & Zarghamee, 2011). Further, long-term contracts and employee training are unlikely in family firms (-3.48, and -3.90 test statistics in models M3 and M4, respectively). It is possible that CEOs in family firms may prefer to govern by means of the informal control of network closure rather than the legal control provided by a formal contract. Network constraint is markedly higher in family firms than non-family firms (5.33 t-test). (The network in Figure 1B is an example family firm.) Here again, what CEOs say they do is distinct from what they actually do: the associations between CEO

emotional state and family firms only exist for the business practice measures reported in Table 3 (M2 – M4). No association is found for the two control variables with CEOs declaring that they focus on short-run versus long-run planning.

Robustness: Unobserved Variables

Unobserved variable bias is a concern in any cross-sectional survey design. Guided by the literature on time preferences and network structure, our control variables have addressed some of the most pressing concerns. Our estimations include a number of measures reflecting personal status, including age, gender, and education (Lin, 1999; Marsden, 1987), and measures reflecting the status of the entrepreneurial ventures, such as firm age, firm size, technical sophistication, and industry (Burt & Opper, 2017; Hite & Hesterly, 2001), all of which are likely correlates of different network structures and strategies. We have no direct measure of personality traits such as self-monitoring or the Big Five personality traits, but we are less concerned about their influence. First, according to the literature, variation in network position attributable to these traits appears to be extremely small. Fang et al. (2015) conduct a meta-analysis of 138 independent samples and find variation of only 3-5% in network position attributed to personality differences (the study focuses on in-degree centrality and brokerage). Second, because selection into entrepreneurship is associated with the Big Five personality traits (see meta-analysis by Zhao & Seibert, 2006; for a review of five different meta-analyses, see Brandstätter, 2011), the high representation of founder-CEOs in our sample is likely to result in interpersonal differences that are even smaller than would be found in the general populations of professionals.

Unobserved differences in the market environment pose greater concerns. Although we have included fixed effects for five industries and seven cities, there could still be within-industry

variation. Such variation could shape different resource-needs, which in turn might influence network structure and planning preferences. We explore this possibility using fixed effects coded at the four-digit level of China's industrial classification (77 dummies in total). As an example, an industry niche would be defined as "Machinery parts for agricultural, animal husbandry and fishing machines". We retain the seven city dummies, so that we control for local sector variation within each industry niche. There is, however, a cost to this strategy: we reduce our sample size on average by 10% in logistic regression models, because not all responses vary in each of the 77 industry niches. Also in re-estimating model M1 we can no longer perform a multi-nominal logit model, and instead apply a logistic regression model with short-term plans as the dependent variable.

The results, shown in Appendix A, are consistent with the results presented in Table 3. Network constraint is still associated with short-run planning horizons (model M13) and lower percentages of long-run contracts for managers (model M14) and technical staff (model M15), and is negatively and statistically significantly correlated with the provision of employee training (Model M16), yielding test statistics for network constraints of -2.27 (M13), -4.66 (M14), -3.81 (M15), and -6.03 (M16).

Robustness: Reverse Causality

Cross-sectional survey network data are always open to a charge of reverse causality. Due to the timing of the data collection, a recent entrant into a manager's network immediately influences the size of the network constraint, but may in fact not have had opportunity or sufficient time to influence managerial decisions. It could be that the entry simply occurred too late to affect either information diversity or social influence. Further, a skeptic could argue that contacts who entered

the network in the same year that strategy measures are recorded could have been recruited into the network to match the manager's temporal preferences and strategies.

Fortunately, the managerial networks in our sample contain a large proportion of contacts that have been established many years before the survey was conducted. The average contact duration across all 4,463 contacts, distributed over the 700 networks, is 10.5 years. There are 70 contacts (that is 1.57% of all sample contacts) known by respondents for only one year; in those cases entry into the respective network, formation of strategy, and firm performance are broadly simultaneous events. Some of the managerial networks contain more than one of these novel contacts, and a total of 64 of the 700 networks are affected.

To ensure that our results are not driven by these entries, we re-estimated models M1 to M4 excluding the 64 networks that include recent contacts. For these estimations we also maintained the more demanding four-digit level industry controls. Appendix B summarizes the results for this reduced sample. All baseline findings are confirmed by this sample, with a slightly higher effect size found for network constraint in predicting utilization of long-term contracts for managers and technical staff. The estimates increase from -0.69 (model M2, Table 3) to -0.81 with -4.20 test statistic (model M18, Appendix B), and from -0.65 (model M3, Table 3) to -0.73 with -6.21 test statistic (model M19, Appendix B), respectively. Although these results cannot rule out the possibility that network recruitment reflects managerial time preferences developed at an earlier stage, the results give some assurance that temporality in the research design did not drive the prediction. Results for our control variables are also confirmed, with some increases found in effect size and test statistics for emotional state (M18 and M19, Appendix B) and family firms (M19, Appendix B).

Robustness: Network Structure versus Composition

We also considered the possibility that the network-myopia associations depicted in Figure 2 may be due to network composition rather than network structure. A skeptic could argue that the diversity of opinion in a network reflects the similarity of people in a network, regardless of whether or not they have strong relationships with one another. We focus on three composition variables:

First, gender diversity could affect opinion diversity (Knippenberg, De Dreu, & Homan, 2004). We constructed a binary variable that is equal to 1 if there is a mix of women and men in the manager's business network, and 0 otherwise. Of the 700 sample networks, 357 (51%) contain both male and female contacts.

Second, we considered the percentage of business contacts who are family members. The percentage of close and remote family members in a CEO's network could affect planning, specifically in the Chinese context, in which family ties are believed to play a decisive role in business (Luo & Chung, 2005). Of the 700 sample networks, 274 networks (39%) include family members, and the percentage of contacts who are family ranges from 10% to 80%, with a mean of 23.4%.

Third, to account for the different worldviews, opinions, and personal experiences that contacts bring to the manager's network, we calculate the difference in years "known" between the earliest and most recent entries into the manager's network. For an initial test, we construct a dummy variable equal to 1 if the spread in years exceeds the median value for the sample of 15 years.

