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Internal Resources, External Network, and Competitiveness during the Growth Stage: A Study of Taiwanese High-Tech Ventures[1]

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This study explores the performance implications of internal resources and external networks for entrepreneurial firms. A relationship of trust among network members is essential because of the high risk during the initial start-up stage. However, once high-tech firms initiate mass production and enter the growth stage, whether trust influences competitiveness more than resources becomes uncertain. This study examines Taiwanese firms to elucidate the main influences on firm competitiveness. In conclusion, the result indicates the competitiveness of high-tech firms during the growth stage is determined by firm resources and the willingness of support firms to cooperate—where willingness is determined by the trust of the support firms in the high-tech firm but is unrelated to firm resources.

Introduction

The influence of network ties in entrepreneurial firms recently has received considerable attention (Hite & Hesterly, 2001; Hite, 2005; Jarillo, 1989; Krackhardt, 1995; Larson & Starr, 1993; Larson, 1992). The operating model of Asian firms, with its emphasis on networks, has greatly attracted particular interest from Western scholars (Hamilton & Biggart, 1988). After comparing the market, hierarchy and network transaction models, scholars have concluded that "trust" as the foundation for networks offers another alternative governance structure (Bradach & Eccles, 1989), and can effectively reduce interfirm transaction costs (Gulati, 1998). In the Asian business environment,

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1. This study has not been published elsewhere.

which is relatively weakly regulated, trust-based transaction methods are particularly important (Khanna & Palepu, 1997).

Besides reducing the cost of interfirm transactions, trust is also considered a form of social capital (Lin, Li, & Chen, 2006). Firms with high trust benefit in various areas, including the acquisition of information, resources, and business opportunities (Nahapiet & Ghoshal, 1998). Trust relationships can also influence organizational learning. For example, Schildt, Maula, and Keil (2005) proposed that different governance modes (simultaneously implying different levels of trust) for conducting external corporate ventures are likely to differ in their degree of support for explorative and exploitative learning. Empirical research also shows that Asian firms can enhance their global competitiveness through strategic alliances and enterprise networks (Killen, Hunt, Ayres, & Janssen, 2002).

Nevertheless, some scholars have argued that an excessive emphasis on trust and relationships neglects the nature of a firm's pursuit of profit. Possibly, in traditional industries, personal networks and social capital are clearly important; but in the highly competitive and rapidly changing high-tech industry, trust and interpersonal relationships are comparatively unimportant during the growth stage. For example, Nesheim (2000) questioned the importance of interpersonal networks, and believes that while Asian enterprise startup models previously depended on relationships, they now depend on know-how. Moreover, Wu (1999) contends that the networks of close connections among firms in traditional industries are largely absent in high-tech industries.

This study examines Taiwanese high-tech firms to better understand the influences on firm competitiveness during the growth stage. The "growth stage" was defined as the first year of operations following the formal start of mass production.[2] Two firm-level theories, the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991; Dierickx & Cool, 1989; Grant, 1991; Rumelt, 1984) and social capital theory (Nahapiet & Ghoshal, 1998; Chung, Singh, & Lee, 2000; Lin et al., 2006), are adopted to explain the variation in competitiveness. While other authors have explored earlier stages (see also Hite & Hesterly, 2001), this study focuses on a later stage, an approach that is necessary to extend the theory and understanding of entrepreneurial networks. During the initial start-up phase, as start-ups face extreme levels of risk, resource acquisition becomes difficult, and thus the importance of entrepreneur interpersonal networks is self-evident. However, this study investigates the importance of relationships during the growth stage, when firms are more mature and face increased competition. Key success factors during initial start-up may be market or prototype development, but once mass production begins, the challenge can change significantly. For example, production efficiency and quality control may become more important. Previous research on entrepreneurship contains little discussion of start-ups during the growth stage, and influences on competitiveness during this stage are also unclear. Therefore, the key questions herein include the roles of firm resources and network relationships during this stage of firm development, and their influence on firm competitiveness.

To summarize, the close connectivity in the previously studied networks of traditional industries has not been replicated in the high-tech industry. This study investigates the

2. Following the approach of Block and MacMillan (1985) and Starr, Bygrave and Tercanli (1993), this study uses new product R&D success, new product exhibition, formal mass-production, and the involvement of institutional investors to indicate the beginning of the startup growth stage. In-depth interviews with three high-tech firms and two entrepreneurs found agreement that "formal mass production" is the most important milestone.

influence of trust relationships and firm resources on the competitiveness of high-tech firms during the growth stage using Taiwanese high-tech firms as subjects.

The rest of this article is organized as follows. Section 2 draws the resources-based view and social capital theory to develop hypotheses regarding the relationships among trust, firm resources, cooperative willingness of support firms and competitiveness during the growth stage. Section 3 then introduces the sample, measures, and survey process used in this study. Next, section 4 presents the empirical results. Section 5 discusses the findings of this study. Conclusions are finally drawn in Section 6, along with theoretical and practical implications, limitations, and future research directions.

Literature Review and Hypothesis

To explain the variation in competitiveness among entrepreneurial firms, this study used two guiding firm-level theories: the resource-based view of the firm and social capital theory.

Resource Base and Core Competence

The resource-based view (RBV) can be attributed to Penrose (1959), who proposed that sustained firm growth is based on internal firm characteristics, such as management capability and economies of scale of technological expertise. Only when Wernerfelt (1984) proposed the concept of resource position barrier did scholars begin to consider that sustainable competitive advantage derives from differentiated firm resources. Through the efforts of Rumelt (1984), Dierickx and Cool (1989), Reed and DeFillippi (1990), Barney (1986, 1991), Grant (1991), Mahoney and Pandian (1992), and Peteraf (1993), has RBV become a major consideration in developing firm strategies. The core competence view proposed by Prahalad and Hamel (1990), the competence-based competitive strategy proposed by Heene and Sanchez (1997), and the dynamic capability proposed by Teece, Pisano, and Shuen (1997) all conceptually resemble RBV.

