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A Social Capital Model of High-Growth Ventures

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A SOCIAL CAPITAL MODEL OF HIGH-GROWTH VENTURES

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We use social capital theory to explain how human and social capital affect a venture's ability to accumulate financial capital during its growth stages (before an initial public offering) and its performance during the two-year period after going public. Consistent with theory, data drawn from a sample of 275 ventures that went public indicate that social capital leverages the productivity of a venture's resource base and provides the venture with a durable source of competitive advantage.

When entrepreneurial firms initiate high-growth strategies, they face the challenge of accumulating supporting resources from factor and capital markets in which they have yet to establish legitimacy (Brush, Greene, & Hart, 2001). To date, research on this challenge has focused on the independent effects of human, social, or financial capital but has lacked a theory to explain how these different types of resources might act in concert. Shane and Venkataraman (2000) and Gartner (1988) have noted that this omission may have caused researchers to underspecify models of venture creation and growth.

The purpose of this study is to propose and test a model that can explain relationships among types of resources and consequently provide a more fully specified empirical model of the relationship between social capital and firm performance. Our model is grounded in a theory of social capital, which we extend to the management literature from the socioeconomic literature (e.g., Loury, 1987; Schiff, 1992). Our core thesis is that social capital contributes directly to a venture's resource base, by allowing it to better attract human and financial resources, and also contributes indirectly, through its ability to leverage the productivity of the venture's resources.

We tested this thesis in the two steps portrayed in Figure 1. In the first step, we used data drawn from a sample of 275 ventures that went public to examine the relationship between a venture's human and social resources and its ability to accumulate financial capital during its pre-IPO growth stages—that is, the period up to, and including, the generation of proceeds from its initial public offering (IPO). In the second step, we assessed the extent

to which a venture's pre-IPO endowments account for profitability and firm growth during the two-year period following its IPO. We begin here by reviewing research about the direct effects of human and social resources on venture performance and then use this research to ground hypotheses about the indirect effects of these resources on venture profitability and growth. We conclude by discussing the broader implications of our findings for management theory and practice.