Results are given in Appendix C. The model specification builds on previous robustness tests and again controls for fixed industrial effects at the four-digit industrial classification (as in

Appendix A and B) and for recent entries into the network (as in Appendix B). The overall

account confirms previous findings, with statistically significant coefficient estimates for the

network association with all four of the planning proxies. Further, we find no systematic

association between any of the composition measures and managerial planning horizons. There

are only two statistically significant coefficient estimates: percentage of family members in the

network is negatively associated with the share of long-term management contracts (M22, β =

-0.34, t-test = -2.49) and the representation of both genders in the network is marginally

significant (β = 8.87, t-test = 2.12) in the same model. Overall, the predictive power of each

model is smaller than models that exclude these compositional features. From these results, we

conclude that structure rather than any of the tested measures of composition is the network

condition inducing temporal myopia.

Robustness: Perceived Market Elasticity

In the spirit of the Schumpeterian idea of "creative destruction", and with market competition

incentivizing exploratory activities, the neglect of long-run plans is expected to go hand-in-hand

with an exaggerated feeling of safety. Relatedly, others propose that the same organizational

pathologies resembling life in closed networks do not lead only to temporal myopia, but also to

the neglect of other markets, competitors and technologies. Levinthal & March (1993) coin the

term 'spatial myopia' for this phenomenon. If true, this appears to imply that the network

structure surrounding a manager is also associated with the manager's beliefs about the current

market situation. Closed networks should be associated with a feeling of safety, and open

networks should be associated with a sense of alert. As a proxy of the manager's perception of

immediate competitors in their own niche, we asked respondents to what extent sales would be

likely to drop if the firm increased the product price by 10%. Figure 3 illustrates the findings

relevant to this anticipated direct association: perceived price elasticity is found to decrease as the

network around a CEO becomes more closed (-0.87 correlation in Figure 4, -3.20 t-test in M5,

Table 4).

——— Figure 3 and Table 4 About Here ———

The regression results presented in Table 4 show that the zero-order association in Figure

3 is robust to controls and to the inclusion in the model of the previously used measures of

planning behavior (β = -0.09, t-test -3.20). In addition, the coefficient for short-run planning on

predicted drop in sales in the first column (model M5) of Table 4 shows that CEOs who only plan

for the short-run expect a change in sales two percentage points lower (β = -2.01, -4.73 t-test)

than CEOs that plan for longer periods. In the second column of Table 4 (M6), we expand our set

of industry classifications to the 4-digit level (77 dummy variables). The coefficient estimate for

network constraint is slightly larger than in the two-digit specification (β = -0.10, -3.24 t-test,

compared to -0.09 with two-digit industry distinctions). In model M7, we exclude networks

containing contacts known for only one year, and this does not affect the network constraint-

elasticity association. The coefficient estimate increases slightly to β = -0.11 with -3.47 t-test.[6]

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[6] We also explored whether a more recent experience with drops in sales—representing an information shock—might moderate the network-belief association. Although most entrepreneurs have experienced market volatility during the global financial crisis, some of the entrepreneurs have also experienced a more recent decline in sales during the period of the time discussed by the survey. 44 entrepreneurs reported declining sales between 2010 and 2011; 163 entrepreneurs reported a sales drop in either one or both years between 2009 and 2011. Corresponding coefficient estimates for level adjustments and slope adjustments (in extension of M5 to M7), however, remain not statistically significant, and coefficient estimates for network constraint are confirmed. For M5: β = -0.09 (compared to β = -0.09), -3.13 t-test if controlling only for the one preceding year; β = -0.10, -3.30 t-test if controlling for both preceding years. For M6: β = -0.10 (compared to β = -0.10), -3.13 t-test if controlling only for the last year; β = -0.10, -3.49 t-test if controlling for both preceding years. For M7 excluding novel network

Only one of the control variables has a statistically significant association with perceived price elasticity, which is book value of capital assets: CEOs of larger firms perceive less price elasticity for their product. Lower price elasticity for large firms is not surprising given their stronger market position. More surprising is the fact that we find no statistically significant effects for the many other variables that represent ways in which firms and CEOs can differ.

RESULTS ON HYPOTHESIS TWO:
MYOPIA AND PERFORMANCE

Figure 4 presents illustrative evidence consistent with our second hypothesis. Businesses that have fewer employees, lower sales, and fewer patents are run by CEOs engaged in shorter-range business planning (9.88 $F_{(2,657)}$, $P < 0.001$). Of course, the same figure could be used to tell the reverse story: Poor performers do not plan into the future, while high performers have the means and resources to think strategically. A number of observations are useful: First, we ran standard mean comparison tests of the firms' return on assets in the years preceding the survey (2009-2011) and find no significant performance difference across firms relying on short-term plans and those that plan for longer periods. Second, a comparison of the frequency of short-term plans between companies that have experienced a drop in their sales during the three years preceding the survey and those that have not, yields no significant difference between both groups. Finally, one could argue that business leaders may not yet have encountered economic problems, but may already sense future problems or even silently plan to withdraw. Both could influence their planning horizon. To control for such 'shadow of the future'-effect, we use data on the five year

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contacts: $\beta = -0.11$ (compared to $\beta = -0.11$), -3.27 t-test if controlling only for the preceding year's drop in sales; $\beta = -0.12$, -3.76 t-test if controlling for both preceding years.

survival of our survey firms (data is from Zhao & Burt, 2018), but do not find significant differences in survival between short-term planners and others. While none of these three tests is definitive evidence ruling out reverse causality, we conclude that financial performance is an unlikely driver of our results.

Table 5 contains regression results. To trace the association between constraint and performance, as well as our hypothesized interaction between constraint and length of planning horizon, we expand the model stepwise. In model M8 we only include the continuous measure of network constraint, for which results replicate the negative association between network closure and business performance demonstrated in earlier studies that use the same data (Burt & Burzynska, 2017). In M9 we include measures of medium and long-run planning, using planning horizons up to 4 months as benchmark category. Both measures generate the expected association with business performance. Firms run by managers that plan for more than 4 months but not more than one year perform better ($\beta = 0.09$, t-test 4.53), and those who plan for longer than a one year horizon perform best ($\beta = 0.17$, t-test 3.41). The association between network structure and performance remains almost identical in terms of effect size ($\beta = -0.005$ compared to $\beta = -0.004$) and level of statistical significance (-3.255 and -3.210 t-tests in models M8 and M9 respectively).