RBV holds that, rather than continuously adjusting the firm operating category to fit environmental changes, a better strategy is the sustained construction of core resources; enterprises with abundant resources can then survive and grow owing to their competitive advantages, regardless of external environmental changes. Strategically valuable core resources should possess tacitness, complexity (Schoemaker, 1990), exclusivity (Wernerfelt, 1984), the inability to be rapidly accumulated (Dierickx & Cool, 1989), and the characteristic of being "valuable, rare, and inimitable" (Barney, 1991), thus preventing them from being easily acquired by other companies.

Social Capital: Networks and Trust

Organizations depend on their environment to provide resources (Pfeffer & Salancik, 1978). Social capital theory suggests that a firm's external networks contribute significantly to firm performance. Organizations transact with suppliers and other partners to acquire external resources to produce products/services at competitive prices, while maintaining the quality necessary to attract and retain customers. External networks influence firm ability to mobilize environmental resources, attract customers, and identify entrepreneurial opportunities (Lee, Lee, & Pennings, 2001).

Western scholars discussing networks generally stress interfirm networks, which they frequently term as business networks (Forsgren & Johanson, 1992); moreover, business networks that include both firm upstream and downstream relations are often labeled production networks (Yu, 2000). Interpersonal relationships are the main concern when considering the network relations of Asian firms (Kienzle & Shadur, 1997). Individuals are the nodes that mesh interpersonal networks together, and the ties between them can be affectively or economically oriented (Chang & Tan, 1999). For example, Hite (2003) identified three components of embedded network ties: personal relationships, dyadic economic interaction, and social capital. Different combinations of these three components suggested a classification typology of seven types of embeddedness.

An example of an affective-orientated network (the "personal relationship" component of tie of Hite, 2003) is how entrepreneurs with start-up concepts frequently use their personal interpersonal-network relations and affection to encourage close friends and family to jointly invest in their ventures (Bruderl & Preisendorfer, 1998; Dubini & Aldrich, 1991). In an economic-orientated network (the "dyadic economic interaction" component of Hite, 2003), the willingness of external firms to cooperate with entrepreneurs is primarily determined by the attractiveness of the resources and capabilities of the entrepreneur to that firm ("competency trust" of Hite, 2003). For example, most high-tech entrepreneurs have professional expertise and capabilities (Bruno & Tyebjee, 1985), which attract cooperative partners, the startup management team, suppliers, and resellers, specifically because they believe that cooperating with entrepreneurs can be profitable (Laumann, 1982).

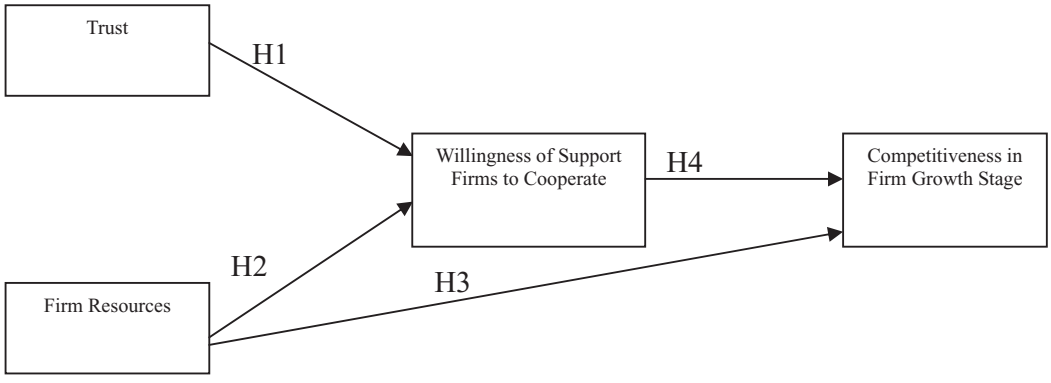
Network relationship management depends on trust (Powell, 1990) and network relations facilitate the development of trust (Hite, 2005). Scholars have examined interfirm trust in such areas as supplier relations, joint ventures, and strategic alliances in general (Das & Teng, 1998). The benefits of interfirm trust in strategic alliances appear wide ranging, and include reducing transaction costs (Gulati, 1995), inducing desirable behavior (Madhok, 1995), reducing the use of formal contracts (Larson, 1992), and facilitating dispute resolution (Ring & Van de Ven, 1994). The nature of trust thus becomes an important issue.

Diverse interpretations of the concept of trust exist. For example, Hosmer (1995) defined trust as "the expectation by one person, group, or firm of ethically justifiable behavior—that is, morally correct decisions and actions based upon ethical principles of analysis—on the part of the other person, group, or firm in a joint endeavor or economic exchange." Mayer, Davis, and Schoorman (1995) defined trust as the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of their ability to monitor or control that other party.

Scholars have also categorized trust in various ways. For example, Zucker (1986) distinguished among characteristic-based trust, process-based trust, and institutional-based trust; Williamson (1993) classified trust into calculative, personal and institutional trust; Zaheer and Venkataraman (1995) proposed that trust can comprise both rational calculation and "leaps of faith"; Barney and Hansen (1994) distinguished among weak form, semistrong-form and strong-form trust; Rousseau, Sitkin, Burt, and Camerer (1998) categorized trust into deterrence-based trust, calculus-based trust, relational trust, and institutional-based trust; Jones and George (1998) differentiated between "conditional" and "unconditional" trust; Hite (2005) identified social trust, personal goodwill trust, and personal economic trust; finally, Beccerra and Gupta (1999) suggested that it is useful to classify trust using the three dimensions of attitude-focused trust (trust in the honesty and

Figure 1

Conceptual Framework of a High-tech Startup Network



benevolence of others), behavior-focused trust (trust in the behavior of others), and competence trust (trust in the competence of others).

However, Tinsley (1996) advocated that capability should not be considered part of trust, because certain highly capable individuals are still unreliable: Trust thus should include honesty and good intention, and it has moral implications, while capability is not morally significant and should be classified as an independent dimension of trust. Similarly, Nooteboom, Berger, and Noorderhaven (1997) believed that trust was a belief in the willingness of another party to cooperate even in the absence of material coercion or incentives. Consequently, trust should exceed the scope of self-interest. Finally, McAllister (1995) classified trust into cognition- and affect-based trust with similar effect.