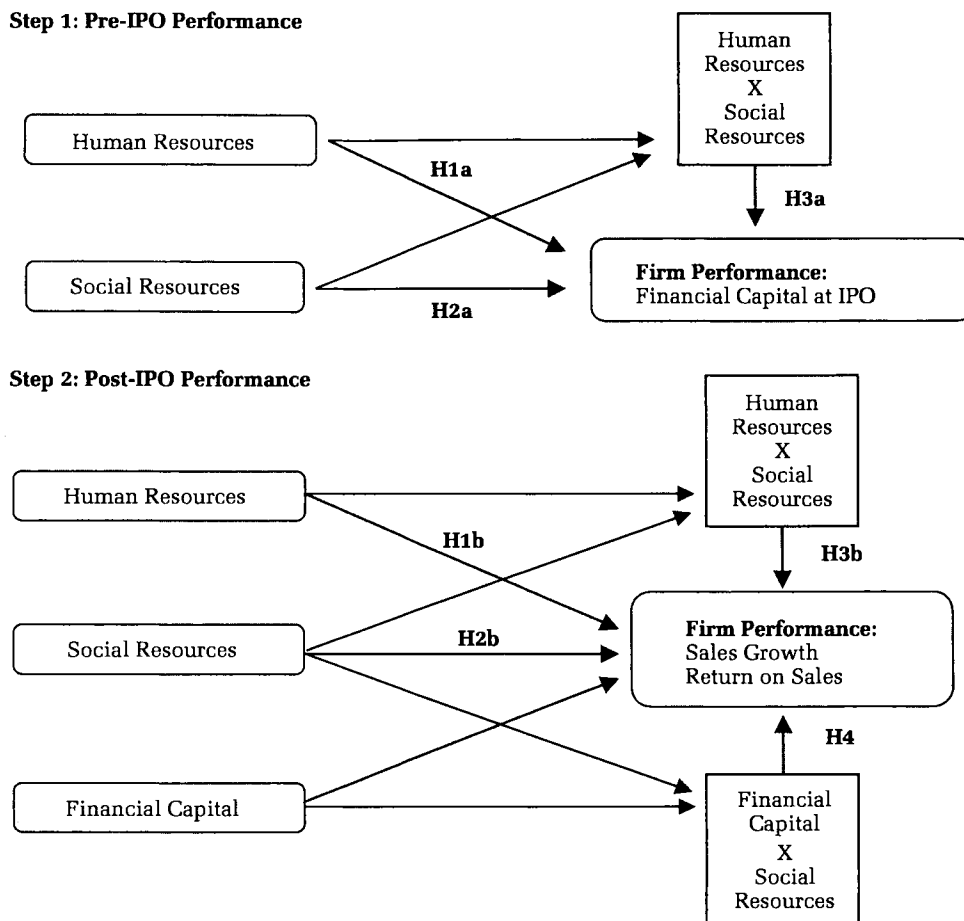
THE EFFECTS OF HUMAN AND SOCIAL RESOURCES

The Direct Effects of Human Resources

Human resources have long been viewed as being essential to a venture's ability to survive and grow. Superior human resources can reduce outside stakeholder uncertainty. During a venture's pre-growth stages, potential stakeholders from the input, output, labor, and capital markets lack reliable information about product or service quality, the size of the market for that product or service, the accuracy of sales and earnings forecasts, creditworthiness, and so on. Consequently, whether or not these stakeholders provide resources to a firm will depend partly on how they view the credentials of its key players. Thus, a venture's human resources act as a surrogate indicator of its competence and credibility (Pennings, Lee, & Witteloostuijn, 1998).

Superior human resources can also enhance a venture's dynamic capabilities. During the transitional post-IPO stage, when market uncertainties are high, ventures that are endowed with better human resources should be more able to effectively

FIGURE 1



plan, troubleshoot, and problem-solve (Snell & Dean, 1992), and they should be better able to continuously adapt to environmental contingencies (Youndt, Snell, Dean, & Lepak, 1996). They should also be more able to find new ways to increase customer benefits (Coleman, 1988), by decreasing production and organizational costs and/or by innovating (Lengnick-Hall, 1992), or by identifying ways to stretch limited financial resources (Chandler & Hanks, 1998). Thus, superior human resources enhance a venture’s ability to attain, sustain, and even enhance its competitive advantage during its pre- and post-IPO growth stages.

Hypothesis 1a. There is a positive relationship between a venture’s human resource endowment and its ability to accumulate financial capital during its pre-IPO growth stages.

Hypothesis 1b. There is a positive relationship between a venture’s human resource endowment and its post-IPO performance.

Interestingly, previous studies indicate mixed support for Hypothesis 1a. Although some re-

searchers (e.g., Freid & Hisrich, 1994; MacMillan, Zemann, & Subbanarasimha, 1987; Tyebjee & Bruno, 1984) have found that the relationship between the quality of a venture’s human resource base and its ability to acquire funding is positive, others have reported that only certain characteristics, like industry experience (Hall & Hofer, 1993; Zacharakis & Meyer, 2000) and education (Cooper, Gimeno-Gascon, & Woo, 1994), are important. Support for the effect of a founding team’s prior start-up experience on venture performance (Gartner, Starr, & Bhat, 1998) is also mixed, even for start-ups founded by “serial entrepreneurs” (Alsos & Kolvereid, 1998).

One explanation for the past mixed support for the relationship stated in Hypothesis 1a is that no study has examined the durability of the advantages that human resources might provide; we formalize a conjecture about such durability in Hypothesis 1b. Researchers may also have underestimated the performance effect of human resources by examining only direct relationships and not those emanating from the interaction of human re-

sources with social resources. Or, as Shane and Venkataraman noted, "It is improbable that entrepreneurship can be explained solely by references to a characteristic of certain people independent of the situations in which they find themselves" (2000: 218). We develop hypotheses concerning the direct and indirect (situational) effects of social resources in the next section.