When we include both interaction terms between high constraint and length of planning horizons (M10), two things change: First, the advantage of companies relying on medium-term plans decreases, and is only marginally statistically significant ($\beta = 0.04$, t-test 1.971), whereas companies with closed networks gain an additional advantage from pursuing plans with a maximum outlook of one year ($\beta = 0.10$, t-test 2.901). At the same time, there is a slight increase in the coefficient estimate for long term plans (from $\beta = 0.17$ in M9 to $\beta = 0.20$ in M10, with

corresponding t-test values of 3.41 in both specifications). Further, the performance association with long-run plans appears to be smaller for managers who are surrounded by highly constrained networks (β = -0.06, and t-test – 2.142), although the level of statistical significance is marginal. Hence long-run plans exceeding one year are associated with a coefficient estimate about 30% smaller for managers embedded in closed networks than for their peers embedded in open networks. The individual coefficient estimate of constraint remains stable (β = -0.005), with a slightly increased test statistic (-3.499).

——— Figure 4 and Table 5 About Here ———

In sum, for M10 the familiar negative association between closed networks and business success is complemented by a positive association in cases where medium-term planning is used and a negative association in cases where long-run planning is used. Closer inspection of the estimation results leads us to the following tentative conclusion: managers with no or extremely short plans (less than 4 months) perform worst. When it comes to long-run plans, managers with closed networks have a disadvantage compared to their peers with open networks, but when it comes to medium-range plans (four months to one year), managers surrounded by closed networks perform better than their peers with open networks. These results are consistent with general perceptions that closed networks are well positioned to improve the efficiency and productivity of established tasks, whereas open networks are well-predisposed for exploratory tasks that are of value in planning for the future.

Several control factors are found to be relevant to the relationship, most of which are to be expected. One of these is company size measured by book value of assets. The value of assets is correlated with business success, as measured by number of employees, value of sales, and number of patents (33.15 t-test for log assets in model M10). A similar logic applies to the

availability of a research department (12.01 t-test in model M10). Firm age is correlated with

business success (t-test 4.40). The negative association with founder status (β = - 0.13; t-test = -

5.50), in contrast, deserves some explanation. A common reason for the negative relationship is

that company founders who continue to run their firm in person rather than allowing a

professional CEO take over tend to lack the type of skills, education, and knowledge that are

needed to grow a business beyond a certain size. Most entrepreneurs in China are in fact aware of

this problem, but find recruiting a competent manager difficult. Lack of trust and the shortage of

talent in the managerial labor market are perceived as problems (Nee & Opper, 2012, chapter 7).

Robustness

As discussed in the context of robustness checks for hypothesis one, we consider the possibility

that network contacts known for less than 2 years may in some way have biased our results. A

closer look at the nature of the 64 networks identified as containing such contacts shows that 53

cases involve new contacts who were named as difficult contacts.[7] Brief explanatory comments

provided by the entrepreneurs suggest that these contacts did not enter the managerial network in

response to already accomplished business success or as a necessary network component selected

on the basis of matching the manger's temporal preferences. Notwithstanding, in M11 we include

a dummy variable to control for networks that contain one or more contacts known for less than 2

years. Results are consistent with M10, providing some assurance that the identified association

between network type and business success is not driven by these new entries.

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[7] Difficult contacts were identified by respondents in response to the following question: "In contrast to people who help and are valued in your business activities, there are usually some people who make life difficult. Without mentioning the person's name, who was the most difficult person to deal with in your business activities this year? Just jot the initials in the box. Only you are going to know who this person is."

Finally, M12 controls for fixed industry effects by using the 4-digit industrial classification, and we retain all other controls. The only change in our estimation results is that the coefficient estimated for long-run plans conducted by managers surrounded by closed networks is no longer statistically significant. This is not surprising: there are only 87 observations combining long-run plans with high network constraint. Given the large number of fixed effects included in M12 (77 industry dummies, 7 city effects, and 22 controls for interviewers), non-statistically significant estimates were to be expected. We take from M12 a corroboration of the stable association between network constraint and performance. The fact that all other estimation effects are confirmed provides reassurance that network structure might indeed also operate through planning strategies, as demonstrated by the continuing positive and statistically significant interaction between medium plans and network closure.

In sum, the results in Table 5 are consistent with our second hypotheses predicting that longer planning horizons are associated with greater success in business, but with lesser success for managers embedded in a closed network.

DISCUSSION AND CONCLUSION

Our central claim is that characteristic features of life in a closed network—redundant information as well as social pressure to adopt majority views—privilege a myopic focus on the present, which is likely to result in the neglect of long run planning as well as in less effective long-run planning. Using data from a large probability sample of 700 CEOs leading private manufacturing firms in China, we find that network closure is in fact associated with short-run planning and a neglect of long-run strategies, here proxied by long-term contracts for managers and technicians, and provision of employee training. Further, we find that CEOs in closed

networks, who tend to be less experienced with long-run planning, are successful in

implementing shorter plans, but less successful in implementing long-run business plans.

These results contribute to two lines of research. First, we respond to an earlier call to incorporate

social influence into the analysis of temporal myopia (Lavert, 1996). Several studies have paved

the way for this, with conceptual work reflecting on the role of organizational structures and

learning processes (Levinthal & March, 1993), with case studies highlighting the role of

information diversity (Kaplan & Orlikowski, 2012; Slawinski & Bansal, 2015), and with

empirical work examining different forms of work group composition as possible predictors

(Marginson & McAulay, 2008). No prior study, however, has suggested a systematic association

between distinct structural features describing the social situation around the decision-maker and

the tendency to neglect the future in business planning.

Further, we add a novel mechanism to the social network literature, which shows a long

standing interest in exploring the association between social structure and business advantage.

Previous research has associated 'vision advantage' in open networks with good strategies, good

ideas, creativity, innovation, alliance formation, and organizational change (Battilana & Casciaro,

2012; Burt, 2004, 2005, 2020; Fleming, Mingo, & Chen, 2007; Perry-Smith & Manucci, 2017;

Ruef, 2002), but has not reflected on the time-dimension that is built in to 'vision advantage'. All

of these outcome variables carry a future-dimension, but open networks have largely been

interpreted as an advantage in coming across the right 'opportunities'. Our findings suggest that

the 'vision advantage' found in broker networks and the corresponding 'vision disadvantage'

found in closed networks operate at two levels. First there is the familiar "creativity effect", as

open networks increase chances for productive or creative 'accidents' by bridging between

distinct clusters and fields of specialty, thereby helping import new ideas, opportunities, and

skills that are familiar elsewhere but novel in the importing cluster. Second, managers in open networks (closed networks) also enjoy a "planning advantage" (disadvantage) because information diversity and weaker normative pressure toward conformity facilitate managerial foresight and limit the risk of developing a myopic focus on the present.