This study builds upon the work of Tinsley (1996) and Nooteboom et al. (1997) by adopting a narrow view of trust that excludes capability. That is, the emphasis is on "affect-based trust"[3] and "interpersonal trust" as the main axes of trust. This conception of trust includes the "emotional based trust" of Gulati (1998), the "personal goodwill trust" of Hite (2005), and the "relationship based trust" of Rousseau et al. (1998) and Dyer and Chu (2000) Accordingly, this study hypothesizes that mutual trust comes form the past relationship and affection of both parties (Dyer & Chu, 2000; Gulati, 1998).

Hypotheses

As noted earlier, network relations can be either affective or economically driven (Zaheer & Venkataraman, 1995; Chang & Tan, 1999). This study argues that network relations comprise "trust" and "economic benefits" (Ahuja, 2000; Ibarra, 1993). This study employs these two essential factors to explore the networks of high-tech firms and extend their strategic implications (Figure 1 presents the conceptual framework used in this study).

3. According to McAllister (1995, p. 26), "affective foundations for trust . . . consisting of the emotional bonds between individuals. People make emotional investments in trust relationships, express genuine care and concern for the welfare of partners, believe in the intrinsic virtue of such relationships, and believe that these sentiments are reciprocated."

In Figure 1, the willingness of support firms to cooperate is mainly influenced by their trust in the entrepreneur, which is the "goodwill trust" of Hite (2003), and by the resources owned by the entrepreneur, which is the economic factor, or the "economic trust" of Hite (2003).

This study defined support firms as suppliers, channels, or other companies related to a focal firm, and developed the new construct of "willingness of support firms to cooperate." "Willingness to cooperate" was separated from "trust" because in pilot interviews (see section 3.3 for details), entrepreneurs expressed that the willingness of support firms to cooperate is a key influence on start-up competitiveness, and neither trust nor firm resources equal willingness to cooperate.[4]

As Hite (2003) suggested, different components of relational embedded ties demonstrated different types of trust: goodwill, competence, or social trust. In this study, trust referred only to the personal "goodwill trust" of Hite (2003); "competence trust" was discussed later in the section on economic considerations.

Trust between focal firms and support firms is based on mutual relationships and affection (Dyer & Chu, 2000; Gulati, 1998) Zaheer and Venkataraman (1995) suggested that trust reduces transaction costs by reducing or eliminating both *ex-ante* and *ex-post* opportunism. Jones and George (1998) argued that, through "broad role definition," "communal relationships," "high confidence in others," "help-seeking behavior," "free exchange of knowledge and information," "subjugation of personal needs and ego for the greater common good" and "high involvement," unconditional trust leads to interpersonal cooperation and teamwork. Furthermore, Zaheer, McEvily, and Perrone (1998) distinguished between interorganizational trust and interpersonal trust. Zaheer et al. (1998) proposed that both types of trust are negatively related to negotiation costs and level of conflict between exchange partners.

Beccerra and Gupta (1999) proposed that high-trust relationships encourage open communication in which people share all information and believe the information they receive. Furthermore, individuals exhibit greater willingness to undertake risk beyond information sharing in high-trust relationships. Lee et al. (2001) also suggested that potential partners are often reluctant to risk their reputation, capital, or other resources in start-ups with uncertain financial prospects. Embedded ties with partners, which can be defined as "ties that are reinforced by mutual feelings of attachment, reciprocity, and trust," can enhance support for a start-up by committing partner resources (Lee et al., 2001). Hite (2003) also suggested that, because "relationally-embedded network ties generally provide greater access to resources for emerging firms, and since access to resources may be tempered by the effectiveness of governance mechanisms," ties based on more overlapping governance safeguards (namely, trust) may have better access to the resources of their network partners. Therefore, firms can use the trust of cooperative partners in firm executives to enhance the willingness of partners to cooperate, and this strategy can be applied to all high-tech firms during the growth stage.

Hypothesis 1: Willingness of support firms to cooperate increases with trust for high-tech entrepreneurs.

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4. In marketing literature, scholars separated consumer "brand attitude" into three parts: "cognitive," "affective," and "behavior intension." Though closely related, these parts represent different constructs: Knowing a brand is good does not equate with liking it, and liking a brand does not equate with buying it. However, liking a brand increases the probability of buying that brand. This study treated "trust" and "willingness to support" in the same way: trusting an entrepreneur does not guarantee support firm cooperation, but does increase the probability of such cooperation.

Regarding the "economic benefit" factor, associated support firms attempt to acquire future economic rewards through cooperation. Accordingly, support firms assess the firm resources, capabilities, and economic benefits that can be obtained via cooperation (Gulati, 1998; McAllister, 1995). Most high-tech entrepreneurs have engineering backgrounds (in this study, 93.6% of surveyed entrepreneurs had engineering backgrounds) as well as professional expertise and capabilities (Bruno & Tyebjee, 1985), and support firms are attracted to cooperate with such personnel because they believe that such cooperation can be profitable (Laumann, 1982). The possibility that support firms will perceive cooperation as beneficial increases with the resources owned by the entrepreneur; that is, firm economic trust (Hite, 2003) or calculative trust (Rousseau et al., 1998; Williamson, 1993) in the focal firm increase with increasing resources. Thus the willingness of support firms to cooperate increases with increasing firm resources.

Hypothesis 2: Willingness of support firms to cooperate increases with high-tech firm resources.

Firm resources include firm assets and capabilities, and were treated as an "input" side concept, while competitiveness was considered an "output" side concept and resembled competitive advantage. Resources were taken to contribute to increasing competitiveness if they were properly mobilized or exploited. Restated, what is here termed "competitiveness during the growth stage" indicates the competitive advantage derived from mobilizing or exploiting resources when enterprises enter the mass production stage.