The Direct Effects of Social Resources

Social capital theory was founded on the premise that a network provides value to its members by allowing them access to the social resources that are embedded within the network (Bourdieu, 1985; Seibert, Kraimer, & Liden, 2001). Originally developed by sociologists to explain the role of family in the development of neighborhoods (Jacobs, 1961), the theory has been expanded to explain a variety of outcomes, including industry creation (Aldrich & Fiol, 1994), firm growth (Ostgaard & Birley, 1994), and career success (Seibert et al., 2001). We deduced that social capital theory is particularly well suited to explain a venture's success from three concepts: Burt's (1992) structural holes concept, according to which it is advantageous for a unit to be linked to other units that are themselves unconnected; Granovetter's (1973) weak tie concept, according to which it is advantageous to have many narrowly defined links; and Lin's (1999) social resource theory, according to which advantages stem from the nature of the resources embedded in a network.

High-growth entrepreneurial ventures are generally run by a small number of colleagues who act like a social clique (all members are interconnected by emotionally intense links), and therefore can lack the requisite diversity of reference frames about best practices, customer needs, competitor moves, and so on. Thus, it is advantageous for a venture to form many links with high-status (credible and competent) external partners who have a diverse set of experience (Burt, 1992). The social resources embedded in such networks can signal potential stakeholders that a venture's business concept is legitimate in much the same way that human resources are thought to signal legitimacy. However, whereas the human capital explanation is based on the credentials of a venture's management team, the social capital explanation is based on the credentials of the team's social contacts.

Also like human resources, the social resources embedded in such networks are thought to reduce the amount of time and investment required to gather information. Narrowly defined links in these networks are valuable conduits for knowledge dif-

fusion and transfer (Coleman, 1988) and for knowledge combinations, which can spark the development of a firm's intellectual capital (Nahapiet & Ghoshal, 1998) and support "knowledge-creating organizations" (Nonaka & Takeuchi, 1995: 67). Thus, social resources, like human resources, can provide a venture with the ability to attain, sustain, and even enhance its competitive advantage. Accordingly:

Hypothesis 2a. There is a positive relationship between a venture's social resource endowment and its ability to accumulate financial capital during its pre-IPO growth stages.

Hypothesis 2b. There is a positive relationship between a venture's social resource endowment and its post-IPO performance.

Published findings show some support for Hypothesis 2a (Chan, 1983; Fried & Hisrich, 1994). For example, Tyebjee and Bruno (1984) found that professional relationships with influential people helped ventures in locating capital. However, no study has investigated the durability of the advantages that social resources might provide (that is, their post-IPO effects), or their ability to leverage the productivity of a venture's internal resource base.

The Indirect Effects of Social Resources

Social capital theory also implies that social resources have important indirect effects. Loury (1987) posited that an individual's achievement is conditioned by the social context in which the individual matures (the family, community, and municipality). Schiff (1992) and Coleman (1988) expressed a similar view, arguing that the productive potential of social capital lies in its ability to enhance returns on human resources and financial capital.

This belief also makes intuitive sense; as Nahapiet and Ghoshal put it, "Who you know affects what you know" (1998: 252). The more informationally rich a venture's external social network is, and the more competent its top managers are (that is, the more valuable its human resources), the more knowledge they will be able to assimilate, value, and apply from the informationally enriched social network (Cohen & Levinthal, 1990). This can set in motion a "virtuous cycle": The more that a venture's human resources are enhanced by external social linkages, the more attractive it becomes to other key external stakeholders, who, in turn, provide access to additional resources and expand the venture's portfolio of capabilities for exploiting

new opportunities. Put differently, a venture's socially complex and historically unique configuration of human and social resources can result in a set of durable, rare, and inimitable resource bundles. Hence,

Hypothesis 3a. The interaction between a venture's social resources and human resources has a positive effect on its ability to accumulate financial capital during its pre-IPO growth stages.

Hypothesis 3b. The interaction between a venture's social resources and human resources has a positive effect on its post-IPO performance.

Although ventures must accumulate financial capital during their pre-IPO growth stages to survive and to fund development (Dean & Giglierano, 1990; Starr & MacMillan, 1990), financial capital by itself is not a productive resource: having it does not ensure post-IPO commercial success. Rather, in line with arguments posed by Schiff (1992) and Coleman (1988), its productive potential is determined through its interaction with social resources. The more informationally rich a venture's external social network, therefore, the more opportunities it will have to invest financial capital in projects with high internal rates of return. Informationally rich external social networks also enhance the venture's ability to withstand random environmental shocks (Bruderl, Preisendorfer, & Ziegler, 1992; Cooper et al., 1994). Whereas we predict in Hypothesis 1a, Hypothesis 2a, and Hypothesis 3a that the amount of financial capital accumulated during the growth stages prior to a venture's initial public offering is associated with the quality of the venture's human and social resources, we now predict that social resource endowment, given its idiosyncratic and dynamic nature, will improve a venture's ability to compete by enabling it to leverage its expanded financial base. Thus,

Hypothesis 4. The interaction between a venture's social resources and its financial capital has a positive effect on the venture's post-IPO performance.