Limitations and Future Research

A step for future research is to explore whether there are situations and contingencies that protect people in closed networks from becoming myopic. Building on research highlighting the potentially positive role of external sources of knowledge in fostering innovation activities (Das 1991; Tortoriello et al. 2015), one could be curious to see whether reliance on external knowledge might limit or reverse myopic tendencies associated with closure. The answer is likely to depend on whether external knowledge increases information diversity within the closed network or is rejected as "not how we are doing things here" (Ter Wal et al. 2016). Such effects should depend on the frequency of knowledge imports, source diversity, and absorptive capacity over time. After all, repeatedly reaching out to the same external source presenting familiar solutions is part of the myopic tendencies described by Levinthal and March (1993) as an element of organizational learning.

Methodologically, the cross-sectional nature of our research design remains problematic. We join the chorus of researchers lamenting the deficiencies of cross-sectional studies, specifically when it comes to their inability to determine causality and rule out endogeneity. At the same time, we also see their continuing utility, if management scholars do not wish to be limited to the study of well-documented phenomena archived in real and virtual longitudinal data repositories. In the present study we address standard concerns regarding cross-sectional data in

various ways: First, we controll for a large number of personal and organizational covariates identified in prior research (Burt & Opper, 2017; Hite & Hesterly, 2001; Lin, 1999; Marsden, 1987). We explore the network's history to be sure that network formation preceded planning needs. And we explore network diversity as a potential covariate of network structure. Second, from a theoretical perspective, it is a useful reminder that there is no powerful theoretical argument predicting that planning preferences define network structure, whereas a substantial literature assumes that social influence matters for planning. Finally, reverse causality would be difficult to reconcile with our observation of smaller performance effects of long-run plans, if conducted by business leaders surrounded by closed networks. If performance predicted strategy, it would be reasonable to expect this effect to be independent of the network structure around business leaders.

Still, one would like to see corroboration of causality. Longitudinal studies of random samples suffer from high attrition rates due to business closure, relocation and managerial turnover. Over time, rapidly declining commitment of survey respondents adds to the problem. The way forward might be to give up representativeness and to turn to longitudinal employee data of single organizations. Yet, this would require a population with actual planning authority and responsibilities. Laboratory and field experiments with their random assignment of well-defined incentivized tasks may therefore offer the most promising approach to confirm causality between network structure, information diversity and planning horizon.

Turning to challenges more easily resolved, we encourage similar work that employs samples of larger firms and firms managed by professional managers. Our sample of predominantly medium-size companies—mostly operated by owners and founders—facilitates the identification of the suspected association between network structure and planning priorities.

The presence of owner and founder CEOs guarantees that individual preferences are relatively independent of the influence of external stakeholders, allowing for a close link between CEOs' preferences and strategic choices (Miller & Toulouse, 1986). Authoritarian leadership structures in family firms and medium-size companies reinforce the strong influence of owner and founder CEOs (Kelly et al., 2000). Although our analysis controls for potential founder effects (which remain not statistically significant), we cannot rule out the possibility that the association between network structure and planning is less pronounced in large-scale public companies, led by professional CEOs answering to shareholders, boards of directors, and external stakeholders.

Finally, as with any single-country study design, there is reason to look for replication studies in different cultural and institutional contexts. We are less concerned about the general network structure-performance association, which is found in China, Europe, and North America (Burt & Batjargal, 2019). There is, however, an open empirical question of whether social influence in entrepreneurial networks is more pronounced in cultures that reward collectivist and conformist attitudes more than individualism and creativity. Comparative designs combining different sample populations in a variety of institutional and cultural settings promise valuable insights into this issue.

In sum, as with any empirical study introducing and testing a novel mechanism, limitations are plentiful and the scope for extensions and corroboration in different settings are broad. Our hope is to encourage related work that will help to corroborate and refine the association between network structure and temporal myopia. Clearly, the identification of relevant contingencies is one of the next steps on the research agenda before such results can be usefully applied to extend and refine theory.

Practical Implications

"Lack of foresight" (Marginson & McAulay, 2008; Miller, 2002) and a "tendency to ignore the long run" (Levinthal & March, 1993) are associated with a neglect of long-run plans, which is in turn associated with long-run business failure (Barton, Manyika, & Williamson, 2017). Understanding the practicalities of a decision environment that limits the risk of steering managers toward a myopic focus on the present is therefore essential. Our results imply tangible advice for decision-makers, because we show that temporal myopia is not an individual attribute, but linked to the social situation in which the decision-maker is embedded.

There are immediate practical implications. First, managers whose companies require long-run strategic plans are likely to be best served by relying on a relatively open business network. Not only is there a larger likelihood of actually settling on long-run plans; the success associated with these plans is likely to be higher. Second, for managers embedded in close-knit networks and striving for long-run success, this suggests an active effort to breaking up established advice and consultant networks, which are likely to produce no more than extrapolations of established concepts and knowledge. Bringing in new and diverse contacts, ideally not associated with existing contacts, opens up the network, brings an immediate increase in information heterogeneity, and weakens the normative pressure toward simple solutions. Third, for those decision-makers embedded in a close-knit network and not able or willing to open their business network, abstaining from complex and forward-looking plans may pose the best intermediate strategy. After all, our results suggest that managers in highly constrained networks are most successful if their planning horizon does not extend beyond one year—which is likely to mean that business plans are focused on short-run efficiency and optimization strategies. Clearly this cannot be a long-run strategy in a competitive and changing business

environment, but it may be a better solution than to push for the creation and implementation of poorly designed long-run plans.

Of course, planning for shorter periods is not necessarily a poor business decision or a sign of temporal myopia. Short-run plans and even short-term contracts may simply be the appropriate strategy in response to extreme environmental uncertainties or a firm's market position. Lack of in-house training provision, however, is more difficult to justify in a modern economy. Even in labor intensive sectors such as the textile industry, technological development will continuously call for the timely adjustment of skills and training. A key question that executives need to ask themselves is whether their commitment to short-run plans (or neglect of long-run plans) and strategies is the result of an informed planning process based on information diversity and open discourse, or whether short-run plans are brought about as a consequence of being embedded in a social network that impedes the development of 'vision advantage'.