Mass production is a critical milestone for high-tech start-ups (Lee et al., 2001). Key activities during the initial phases of a start-up may include developing market or product prototypes. Meanwhile, as firms successfully survive through this initial stage and initiate mass production, the focus may shift to production efficiency and quality control. Certain resources, such as capital, management capability and specialized expertise in mass production, are required for smoothing production processes. Restated, large quantities and superior quality of time, human, and financial resources must be added to competitiveness during the growth stage. As RBV (Barney, 1986, 1991; Dierickx & Cool, 1989; Rumelt, 1984) maintains that resource base is the main source of competitive advantage, the possibility that a firm is more competitive than its rivals increases with firm resources.

Hypothesis 3: Competitiveness during firm growth stage increases with firm resources.

As Hosmer (1995) noted, trust is generally associated with willingness to cooperate and the associated benefits. Cooperation with support firms helps technological start-ups to improve their performance in two ways. First, allies can directly provide information, knowledge, and complementary resources to start-ups. Technological start-ups, with low resource levels, generally seek technical, managerial, and financial resources via alliances with developed market firms. Second, support firms can help start-ups procure resources from third parties through the signaling role of the alliance (Lee et al., 2001). Specifically, if support firms (such as suppliers or channel members) are highly willing to cooperate, they will adjust their supply or marketing schedule to match the needs of high-tech firms, and will thus indirectly attract the cooperation of third parties. Zaheer and Venkataraman (1995) suggested that trust reduces transaction costs (thus enhancing firm competitiveness) by reducing or eliminating both *ex-ante* and *ex-post* opportunism, and this study argues that trust also reduces coordination costs (Gulati & Singh, 1998) by promoting willingness to cooperate, and thus enhancing firm competitiveness. Both reducing coordination cost and promoting third-party cooperation can boost the competitiveness of

high-tech start-ups, and, consequently, firm competitiveness increases with increased support firm willingness to cooperate.

Hypothesis 4: Competitiveness during the firm growth stage increases with support firm willingness to cooperate.

Methodology

Sample and Data Collection

As the subject firms are high-tech firms in their first year of mass production of their first product (a stage not far beyond the start-up stage), enterprise founders are key sources of information. Other managers, who joined a firm after its establishment, may be unable to provide relevant information on the start-up phase. This study obtains data via a structural questionnaire.[5] The respondents are actual Taiwanese high-tech entrepreneurs (or members of the start-up team with a good understanding of company start-up). As many of the questions involve the specific circumstances of firm start-up, while others involve strategic decision making, the respondents must be key decision makers within the firm (Ganesan, 1994; Phillips, 1981).

Sample firms are selected from the Taiwan Hsinchu High Technology Industrial Park Council Science Industry Association Registry and the Taiwan Manufacturers Registry, published by the China Credit Information Service. Before distributing the questionnaires, the firms were contacted by phone to confirm that they were the key informants of their respective companies. After confirmation, subjects were contacted to request their help in answering the questionnaires. After mailing the questionnaires, the respondents were followed up by researchers to ascertain their receipt of the questionnaires, and were urged to quickly return the completed questionnaires (cf. Sivadas & Dwyer, 2000).

One thousand firms were randomly sampled from 5,000 firms listed in the sampling frame. Of the 1,000 questionnaires distributed, 14 were returned because of incorrect addresses, and 172 responses were obtained from the 986 firms that received questionnaires. Six of the returned questionnaires had too many missing values and thus were considered invalid. The final number of respondents was 166, representing a valid return rate of 16.6%. The composition of the responding firms was judged to be sufficiently diverse. Breaking down the sample according to respondent firm industries, 30.2% of the samples were involved in computers and peripheries, 17.3% were involved in integrated circuits, 15.4% in communications, 11.1% in software, 8.6% in precision machinery, 7.4% in optoelectronics, 6.2% in biotechnology, and 3.8% in other products. This distribution among different industries is similar to that of the sampling frame.

Nonresponse Bias Effect

To confirm that the respondent firms were representative of the general population, ANOVAs (analyses of variance) were employed to check for differences between early and late respondents (Armstrong & Overton, 1977). Armstrong and Overton (1977) found that the differences between respondent and nonrespondent firms resembled those

5. According to Churchill and Brown (2004), "structured-undisguised questionnaires" are questionnaires in which questions are presented with exactly the same wording and in exactly the same order to all respondents when collecting data.

between early and late returns. Mishra, Heide, and Cort (1998) also examine the difference between early and late returns to estimate nonresponse bias. Responses returned within 4 weeks of the first mailing were classified as early (n = 121), while those received after 4 weeks were classified as late (n = 41). The ANOVAs were performed against the null hypothesis that average annual turnover sales and employee numbers do not differ between the early and late responding groups. The hypothesis was not rejected. These two groups did not differ significantly in terms of any of the two measures (for annual turnover sales: $p = .885$; for number of employees: $p = .914$).

Measures

Given the exploratory nature of this study, construct measurement was achieved in two ways: (1) for those variables employed in previous studies, the measures were adopted as long as they could provide acceptable measurement quality with minor modifications in wording to increase their applicability to the Taiwanese context; (2) for variables that were not measured in previous studies, this study developed operational measures based on previous conceptual studies and assessed content validity via interviews with five high-tech entrepreneurs and seven scholars. Entrepreneurs and scholars were convenience sampled (Churchill & Brown, 2004) from EMBA (Executive Master of Business Administration program) students and faculty members of National Chengchi University, Taiwan. Self-administrated questionnaires were employed for all variables and scales were established for measuring the latent constructs in this study.

This study considered four constructs (firm resources, willingness of support firms to cooperate, trust, firm competitiveness during the growth stage) and two control variables (firm size and industrial sector). All of the study constructs were measured using multiple-item scales. The measurements were implemented using Likert and semantic-differential scales ranging from "absolutely disagree" = 1 to "completely agree" = 7. This study focuses on the influences on competitiveness during the growth stage for high-tech firms. Respondents were requested to answer questions regarding the situation of the firm during its growth stage.