METHODS

We drew our sample from the population of U.S. initial public offerings for 1996. Keeping to the sampling criteria used in other studies of ventures with high-growth potential (Robinson, 1999; Welbourne & Andrews, 1996), we excluded financial institutions, real estate concerns, "rollups," spin-offs or subsidiaries of large firms, holding companies, and firms with over 800 employees or over

\$500 million in assets at the time of their IPOs. After exclusions, 275 ventures remained. Their founding dates varied; some went public soon after they were founded, while others were founded in the 1980s but were not eligible for IPO until after they had redesigned their products/services or changed their market or technology. Data about each venture's strategy, operations, financials, management background, ownership, and competitive environment was obtained from S1 prospectuses, proxy statements, and year-end financial statements filed with the Securities and Exchange Commission (SEC) from inception to two years after their initial public offerings. These data, which have proven useful to other investigations (e.g., Marino, Castaldi, & Dollinger, 1989), are presumed reliable; the SEC requires that the contents of these filings be accurate to the best of management's knowledge and holds firms liable for any misleading information.

Our independent variable, *human resources*, was a composite of three commonly used firm-level measures: industry experience, start-up experience, and venture capitalist directorships. *Industry experience* was the number of a venture's top management team members that had worked previously in the venture's primary industry or had had experience with its primary technology; any amount of such experience was counted (Cooper et al., 1994; Shepherd, 1999). *Start-up experience* was the number of top managers that had previously started new businesses; we included this measure in light of previous research findings showing that such managers can contribute important know-how (Carter, Williams, & Reynolds, 1997; Stuart & Abetti, 1990). *Venture capitalist directorships* was the number of venture capitalists who were on a firm's board (Barry, Muscarella, Peavy, & Vetsuypens, 1990; Gorman & Sahlman, 1989; Lee, Lee, & Pennings, 2001). When no theory exists to rank extant definitions of a construct in terms of importance, equal weighting is recommended (McGee, Dowling, & Megginson, 1995; Welbourne & Andrews, 1996). We therefore summed the above three measures to form an equally weighted composite.¹

We also constructed an equally weighted firm-level composite measure of *social resources*, consist-

¹ Tests were conducted to make sure that the results were not unduly influenced by the size of a management team. We also found that a commonly used human resource measure, level of education, did not influence the regression analysis results, whether the measure was used independently or as a part of our composite measure. We therefore excluded it from our primary analyses.

ing of the sum of three commonly used proxies, business network, personal network, and underwriters.

Business network was the number of arms-length relationships and alliances with *Fortune* 1000 clients and suppliers that a firm had at the time of its IPO (Chung, Singh, & Lee, 2000; Deeds, Decarolis, & Coombs, 1997; Pennings et al., 1998). Such relationships provide access to established networks and a potentially large customer base. *Personal network* was a count of the number of top management team members and directors who were also directors of other firms with similar technologies or markets. This measure has been used as a proxy for the network's informational richness because board memberships provide access to knowledge and resources outside the immediate environment of new firms (Ostgaard & Birley, 1996; Starr & MacMillan, 1990). Finally, since *underwriters* introduce a venture's top management to potential investors, we coded this variable as the count of the number of underwriters that subscribed to an IPO. Following Chung and colleagues (2000), we qualified the count by assigning a "reputational" weight to the lead underwriter that was based on the number of initial public offerings it had successfully completed. Certo, Covin, Daily, and Dalton (2001) found that investors associate the number of IPOs completed by an underwriter with its ability to accurately assess a venture's future value.