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A. Open Network around a Long-Run Planner

(37.1 constraint, -1.38 z-score)

1 — Person cited as most valuable in founding the business, known for 27 years ($c_1 = 5.1$).

6 — Person cited as most valued in fifth event, and as a most valuable current contact, and as most valued employee, known for 7 years ($c_6 = 4.1$)..

2 — Person cited as most valued in the first event, known for 19 years ($c_2 = 7.6$)

4 — Person cited as most valued in third event, known for 13 years ($c_4 = 4.8$).

9 — Person most difficult to deal with this year (machine break down caused heavy losses), known 4 years ($c_9 = 0.5$).

5 — Person known for 15 years, cited as most valued in the fourth event, and as a most valued current contact ($c_5 = 4.1$).

Respondent founder of 12-year business, now 467 employees

8 — Person cited as a most valued current contact, known for 4 years ($c_8 = 2.9$).

Founding   Found reliable supplier   Financial crisis
Secure overseas customer   Plant explosion   Plant discharge

1 2 3 4 5 6 7 8 9 10 11 12 13
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Time Line
(years since founding above, percent business life below)

7 — Person cited as a most valued current contact, known for 7 years ($c_7 = 4.4$).

3 — Person cited as most valued in the second event, known for 17 years ($c_3 = 3.6$).

3 — Son currently one of respondent's most valued contacts, and cited as most valued during the fifth significant event, known 23 years, meets weekly ($c_3 = 19.3$).

4 — Person currently one of respondent's most valued contacts, known 3 years, meets weekly ($c_4 = 5.3$).

2 — Son currently one of the respondent's most valued contacts, most valued employee, and cited as most valued during third (first big contract) and fourth significant events, known 18 years, meets weekly ($c_2 = 19.3$).

1 — Uncle cited as most valued in founding the business, during the first significant event (found new operations manager), and during the second significant event (helped replace major supplier), known 41 years, meets daily ($c_1 = 36.8$).

B. Closed Network around a Short-Run Planner

(82.1 constraint, 1.75 z-score)

Respondent founder of 13-year business, now 21 employees

Figure 1.
Illustrative Business Networks

5 — Person most difficult for respondent to deal with this year (job hopping, took away customers), known 8 years, meets weekly ($c_5 = 0.5$).

(Line thickness indicates closeness. No line is "distant" relation. Respondent is the square.)

Figure 2: Planning Horizons Are Shorter for CEOs in More Closed Networks

Note: Data are averaged within five-point intervals of network constraint, with extremes truncated for lack of observations.

Figure 3: Price Elasticity Is Perceived To Be Lower by CEOs in More Closed Networks

Note: Perceived price elasticity are answers to the question: If your firm were to raise prices of your main product by 10% above their current level (after allowing for any inflation and assuming that your competitors maintained their current prices), by how many percent would your sales drop?" Data are averaged within five-point intervals of network constraint, with extremes truncated for lack of observations. Solid dots are CEOs with networks more constrained than the median sample CEO.
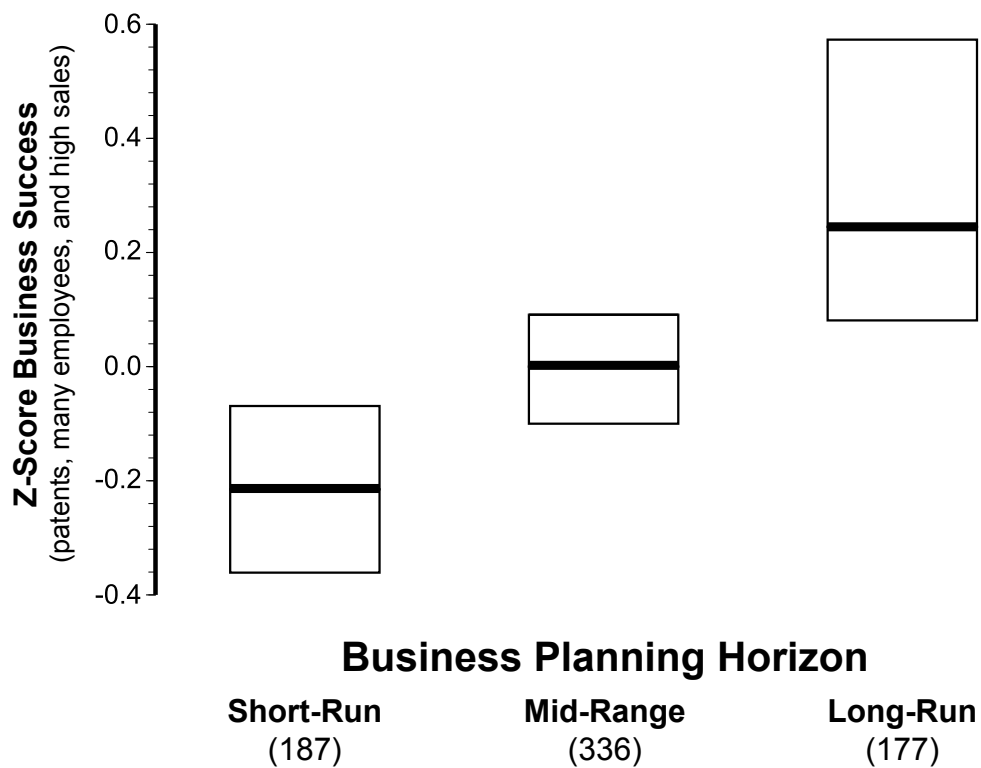
Figure 4: Predicting Business Performance

Note: Columns show mean on vertical axis plus and minus two times the standard error of the mean. Planning categories are from Table 1.