Firm Resources. "Firm resources" describes the both tangible and intangible assets and firm capabilities during the growth stage. This variable comprises the resources of the entrepreneur and the accumulated resources provided by the members of the startup team, which are acquired via the personal network of the entrepreneur and integrated by that entrepreneur. Based on the results of in-depth interviews, this study devises five operational variables for measuring firm resources, including: specialized know-how (Amit & Schoemaker, 1993; Leonard-Barton, 1992); financial capital (Brush, Greene, Hart, & Edelman, 1997; Tsai & Ghoshal, 1998); managerial capability (Collis, 1991; Lippman & Rumelt, 1982); reputation (Gulati, 1998); and past-alliance experience (Gulati, 1995). Concerning the questionnaire design, entrepreneurs were asked the condition of these five factors when the firm was entering the growth stage. A 7-point semantic-differential scale ranging from below to above the industry average was used for response assessment (see Table 1).

Willingness of Support Firms to Cooperate. Trust and economic benefits are two basic elements of cooperation networks (Ahuja, 2000; Ibarra, 1993). Accordingly, new startups can increase the willingness of associated support firms to cooperate based on both trust and firm resources (Birley, 1985; Bruderl & Preisendorfer, 1998; Dubini & Aldrich, 1991; Laumann, 1982). Willingness of support firms to cooperate is a new construct developed

here. The results of in-depth interviews identify four items for measuring the willingness of support firms to cooperate. Respondents were asked to respond to the following statements: "Even in a situation where you have poor production capability, support firms remain willing to continue to provide resources," "Support firms are willing to prioritize providing the company with resources," "Support firms are unwilling to sever cooperative relations with the company lightly," "Support firms will not try to take advantage of the company." A 5-point Likert scale (ranging from strongly disagree to strongly agree) was used for measurement.

Trust. The trust relationship between the entrepreneur and support firms is based on their mutual relationships and affections (Dyer & Chu, 2000; Gulati, 1998). This study measured entrepreneur impressions of trust gained from support firms. Participants responded to four statements, as follows: "Support firms tell you the problems they encounter" (Johnson & Grayson, 2005), "Support firms believe that you will not cheat them" (Gounaris, 2005), "Support firms believe that you will not seek rewards at their expense" (Joshi & Stump, 1999), and "Support firms have a good relationship with you" (Johnson & Grayson, 2005). A 5-point Likert scale (ranging from strongly disagree to strongly agree) was used to reflect the subjective answers of respondents.

Competitiveness during Firm Growth Stage. Most previous studies on measuring firm competitiveness adopted financial indicators, which have limited applicability to the high-tech industry. Owing to the rapidly changing environment of the industry, financial figures do not necessarily reflect sustained improvements in actual strength. For example, Ronald (1999) used rates of innovation, rates of return from R&D, and accumulation of valuable knowledge assets to assess the competitiveness of high-tech firms. The applicability of financial indicators to the study sample is even lower than that for usual high-tech firms because the sample firms are selected because they are all within the first year of starting mass production of their first product. Besides, Ray, Barney, and Muhanna (2004) argued that financial performance may be a misleading dependent variable from the perspective of the resource-based view of the firm, owing to it being a highly aggregated dependent variable. To investigate the influences on the competitiveness of high-tech firms, competitiveness indicators should accurately indicate high-tech firm competitiveness.

In this study, competitiveness during the firm-growth stage describes the achievements of firms compared to competitors following the integration of firm resources and the complementary and important resources of cooperation partners. Based on in-depth interviews with five high-tech entrepreneurs and seven scholars, this study replaces financial measurements with six measurements that are more suitable for high-tech firms, as follows: innovation speed (Bruderl & Preisendorfer, 1998; Lee et al., 2001); speed of response to the market (Hill & Jones, 2004); production efficiency (Hill & Jones, 2004); product quality (Hill & Jones, 2004); Lee et al., 2001); production flexibility (Hill & Jones, 2004); and R&D capability (Dollinger, 1995; Lee et al., 2001). Pilot-study respondents expressed that these six measures are highly appropriate for the high-tech industry because the financial figures of the growth stage are only proxies of short-term results, and are not relevant to the "competitiveness of the growth stage" which this study is concerned with. That is, better performance in financial figures during the growth stage does not guarantee future profit, but if firms outperform in terms of production, innovation, response speed, quality, flexibility, and so on during the growth stage, they have a better chance of being profitable in the long term. Regarding the questionnaire design, the entrepreneurs were asked to provide information on the six performance measures for

their companies during the growth stage using a 7-point semantic-differential scale ranging from below to above the industry average.

Control Variables. This study added two control variables to the model, namely firm size and industry sector. Firm size was measured as a logarithmic function of the total number of employees. Meanwhile, industry sector was represented by dummy variables, with the computer and peripheries sector serving as the reference (i.e., being coded as 0).

Survey Development and Administration

To assess the content validity of the survey items, survey questions were pretested and refined through application to convenience-sampled 30 CEOs (who were also entrepreneurs) chosen from among EMBA students of National Chenchi University (NCCU), Taiwan, to assess both the questionnaire and the administrating process. The respondents were given 1 month to respond, and 17 complete responses were obtained. Ambiguities in the wording were identified and clarified based on these responses. Overall the respondents exhibited no difficulty in understanding the items or the instructions on completing and returning the questionnaire. Based on pilot study data, the measurements were refined by checking item-to-total correlation and Cronbach's alpha (Nunnally, 1978).

Results

This study models support-firm willingness to cooperate as a mediating variable. To best capture the theoretical interdependencies among firm resources, trust, willingness of support firms to cooperate, and firm competitiveness during the growth stage, the data was analyzed using structural equation modeling (LISREL 8.54 statistical package). This procedure enables fine-grained analysis of the hypothesized relationships within the model context. Structural equation modeling is particularly attractive when testing mediating variables, because all of the relevant paths are directly tested, and complications, such as measurement error and feedback, are directly incorporated into the model (Edelman, Brush, & Manolova, 2005; Venkataraman, 1989).