The dependent variable used in our test of the three pre-IPO hypotheses (1a, 2a, and 3a; see step 1 in Figure 1) was financial capital. Like Robinson (1999), we measured accumulated *financial capital* by adding a venture's assets during the quarter just prior to the date of its IPO to the proceeds from that offering, the latter being the much larger of the two components. We controlled for the asset intensity of the firm's industry sector by including both liquid and hard assets in our calculation.

We used two dependent variables, *sales growth* (the two-year change in sales after the year of an IPO) and *return on sales (ROS)* (profits over sales in the second year after the year of the IPO) to test the four post-IPO hypotheses (1b, 2b, Hypotheses 3b, and 4; see step 2 in Figure 1).² Each of the two

dependent measures captured a different dimension of market legitimacy—the ability of a venture to compete for customers and for limited resources in its chosen market niche—and thus each is particularly relevant to gauging early market success. Further, and as Bettis (1981) observed in his critique of Rumelt's (1974) findings for related-constrained firms, ROS (profit margin) provides a less biased performance statistic than return on assets (ROA) in cross-sectional comparisons of firms that are expected to vary by the asset-intensity requirements of their market niches. Finally, because both of our dependent measures were based on operational performance, they are unbiased by the bullish expectations that characterized the capital and IPO markets in 1996.

Because our purpose was to assess the extent to which a firm's pre-IPO endowment of human and social (but not other) resources affected its post-IPO performance, financial capital (the dependent variable used to test Hypotheses 1a, 2a, and 3a) was used as an independent variable in the regression analyses that tested Hypotheses 1b, 2b, 3b, and 4.

We controlled for *size* (sales dollars the year prior to the IPO), *firm age* at the time of the IPO, and *hot industry sector* (the number of IPOs that occurred in a focal venture's industry sector in the period from two years before the year of its IPO to two years after). Finance researchers use the term "hotness" to describe the amount of investor activity associated with a particular industry sector (Ritter, 1989). As such, hotness is conceptually analogous to what ecologists refer to as a sector's "carrying capacity" (Hannan & Carroll, 1992) and to what strategists call "munificence" (in that the higher the number of new ventures that successfully go public in a particular sector, the more munificent the sector can be presumed to be). Because the competitive value of resources may vary with industry conditions (Barney, 1996), we tested the sensitivity of the regression coefficients in all models by adding hot industry sector as a covariate.

RESULTS

Descriptive statistics and correlations are shown in Tables 1 and 2, and the regression results are in Table 3. Following Aiken and West (1993), we centered all variables before using three-step moderated hierarchical regression analyses to separately test the hypothesized relationships with financial capital (model 1), sales growth (model 2), and return on sales (model 3). We entered the covariates and independent variables in the first step (shown in Table 3 as the first column of results for each model), added the hypothesized interactions in the

² The fact that the pre- and post-IPO hypotheses were being tested with many of the same variables initially raised concerns about independence (that is, concern that the results of the post-IPO tests might be driven by the hypothesized pre-IPO relationships). We therefore calculated the models' residuals. Virtually no relationship was found. The correlation between the residuals (or disturbance terms) of the pre-IPO and sales growth models is .01 ($p < .84$), and the correlation between the residuals of the pre-IPO and ROS models is $-.02$ ($p < .73$).

TABLE 1
Sample Statistics

Variable	Minimum	Maximum	Mean	s.d.
Firm age at IPO	0.00	30.00	7.22	5.00
Venture capitalist ownership ^a	0.00	80.00	23.58	20.68
Sales at IPO ^b	0.02	457.00	25.16	53.38
Income at IPO ^b	-17.00	12.00	-1.63	4.02
Number of employees	4.00	755.00	149.66	44.63
Business network	0.00	10.00	3.24	3.51
Personal network	0.00	21.00	6.34	3.31
Venture capitalist board seats	0.00	6.00	1.63	1.43
Industry experience	1.00	15.00	5.28	2.33
Start-up experience	0.00	6.00	0.50	0.74
Number of underwriters	1.00	4.00	2.12	0.83

^a Percentage.

^b In millions of dollars.