Table 1: Specific and general indicators of planning horizon

| Specific Indicators | Planning Horizon | | | |
	Short-Run	Mid-range	Long-Run	Total
Number of Observations	187	336	177	700
Average Percent Long-Term Management Contracts	31.98 (3.15)	38.97 (2.42)	41.13 (3.36)	37.65 (1.67)
Average Percent Long-Term Technology Staff Contracts	29.09 (2.92)	36.61 (2.27)	36.44 (3.13)	34.56 (1.56)
Probability Employee Training during Last Three Years	.56 (.04)	.72 (.02)	.72 (.03)	.68 (.02)

Note: Respondents are sorted across columns by width of planning horizon as short (four months or less), mid-range (longer up to a year), and long (year or more). First specific indicator is the percent of contracts with company management that run more than three years. Second specific indicator is the percent of contracts with company technical staff that run more than three years. Third specific indicator is whether the company has invested in employee training at any time during the last three years. Standard errors are given in parentheses.

Table 2: Means, Standard deviations, and correlations (computed across 700 respondents)

Variables	Means	S.D.	1	2	3	4	5	6	7	8
1. CEO short-run planning	.27	.44	—							
2. CEO long-run planning	.25	.43	-.35	—						
3. Firm % long-term contracts, managers	37.65	44.16	-.08	.05	—					
4. Firm % long-term contracts, tech staff	34.56	41.28	-.08	.03	.66	—				
5. Firm employee training in last 3 years	.68	.47	-.16	.05	.28	.34	—			
6. Perceived price elasticity	10.91	9.73	-.13	.02	.01	-.10	.15	—		
7. Firm return on assets 2011	.26	.29	-.04	.03	.04	-.01	.06	.06	—	
8. Firm business success (z-score, 2012)	.00	1.00	-.13	.14	.07	.10	.17	.17	.10	—
9. CEO network constraint (x 100)	56.61	14.09	.11	-.01	-.26	-.27	-.27	-.27	-.10	-.11
10. CEO age (years)	45.68	8.35	.00	.02	.02	-.04	-.07	-.07	-.12	.07
11. CEO female	.16	.37	.06	-.02	.04	-.01	-.02	-.02	.03	-.04
12. CEO education (years)	13.02	2.98	-.08	.10	.06	.04	.12	.12	.15	.18
13. CEO founder	.80	.40	.01	.00	-.06	-.07	-.12	-.12	-.08	-.25
14. CEO neither founder nor owner	.12	.32	-.01	-.01	.04	.04	.13	.13	.07	.16
15. CEO unhappy	.23	.42	.05	-.07	-.11	-.11	-.11	-.01	-.01	-.01
16. Firm age (years)	11.87	4.63	-.02	.00	.12	.14	.04	.04	-.13	.22
17. Firm assets 2011 (log)	6.83	1.20	-.08	.10	.01	.07	.10	.10	-.18	.85
18. Family firm	.36	.48	.07	-.04	-.21	-.25	-.24	-.24	-.09	-.04
19. Firm research & development dept.	.50	.50	-.10	.04	.01	.00	.15	.15	.06	.42
20. Firm initial business success (z-score)	.00	1.00	.00	.05	-.02	-.01	.02	.02	.02	.48

Table 2 cont.

Variables	9	10	11	12	13	14	15	16	17	18	19	20
1												
2												
3												
4												
5												
6												
7												
8												
9	—											
10	.00	—										
11	-.02	-.11	—									
12	-.05	-.18	.02	—								
13	.07	.14	-.07	-.16	—							
14	-.05	-.08	.10	.11	-.73	—						
15	-.05	.08	-.02	-.10	-.04	.07	—					
16	-.07	.20	-.05	-.08	-.16	.11	.07	—				
17	-.05	.08	-.05	.15	-.21	.13	.03	.25	—			
18	.20	.19	-.03	-.20	.14	-.15	-.03	-.01	.00	—		
19	.06	.02	-.04	.11	-.07	.06	-.06	.07	.30	.05	—	
20.	-.02	.16	-.06	.10	-.08	.04	-.02	-.07	.42	.03	.12	—

Table 3: Planning horizons are shorter in more closed networks

Predictors	M1, CEO Planning Horizon		Percent Long-Term Contracts		M4, Employee Training in Last Three Years
	Short-Run	Long-Run	M2, Managers	M3, Tech. Staff	
CEO network constraint (x 100)	.02** (.01) [2.89]	.01 (.01) [1.18]	-.69** (.15) [-4.51]	-.65** (.16) [-4.15]	-.04*** (.01) [-5.73]
CEO age (years)	.00 (.01)	.01 (.01)	.37 (.09)	-.05 (.18)	.00 (.01)
CEO female	.52 (.38)	.08 (.24)	4.41 (3.06)	-2.93 (4.17)	-.31 (.32)
CEO education (years)	-.01 (.05)	.07* (.03)	.74 (.71)	.18 (.64)	.04 (.20)
CEO founder	-.16 (.21)	.11 (.20)	-.60 (4.45)	.67 (5.26)	-.20 (.25)
CEO unhappy	.03 (.29)	-.38 (.28)	-13.28† (5.57)	-13.22† (5.88)	-.57* (.23)
Firm age (years)	-.01 (.03)	-.02 (.04)	.91* (.25)	.94† (.41)	.01 (.02)
Firm assets 2011 (log)	-.06 (.14)	.23† (.13)	-.48 (1.55)	1.98 (2.17)	.23*** (.06)
Family firm	.23 (.16)	-.03 (.16)	-13.75† (6.55)	-16.45* (4.73)	-.75*** (.19)
Firm research & development dept.	-.38 (.24)	-.22** (.06)	.36 (7.12)	-.73 (4.31)	.71* (.29)
Firm initial business success (z-score)	.12 (.11)	-.03 (.10)	-.29 (.95)	-.99 (1.11)	-.09 (.07)
Intercept	-.92 (.77)	-4.63 (1.34)	36.18 (10.40)	48.38 (19.82)	.71 (1.34)
R^2 (pseudo for M1 and M4)	.08		.19	.22	.23

Note: Statistics are computed across 700 respondent CEOs. Each of the models contains fixed effects for industry, city, and interviewer. M1 is a multinomial logit predicting the three columns in Table 2 using "mid-range" as the reference category ("short-range" in first column is vertical axis in Figure 2A). M2 and M3 respectively are OLS regression models predicting the vertical axes in Figures 2B and 2C. M4 is a logit model predicting whether a firm invested in employee training during the last three years (Figure 2D). Robust standard errors clustered on city are in parentheses. Test statistics for the network association are in brackets. † p <.10* P < .05   ** P < .01   *** P < .001