Before running the model, the data was examined for possible abnormalities. This study followed Kline (1998, p. 89) and checked the data for missing data points, data distribution normality, outliers, and multicollinearity using the SPSS 11.5 statistical data analysis package. Mean substitution, a technique in which variable means replace missing data, was applied to deal with missing data (cf. Edelman et al., 2005). To increase the robustness of the analysis, this study used Mahalanobis distance to check for outliers. Mahalanobis distance indicates the distance of an observation from the set of x-value means. In all of the observations in the present data set, the Mahalanobis distance lies between the recommended values of 0 and 1, indicating that outliers are not a problem in the study data set (Kleinbaum, Kupper, & Muller, 1988). This study also checked the data for multicollinearity. In all cases, the variance inflation factor (VIF) statistic was below 1.9, well below the 10.0 cutoff, indicating problematic data collinearity (Hair, Black, Babin, Anderson, & Tatham, 2006). Therefore, the data do not violate normality or multicollinearity assumptions.

Construct Measurement

This study employs confirmatory factor analysis (CFA) to derive the measurement model, which includes the measurement items of the study constructs (see Table 1). All of

Table 1

Research Constructs and Questionnaire Items

Constructs	Measurement	Items
Firm resources	Semantic-differential scale	1. The specialized expertise of the firm was (below the industry average—above the industry average) 2. Firm capital was (below the industry average—above the industry average) 3. The operational management capability of the company was (below the industry average—above the industry average) 4. The reputation of the company was (below the industry average—above the industry average) 5. The cooperative alliance experience of the company was (below the industry average—above the industry average)
Willingness of support firms to cooperate	Likert scale	1. Although the production capacity of the company was not great, support firms are still willing to invest 2. Support firms are willing to prioritize providing the company with resources. 3. Support firms are unwilling to sever cooperative relations with the company lightly. 4. Support firms do not attempt to take advantage of the company[†]
Trust	Likert scale	1. Support firms tell you all about problems they encounter 2. Support firms trust you not to cheat them 3. Support firms believe that you will not seek rewards at their expense[a] 4. Support firms have a good and friendly relationship with you
Firm competitiveness during the growth stage	Semantic-differential scale	1. Innovation speed (below the industry average—above the industry average)[a] 2. Ability to respond rapidly to the market (below the industry average—above the industry average) 3. Production efficiency (below the industry average—above the industry average) 4. Product quality (below the industry average—above the industry average) 5. Production flexibility (below the industry average—above the industry average) 6. R&D capability (below the industry average—above the industry average)

[†] CFA indicates that these questionnaire items load two concepts simultaneously and thus are eliminated.

the constructs besides firm resources are reflective concepts (Cohen, Cohen, Teresi, & Velez, 1990). Formative constructs do not require inclusion in the analysis when conducting CFA. Therefore, three constructs are incorporated into the CFA, including the willingness of the supporting firm to cooperate, trust, and competitiveness during the growth stage.

Regarding the measurements of firm competitiveness, this study eliminated one of the six indicators, namely innovation speed, owing to cross loading (see Table 1). The five indicators found to be useful for measuring competitiveness were: "ability to respond rapidly to the market," "production efficiency," "product quality," "flexible production methods," and "R&D capability."

The overall disposition of the CFA model fit index χ^2-value was 50.37 (with a degree of freedom of 41) and the *p*-value was.15. The GFI (goodness of fit index) was .93, AGFI (adjusted goodness of fit) was .89, RMSEA (root mean square error of approximation) was .036, NFI (normed fit index) was .92, TLI (Tucker-Lewis index) was .98, and CFI (comparative fit index) was .98. These indicators indicate that the overall disposition of the model fit indexes is quite good.[6] Moreover, the reliability

6. The model-fit indexes have the following overall disposition: the *p*-value must exceed 0.05, the GFI and AGFI exceed 0.9, the RMSEA is below .08, and the NFI, TLI and CFI exceed 0.9 (Bagozzi and Yi, 1988; Hair et al., 2006). Generally, the overall disposition of the model fit indexes in this study is good.

Table 2

Results of Hypotheses Testing

Path	Hypothesis	Standardized estimate	*t*-value
Trust→ willingness of support firms to cooperate	H1	.71*	7.67*
Firm resources→ willingness of support firms to cooperate	H2	.07	1.40
Firm resources→ competitiveness during the growth stage	H3	.43*	6.41*
Willingness of support firms to cooperate → competitiveness during the growth stage	H4	.41*	3.37*
Firm size→ competitiveness during the growth stage		.13	.65
Industry sector→ competitiveness during the growth stage		.21	.92

* significant at $p < .01$.

value of each of the study constructs exceeds .8, meaning that each has acceptable reliability (Nunnally, 1978).

Hypothesis Testing

A two-stage structural equation model (Anderson & Gerbing, 1998) is adopted for analyzing the theoretical model developed in this study. The first step employs CFA to yield an effective measurement model. Path analysis is then employed to test the causal relationship between the research constructs. An equal weight approach was applied to determine the construct scores. The individually calculated construct numbers were displaced with mean numbers to simplify the model and make it more parsimonious (Babin & Boles, 1998).

The path analysis results reveal that the overall disposition of the model fit index x^2-value was 1.52, with a *p*-value of .22. The GFI was .99, AGFI was .94, RMSEA was .067, NFI was .99, TLI was .97, and CFI was 1.00. These indicators show that the model-fit indexes have an excellent overall disposition. The analytical results show support for three of the four hypotheses. The supported hypotheses include hypothesis 1 (Willingness of support firms to cooperate increases with trust in high-tech entrepreneurs) ($\beta = .71$, *t*-value = 7.67); hypothesis 3 (Firm competitiveness during the growth stage increases with firm resources) ($\beta = .43$, *t*-value = 6.41); and hypothesis 4 (Firm competitiveness during the growth stage increases with support firm willingness to cooperate) ($\beta = .41$, *t*-value = 3.37). However, hypothesis 2 (Willingness of support firms to cooperate increases with high-tech firm resources) ($\beta = .07$, *t*-value = 1.40) was not supported (see Table 2).

Discussions

The empirical results show that the main influences on high-tech firm competitiveness during the growth stage are "firm resources" and "willingness of support firms to cooperate." Additionally, the "willingness of support firms to cooperate" is influenced by their

trust in high-tech entrepreneurs, and is not related to firm resources. This phenomenon indicates that even if a high-tech firm has already completed the start-up stage and entered the growth stage, "relationships and affection" remain the main influences on the willingness of the support firm to cooperate. Restated, even in the high-tech industry, trust is more important than economic considerations (that is, firm resources) in gaining the cooperation of support firms.