TABLE 2
Descriptive Statistics and Pearson Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Human resources	7.4	3.2							
2. Social resources	5.6	4.9	.46***						
3. Sales at IPO	25.2	53.4	.28**	.49**					
4. Firm age at IPO	7.2	5.0	.01	.07	.31**				
5. Hot industry sector	94.6	68.8	.08	.31**	.18**	-.03			
6. Financial capital	40.1	32.7	.48***	.49**	.58**	.08	.04		
7. Sales growth	37.4	92.1	.14*	.29**	.45**	-.04	.06	.40**	
8. Return on sales	-9.5	49.0	-.18**	.14*	.30**	.13*	.03	-.02	.10

* $p < .05$

** $p < .01$

*** $p < .001$

second step (column 2), and tested for industry sector effects in the final step (column 3). The F -statistic associated with the set of covariates is significant at the .05 level or better in all three models, as are the F -statistics associated with the entry of the main effects and with the entry of the hypothesized interactions. As indicated by the results reported in column 3 of each model, the hotness of an industry sector had no effect on the hypothesized relationships. Collinearity statistics from each of the three models (not shown) revealed no problems.

Model 1 reports results for the three pre-IPO hypotheses (1a, 2a, and 3a). Hypothesis 1a and Hypothesis 2a are supported: There is a positive relationship between a firm's human ($p < .001$) and social ($p < .001$) resources and its ability to accumulate financial capital prior to its IPO. Contrary to Hypothesis 3a, however, social resources had a negative effect on the relationship between human resources and financial capital ($p < .01$). To inves-

tigate what caused the negative relationship, we followed Aiken and West (1993) and plotted the simple slopes of the interaction term (Figure 2). The plots reveal that the negative sign is the product of a steeper (more positive) slope for the relationship between human resources and financial capital when social resources are low, and a slightly less steep slope when social resources are high. The plots also show that for all levels of human resources, ventures with higher social resources accumulated more financial capital than those lacking social resources. Finally, the plots show that the relationship between human resources and financial capital remains positive over the full range of values for social resources. On the whole, we conclude that the results for Hypothesis 3a are generally consistent with our theory and expectations.

Results for the four post-IPO hypotheses, 1b, 2b, 3b, and 4, are reported in model 2 (where sales growth is the dependent variable) and model 3 (for

TABLE 3
Results of Regression Analyses^a

Variables	Model 1: Financial Capital			Model 2: Sales Growth			Model 3: Return on Sales		
Covariates									
Firm size	.45***	.44***	.43***	.40***	.43***	.43***	.42***	.41***	.41***
Firm age	-.07	-.07	-.07	-.19**	-.21***	-.21***	.02	.03	.02
Hot industry sector	-.14**	-.14**	-.14**	-.04	-.03	-.04	-.08	-.07	.07
Main effects									
Hypothesis 1: Human resources	.27***	.26***	.27***	-.08	-.03	-.04	-.25***	-.26***	-.27***
Hypothesis 2: Social resources	.21***	.23***	.23***	.05	-.05	-.06	.18*	.16*	.16*
Financial capital				.20**	.25**	.26**	-.23**	-.20*	-.20*
Interactions									
Hypothesis 3: Human resources × social resources		-.13**	-.15**		.00	.01		.18**	.20***
Hypothesis 4: Financial capital × social resources					.22***	.23***		-.04	-.04
Hot industry sector × human resources			.05			-.03			-.05
Hot industry sector × social resources			-.02			.02			.00
Hot industry sector × financial capital						-.04			.00
<i>F</i>	51.17***	45.60***	34.17***	14.93***	13.49***	9.80***	10.16***	8.93***	6.50***
ΔR^2		.02**	.00		.04**	.00		.03*	.00
<i>R</i> ²	.49	.50	.51	.27	.31	.31	.20	.23	.23
Adjusted <i>R</i> ²	.48	.49	.49	.25	.29	.28	.18	.20	.20
<i>n</i>	275	275	275	249	249	249	247	247	247

^a Coefficients are standardized beta weights.