Table 4: Price elasticity is perceived to be lower in more closed networks

Predictors	M5	M6	M7
CEO network constraint (x 100)	-.09* (.03) [-3.20]	-.10* (.03) [-3.24]	-.11* (.03) [-3.47]
Short-run planning	-2.01** (.43)	-1.99** (.38)	-1.86* (.85)
Long-run planning	-.34 (1.29)	-.46 (1.45)	-.23 (1.61)
Percent long-term management contracts	-.01 (.01)	-.01 (.01)	-.02 (.01)
CEO age (years)	-.02 (.07)	-.01 (.08)	-.03 (.09)
CEO female	.50 (.84)	.31 (.66)	.12 .76)
CEO education (years)	.18 (.15)	.18 (.15)	.14 (.16)
CEO founder	.39 (1.00)	-.20 (1.21)	-.04 (1.09
CEO unhappy	-.29 (1.33)	-.77 (1.61)	-.38 (1.83)
Firm age (years)	-.03 (.10)	-.02 (.10)	-.04 (.11)
Firm assets 2011 (log)	-.71* (.24)	-.85* (.31)	-.74† (.35)
Family firm	.91 (1.64)	1.08 (1.91)	1.62 (1.97)
Firm research & development dept.	1.13 (.75)	1.41 (.87)	2.02 (1.10)
Firm initial business success (z-score)	-.09 (.30)	-.06 (.43)	-.16 (.61)
Intercept	14.18** (3.71)	11.20*** (1.07)	11.03 (1.71)
R^2	.13	.21	.22

Note: Statistics are computed across 700 respondent CEOs. Models predict percentage drop in sales the CEO would expect from a 10% increase in product price (vertical axis in Figure 3) including fixed effects for industry, city, and interviewer. Robust standard errors clustered on city are in parentheses. Test statistics for the network association are in brackets. Models M5 controls industry at the two-digit industry classification level. Models M6 and M7 include 77 industry fixed effects at the four-digit industry classification level. Model M7 is computed across 636 respondents with observations excluded if any of the network contacts are known for less than two years. † P < .10, * P < .05, ** P < .01, *** P < .001

Table 5: Network closure is associated with less success in business and inferior long-term plans

Predictors	M8	M9	M10	M11	M12
CEO network constraint (x 100)	-.005* (.001) [-3.255]	-.004* (.001) [-3.210]	-.005* (.002) [-3.499]	-.005* (.002) [-3.48]	-.005** (.001) [-3.83]
Medium-range planning (4 month – 1year)		.09** (.02)	.04† (.02)	.04† (.02)	.06† (.03)
High constraint *medium plan			.10* (.04)	.10* (.03)	.09* (.04)
Long-run planning (> 1year)		.17* (.05)	.20* (.06)	.20* (.06)	.22* (.06)
High constraint *long-run			-.06† (.02)	-.06† (.03)	-.02 (.04)
Perceived price elasticity	-.002 (.002)	-.002 (.002)	-.003 (.002)	-.003 (.002)	-.003 (.002)
% long-term manager contracts	.001† (.000)	.001 (.000)	.001 (.000)	.001 (.000)	.001 (.001)
CEO age (years)	-.00 (.00)	-.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
CEO female	-.002 (0.05)	.01 (.05)	.01 (.05)	.01 (.05)	-.02 (.06)
CEO education (years)	.01 (.01)	.01 (.01)	.01 (.01)	.01 (.01)	.01 (.01)
CEO founder	-.13** (.03)	-.13** (.03)	-.13** (.02)	-.13** (.02)	-.12** (.03)
CEO unhappy	-.01 (.03)	-.01 (.04)	-.01 (.04)	.01 (.04)	-.02 (.05)
Firm age (years)	.008* (.002)	.008** (.002)	.008** (.002)	.01** (.001)	.01** (.002)
Firm assets 2011 (log)	.60*** (.02)	.60*** (.02)	.60*** (0.2)	.60*** (.02)	.60*** (.02)
Family firm	-.004 (.03)	.01 (.02)	-.01 (.03)	.01 (.02)	.003 (.02)
Firm research & development dept.	.34*** (.03)	.34*** (.03)	.34*** (.03)	.33*** (.03)	.31*** (.02)
Firm initial z-score success (z-score)	.14* (.04)	.15* (.04)	.14* (.04)	.14* (.04)	.15** (0.03)
New contact				.01 (.07)	.03 (.08)
Intercept	-4.11*** (.24)	-4.12*** (.23)	-4.11*** (.23)	-4.12*** (.22)	-3.65*** (.20)
R^2	.81	.81	.81	.81	.83

Note: Statistics are computed across 700 respondents. Success is z-score business success in terms of employees, sales, and intellectual property (vertical axis in Figure 4A). High constraint is a dummy variable indicating that the

constraint is above the median (55.2). Estimations include fixed effects for industry, city, and interviewer. M12 includes industry fixed effects at the four-digit level. Robust standard errors clustered on city in parentheses. Test statistics for network association are in brackets. † $p < .10$ * $P < .05$ ** $P < .01$ *** $P < .001$

Appendix A: Table 3-estimations with four-digit industrial controls

Predictors	CEO Planning Horizon	Percent Long-Term Contracts		Employee Training in Last Three Years
	M13, short-run plans	M14, Managers	M15, Tech. Staff	M16
CEO network constraint (x 100)	.02* (.009) [2.266]	-.74** (.16) [-4.662]	-.63** (.16) [-3.814]	-.05*** (.01) [-6.025]
CEO age (years)	.00 (.02)	.33† (.14)	-.08 (.16)	-.01 (.01)
CEO female	.28 (.23)	5.10 (3.97)	-4.88 (3.75)	-.28 (.22)
CEO education (years)	-.04 (.05)	.57 (.83)	.24 (.75)	.03 (.03)
CEO founder	-.34† (.18)	.68 (4.99)	.83 (5.58)	-.42† (.25)
CEO unhappy	.21 (.38)	-14.59* (5.80)	-12.89† (5.43)	-.52† (.29)
Firm age (years)	-.01 (.02)	.82* (.28)	.96* (.50)	-.01 (.02)
Firm assets 2011 (log)	-.10 (.17)	-.79 (2.27)	1.27 (2.38)	.23*** (.06)
Family firm	.33 (.25)	-13.33† (6.72)	-16.35* (5.35)	-.73** (.24)
Firm research & development dept.	-.41 (.37)	.00 (8.09)	-1.44 (5.02)	.61* (.25)
Firm initial business success (z-score)	.04 (.20)	.67 (1.40)	-.91 (1.33)	-.06 (.08)
Intercept	1.70 (1.21)	42.83* (17.16)	51.00* (19.28)	1.50 (1.08)
R^2 (pseudo for M14 and M17)	.14	.26	.30	.26