Risk considerations may explain why firm resources do not influence support-firm willingness to cooperate. Support firms cooperating with high-tech firms entering the mass production stage face the following risks: First, even if the firm has abundant resources, future profits are not guaranteed because significant further progress is required to achieve true firm success. Notably, only a relatively small proportion of start-ups succeed. Moreover, even if a firm is assured of achieving future profits, support firms must still consider the costs associated with moral hazards or opportunism (Williamson, 1975), and the fear of being cheated owing to the institutional context in developing countries (Khanna & Palepu, 1997), influencing the sense of security among cooperation partners. Accordingly, firm resources do not significantly influence support-firm willingness to cooperate.

Conclusions

Theoretical Implications

Strategic management research has extensively adopted RBV to explain differences in firm performance. However, RBV focuses almost exclusively on internal firm resources and capabilities. Recent investigations have drawn on network literature to highlight the importance of external resources available to firms through their networks (Zaheer & Bell, 2005).

The reasons for the willingness of support firms to cooperate with entrepreneurs in risky situations in high-tech industries offer an interesting area for study. Theoretically this willingness can be explained via RBV and social network theories. Restated, support firms cooperate because of either economic considerations or affective relations. The theoretical implications of this study involve arguments regarding the relative importance of economic versus affective considerations in network cooperation. Taiwanese scholars such as Wu (1999) and Chang and Li (1999) theoretically argued that in high-tech industries, network formation, and maintenance depends more on economic considerations than affective factors. Their reasoning is that in global industries such as the high-tech industry, noneconomic rationale considerations damage firm effectiveness and efficiency, increasing the difficulty of survival. This study empirically demonstrated that even in the high-tech industry, affective trust continues to heavily influence willingness to cooperate. Reasons behind the conflict argument may include: (1) institutional environment still matters for business strategy, as proposed by Khanna and Palepu (1997). Moreover, the role of affective trust in reducing transaction costs is not a noneconomic rationale in network cooperation; and (2) resources may influence willingness to cooperate during the more mature and lower risk stages, but not during the growth stage of mass production.

Second, this study further strengthened social capital theory, because trust was found to remain an important determent of Taiwanese firm competitiveness, even in intensely competitive high-tech industries, and even during the more stable later stage of firm development. This study also strengthened RBV. Although resources were found not to influence firm willingness to cooperate, they still contribute to business competitiveness.

Third, this study focuses on the growth stage of high-tech start-ups, unlike most previous studies on entrepreneurship which explored earlier stages. The findings of this study can be used to establish a dynamic model of entrepreneurship research.

Practical Implications

Although high-tech firm resources are not the main factor attracting support-firm cooperation, they still significantly influence firm competitiveness during the growth stage. Accordingly, before entering the mass production stage, high-tech firm managers must accumulate resources such as specialized expertise, operational management capabilities, reputation, and experience.

Second, it remains important to start-up managers to maintain a relationship of trust with support firms even after the start-up successfully survives through the initial stage. For example, rapid market response ability depends on information provided by downstream distribution channels, and production-method flexibility is determined by the existence of sufficient coordination with suppliers. Because of the accumulative nature of trust relationships, high-tech start-up managers should spend their time and effort in relationship building in the very beginning of the initial stage.

For investors, assessing the profit potential of a high-tech start-up is difficult as a result of high uncertainties regarding environment and technology. This study found that in addition to the traditional evaluation index of technology, market and resources, support firm willingness to cooperate is also a key influence on competitiveness. Investors thus can assess a potential target firm based on the measurement items developed in this study. For example, investors can observe the interaction between the start-up and support firms, thus judging the trust relationship between them, which may influence start-up competitiveness.

Limitations and Future Research

One limitation of this study is variable measurement validity. For example, this study did not measure actual firm resources because for some of the resources (such as management capability and reputation) factual data is lacking. This study did not provide industry averages to help respondents answer questions, because it was judged that respondents who are entrepreneurs or executives were supposed to be able to assess their relative position in the industry. However, we are unsure about if they can or not. Future studies could use factual data or provide industry averages to improve the validity of the measurement of firm resources.

The measurements of support-firm trust and willingness to cooperate were based on the subjective assessments of the respondents and may not be valid. Future studies may overcome this problem by gathering pair data (from both focal firm and one of its support firms).

Future research can continue to use the theoretical framework developed in this study as an analytical foundation, while adding important moderators to enhance framework completeness and readability. For example, Burton and Rubanik (1997) noted that adopting an internationalization strategy is important for start-ups during the early stage, because start-ups with global networks during the early stage have enhanced growth prospects (Bell, McNaughton, & Young, 2001; Ostgaard & Birley, 1996). During the start-up stage, if firms, particularly Taiwanese firms, rapidly internationalize or cooperate with internationally renowned conglomerates, they can gain more

reputation for developing other cooperation networks to increase firm competitiveness. That is, start-ups which adopt an internationalization strategy early should be more competitive than those that are late to adopt such a strategy.

"Cooperation partners" can indicate both support firms and other individuals. This study is concerned mainly on support firms (including suppliers, distributors and R&D institutions), but future research can focus on personnel-type cooperation partners (e.g., top management team), and can compare the personnel and firm cooperation partners. Because personnel cooperation partners are internal firm employees and firm cooperation partners are external, the former put more effort into the start-up than the latter (Sivadas & Dwyer, 2000). Accordingly, the relationship between "trust" and "willingness of partners to cooperate," and between "willingness of partners to cooperate" and "firm competitiveness" can be compared and tested for both types of cooperative partners.

Finally, because networks are dynamic (Gulati, Nohria, & Zaheer, 2000) and because this study only examines high-tech start-up competitiveness during the growth stage, the dynamics after the start-up and growth stages remain unknown. Consequently, future studies can design a long-term cooperation network model for a high-tech startup firm, to further differentiate the stages of high-tech firms and conduct a more in-depth investigation for establishing a dynamic model for high-tech start-up firms.