* $p < .05$

** $p < .01$

*** $p < .001$

return on sales). Results for Hypothesis 1b (testing the effects of human resources), and for Hypothesis 2b (testing the effects of social resources) are mixed: While neither hypothesis found support when we used sales growth as the dependent variable (model 2), both were supported when we used return on sales (model 3; $p < .001$ and $p < .05$, respectively). However, and contrary to Hypothesis 1b, the relationship between human resources and return on sales is negative. Perhaps firms whose leaders choose very fast growth sacrifice profitability for high sales growth and require better-endowed top management teams to succeed with this strategy. We found partial support for this speculation in the significant and positive (not hypothesized) relationship between financial capital and sales growth (model 2) and in the significant and negative relationship between financial capital and return on sales (model 3). It is important to point out, however, that social resources is positively related to return on sales (Hypothesis 2b) and that it moderates the relationship between human resources and return on sales (Hypothesis 3b; model 3; $p < .01$). The plot for this interaction (Figure 3) shows that the relationship between human resources and ROS is less negative

at higher levels of social resources. In other words, high-growth ventures appear to be less unprofitable when social resources are high.

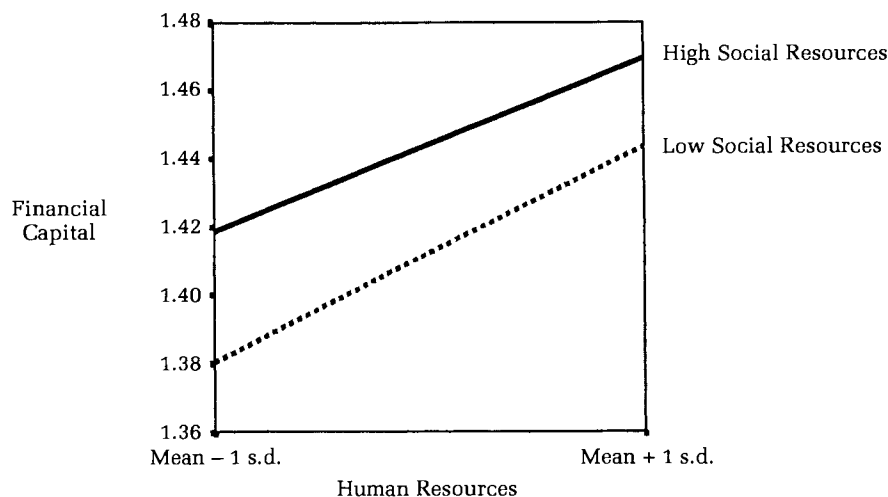
Finally, Hypothesis 4, which posits that social resources positively moderate the relationship between financial capital and firm performance, is supported for sales growth (model 2; $p < .001$), but not for return on sales (model 3; n.s.).

DISCUSSION AND CONCLUSION

To date, high-growth venture research has lacked a theory to explain how different resource types might act in concert. In this study, we drew insight from the socioeconomic literature to propose such a theory. Overall, we found that the relationships between human resources and performance, and between financial capital and performance, both vary with the level of social resources. In other words, and consistent with our theory and expectations, social resources leverage the productivity of a venture's resource base.

Another finding was that environmental conditions do not affect the observed pattern of relationships; none were moderated by whether a firm's industry sector was hot in that it had seen espe-

FIGURE 2
Plot of Hypothesis 3a: The Effect of Social Resources on the Relationship
between Human Resources and Financial Capital



cially high levels of IPO activity. It is also interesting to note that among the covariates, firm size (sales in the year of the IPO) shows, as expected, a positive and highly significant association with the dependent variables. In contrast, firm age at the time of the IPO is only statistically meaningful in model 2, where it was negatively associated with sales growth: younger ventures show higher levels of growth, most likely because their growth rate is magnified by a small start-up base. Finally, we found no evidence that the results in the three models are sensitive to a venture's location. The sample firms were geographically distributed almost equally: approximately a third were located near the areas of the U.S. West Coast known for high-technology endeavors; a third were in similar East Coast areas; and a third were spread throughout the United States. An exploratory examination of location using dummy coding (available upon request) added no explanatory power to any of the three tested models.