Note: Each of the models contains fixed effects for industry at the four-digit classification level, city, and interviewer. M13 is a logistic regression predicting whether a manager typically plans only for the short term estimated across 627 observations. M14 and M15 are OLS regression across 700 observations. M16 is a logistic regression predicting whether a firm invested in employee training across 647 observation. Robust standard errors clustered on cities are in parentheses. Test statistics for network association are in brackets.
† $P < .01$, * $P < .05$ ** $P < .01$ *** $P < .001$

Appendix B: Observations with network contacts known for at least 2 years

Predictors	CEO Planning Horizon	Percent Long-Term Contracts		Employee Training in Last Three Years
	M17, short-run plans	M18, Managers	M19, Tech. Staff	M20
CEO network constraint (x 100)	.02† (.01) [2.266]	-.81** (.19) [-4.20]	-.73*** (.12) [-6.21]	-.05*** (.01) [-7.349]
CEO age (years)	.02 (.01)	.42† (.20)	-.07 (.23)	-.01 (.01)
CEO female	.34 (.25)	3.49 (4.82)	6.80 (4.44)	-.40† (.23)
CEO education (years)	-.02 (.04)	.63 (.89)	.15 (.65)	.00 (.03)
CEO founder	-.34 (.22)	1.19 (4.74)	3.38 (4.73)	-.38 (.28)
CEO unhappy	.17 (.49)	-15.98* (6.14)	-14.28*** (4.04)	-.64† (.34)
Firm age (years)	-.02 (.03)	.73* (.29)	.91* (.43)	-.02 (.03)
Firm assets 2011 (log)	-.09 (.19)	-1.16 (1.89)	1.48 (1.72)	.14* (.06)
Family firm	.29 (.27)	-15.15† (6.81)	-17.45*** (3.81)	-.70** (.23)
Firm research & development dept.	-.46 (.34)	.56 (7.29)	-.70 (3.71)	.68* (.27)
Firm initial business success (z-score)	.11 (.27)	.71 (1.44)	-1.21 (1.98)	-.05 (.07)
Intercept	.79 (1.44)	42.17* (12.71)	55.95* (26,13)	2.89** (1.06)
R^2 (pseudo for M14 and M17)	.15	.29	.32	.28

Note: Each of the models contains fixed effects for industry at the four-digit classification level, city, and interviewer. M17 is a logistic regression predicting whether a manager typically plans only for the short term estimated across 566 observations. M18 and M19 are OLS regression across 636 observations. M20 is a logistic regression predicting whether a firm invested in employee training across 577 observation. Robust standard errors clustered on city are in parenthesis. Test statistics for network association are in brackets.
† $P < .10$ * $P < .05$ ** $P < .01$ *** $P < .001$

Appendix C: Network closure and planning controlling for network composition

Predictors	CEO Planning Horizon	Percent Long-Term Contracts		Employee Training in Last Three Years
	M21, short-run plans	M22, Managers	M23, Tech. Staff	M24
CEO network constraint (x 100)	.02* (.009) [2.35]	-.57* (.16) [-3.57]	-.56* (.17) [-3.24]	-.04*** (.009) [-4.92]
new contact[a]	-.06 (.42)	-11.13 (8.80)	-14.41 (8.00)	-.69* (.34)
mixed gender network	-.29 (.25)	8.87† (4.18)	2.61 (3.88)	.29 (.22)
% of family in network	-.01 (.01)	-.34* (.14)	-.29 (.16)	-.02 (.01)
spread between oldest and youngest contact (above median)	-.35 (.21)	9.75 (5.17)	8.50 (5.68)	18.70 (.26)
CEO age (years)	.001 (.02)	.22 (.11)	-.18 (.19)	-.01 (.01)
CEO female	.35 (.26)	3.22 (3.05)	-3.37 (3.66)	-.32 (.21)
CEO education (years)	-.04 (.05)	.70 (.74)	.13 (.62)	.03 (.03)
CEO founder	-.31 (.18)	-.69 (4.11)	.80 (4.66)	-.39 (.27)
CEO unhappy	.19 (.37)	-11.68† (5.38)	-12.09* (5.25)	-.47 (.30)
Firm age (years)	.002 (.03)	.58† (.25)	.65* (.49)	-.004 (.02)
Firm assets 2011 (log)	-.10 (.16)	-.11 (1.72)	2.16 (2.19)	.27*** (.07)
Family firm	.40† (.21)	-12.43† (6.11)	-14.76* (4.78)	-.65* (.30)
Firm research & development dept.	-.39 (.36)	-.16 (6.75)	-.81 (4.21)	.62* (.27)
Firm initial business success (z-score)	.06 (.20)	-.48 (.62)	-1.11 (.91)	-.05 (.04)
Intercept	1.55 (1.17)	31.83* (12.39)	49.08* (19.67)	1.28 (1.12)
R^2 (pseudo for M14 and M17)	.14	.22	.24	.28

Note: Each of the models contains fixed effects for industry at the four-digit classification level, city, and interviewer. M21 is a logistic regression predicting whether a manager typically plans only for the short term estimated across 627 observations. M22 and M23 are OLS regression across 700 observations. M24 is a logistic regression predicting whether a firm invested in employee training across 647 observation.

a) Repeating the same estimations under exclusion of observations containing contacts known for only one year, yields the following estimates for constraint: M21, $\beta = .02$, z-test = 1.81; M22, $\beta = .63$, t-test = -3.14; M23, $\beta = -.64$, t-test = -2.98; M 24, $\beta = -.04$, z-test = -5.86. Among the composition measures only two results are weakly consistent: M21, high-spread, $\beta = -.44$, z-test = -1.79; M22, percentage of family, $\beta = -33$, t-test = -2.34.

Robust standard errors clustered on city are in parentheses. Test statistics for network association are in brackets.

† $P < .10$ * $P < .05$ ** $P < .01$ *** $P < .001$

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