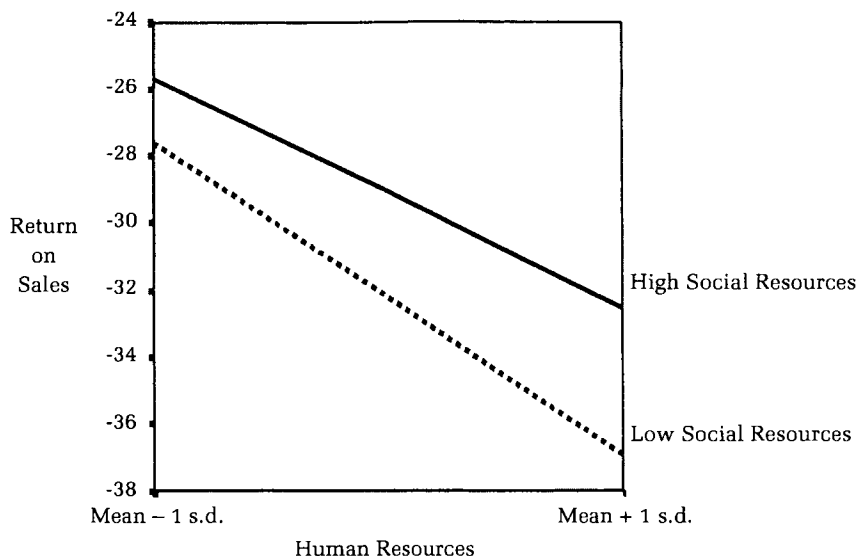
The fact that we found support for our social capital model after controlling for firm size, age, location, and industry sector leads us to speculate that the model might also explain the performance of established public firms and small private firms pursuing high growth by redesigning their products or services or by venturing into markets in which they lack immediate legitimacy. We speculate that, just as they do for ventures, growth-oriented changes made by established firms will engender skepticism from lenders, investors, and customers. And, again, just as we theorized for ventures, such skepticism can be mitigated if stakeholders perceive a firm as having high levels of human re-

sources (an experienced and capable management team) and social resources (positive relationships with individuals and institutions that lend legitimacy). This speculation points to future investigations of growth strategies using other sample frames.

Interestingly, social capital's effects appear to be both quite durable—lasting over the two-year period following the year of an IPO—and to vary across the two post-IPO performance measures. Although both measures reflect a venture's ability to compete for customers and limited resources in its chosen market niche, they may be capturing different dimensions of performance. Sales growth captures a forward-looking trend in revenues, independent of the costs incurred to obtain them. In contrast, ROS is a static measure of the productivity of past investments. Not surprisingly, the correlation between these two variables is small ($r = .10$) and not significant.

These differences may shed light on why the sign of the financial capital variable was positive in the sales growth model (model 2) and negative in the ROS model. Consistent with Chandler and Hank's (1994) finding that ventures with more resources tend to grow faster, we suspect that firms that were able to accumulate more funds up to the time of their IPOs could better afford to focus on growth (hence the positive association of financial capital and sales growth), without being overly concerned with profitability (hence a null to negative financial capital-ROS association). Of course, the growth-at-any-expense business model has obvious practical limits, as was shown by the late 1990s stock performance of many high-technology firms.

FIGURE 3
Plot of Hypothesis 3b: The Effect of Social Resources on the Relationship
between Human Resources and Return on Sales



Our findings may suffer from a survivor bias; we only examined the effects of human and social resources on ventures that secured IPO financing. Second, all the sample firms went public in a relatively bullish year, 1996. And, although the use of cross-sectional analyses should minimize any capital market bias—as should conducting post-IPO tests that relied on operating performance measures—it remains an open question whether the model explains venture performance during bear markets. Third, while we drew direction from published studies in constructing measures of human and social resources and used multiple measures, our composite measures are nevertheless indirect proxies of largely unobservable phenomena, and therefore they may lack precision. For example, our measure of industry experience, like others used in other recently published studies, does not account for the length of experience. Finally, we used equal weighting to construct our two composite resource measures. More work like Shepherd's (1999) field experiment is needed to develop a theory for ranking the various resource proxies in terms of their importance.

Shane and Venkataraman recently stated that "entrepreneurship involves the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals" (2000: 218). Our test of a social capital model suggests that the nexus is not complete unless researchers also consider the presence of social resources and their ability to leverage the productivity of a venture's resource base. We speculate

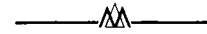
that the current findings inform not only the managers of high-growth entrepreneurial ventures, but also the managers of established firms who are in pursuit of high growth.

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