REFERENCES

Ahuja, G. (2000). The duality of collaboration: Inducement and opportunities in the formation of interfirm linkages. *Strategic Management Journal*, *21*(3), 317–343.

Amit, R. & Schoemaker, P.J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33–46.

Anderson, J.C. & Gerbing, D.W. (1998). Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423.

Armstrong, J.S. & Overton, T.S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, *14*(3), 396–402.

Babin, B.J. & Boles, J.S. (1998). Employee behavior in a service environment: A model and test of potential differences between men and women. *Journal of Marketing*, *62*, 77–91.

Barney, J.B. (1986). Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, *32*(10), 1231–1241.

Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J.B. & Hansen, M.H. (1994). Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, *15*, 175–190.

Beccerra, M. & Gupta, A.K. (1999). Trust within the organization: Integrating the trust literature with agency theory and transaction cost economics. *Public Administration Quarterly*, *23*(2), 177–203.

Bell, J., McNaughton, R., & Young, S. (2001). "Born-again global" firms an extension to the "born global" phenomenon. *Journal of International Management*, *7*(3), 173–189.

Birley, S. (1985). The role of networks in the entrepreneurial process. *Journal of Business Venturing*, *1*(1), 107–117.

Block, Z. & MacMillan, I.C. (1985). Milestones for successful venture planning. *Harvard Business Review*, *63*(5), 184–196.

Bradach, J.L. & Eccles, R.G. (1989). Price, authority, and trust: From ideal types to plural forms. *Annual Review of Sociology*, *15*, 97–118.

Bruderl, J. & Preisendorfer, P. (1998). Network support and the success of newly founded business. *Small Business Economics*, *10*(2), 213–225.

Bruno, A.V. & Tyebjee, T.T. (1985). The entrepreneur's search for capital. *Journal of Business Venturing*, *1*(1), 61–74.

Brush, C.G., Greene, P.G., Hart, M.M., & Edelman, L.F. (1997). Resource configurations over the life cycle of venture. *Frontiers of Entrepreneurship Research*, 315–329.

Burton, G.D. & Rubanik, Y. (1997). High technology entrepreneurship in transitional economies: The Russian experience. *Journal of High Technology Management Research*, *8*(2), 213–223.

Chang, L.Y. & Li, J.F. (1999). Taiwanese industries, the frontier of trend. In L.Y. Cheng (Ed.), *Network of Taiwan: Personal relationships and economic rational of business*, (9–16). Taipei: Yuan-Liu. (In Chinese).

Chang, L.Y. & Tan, K.J. (1999). Configuring industrial networks. In L.Y. Cheng (Ed.), Network of Taiwan. *Personal Relationships and Economic Rational of Business* (pp. 17–64). Taipei: Yuan-Liu. (In Chinese).

Chung, S., Singh, H., & Lee, K. (2000). Complementarity, status similarity and social capital as drivers of alliance formation. *Strategic Management Journal*, *21*(2000), 1–22.

Churchill, G.A., Jr. & Brown T.J. (2004). *Basic Marketing research* (5th ed.). Mason, OH: South-Western.

Cohen, P., Cohen, J., Teresi, J. Marchi, M., & Velez, C.N. (1990). Problems in the measurement of latent variables in structural equations causal models. *Applied Psychological Measurement*, *14*(2), 183–196.

Collis, D.J. (1991). A resource-based analysis of global competition: The case of the bearing industry. *Strategic Management Journal*, *12*, 49–68.

Das, T.K. & Teng, B. (1998). Between trust and control: Developing confidence in partner cooperation in alliance. *Academy of Management Review*, *23*(3), 491–512.

Dierickx, I. & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, *35*(12), 1504–1511.

Dollinger, M.J. (1995). *Entrepreneurship: Strategies and resources*. Boston: Irwin.

Dubini, P. & Aldrich, H. (1991). Personal and extended networks are central to the entrepreneurial process. *Journal of Business Venturing*, *6*(5), 305–313.

Dyer, J.H. & Chu, W. (2000). The determinants of trust in supplier-automaker relationships in the U.S., Japan, and Korea. *Journal of International Business Studies*, *31*(2), 259–285.

Edelman, L.F., Brush, C.G., & Manolova, T. (2005). Co-alignment in the resource-performance relationship: Strategy as mediator. *Journal of Business Venturing*, *20*, 359–383.

Forsgren, M. & Johanson, J. (1992). *Managing networks in international business*. Philadelphia: Gordon and Breach Science Publishers.

Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, *58*(2), 1–19.

Gounaris, S.P. (2005). Trust and commitment influences on customer retention: Insights from business-to-business services. *Journal of Business Research*, *58*, 126–140.

Grant, R.M. (1991). The resource based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, *33*(1), 114–135.

Gulati, R. (1995). Does familiarity breed trust? The implication of repeated ties for contractual choice in alliances. *Academy of Management Journal*, *38*, 85–112.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, *19*(4), 293–317.

Gulati, R. & Singh, H. (1998). The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliance. *Administrative Science Quarterly*, *43*, 781–814.

Gulati, R., Nohria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, *21*, 203–215.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., & Tatham, R.L. (2006). *Multivariate data analysis*. Upper Saddle River, NJ: Pearson Prentice Hall.

Hamilton, G. & Biggart, N.W. (1988). Market, culture and authority: A comparative analysis of management and organization in the Far East. *American Journal of Sociology*, *94*, 52–94.

Heene, A. & Sanchez, R. (1997). *Competence-Based Strategic Management*. Chichester, UK: John Wiley and Sons.

Hill, C.W.L. & Jones, G.R. (2004). *Strategic management theory: An integrated approach* (6th ed.). Boston: Houghton Mifflin.

Hite, J.M. (2003). Patterns of multidimensionality among embedded network ties: A typology of relational embeddedness in emerging entrepreneurial firms. *Strategic Organization*, *1*(1), 9–49.

Hite, J.M. (2005). Evolutionary processes and paths of relationally embedded network ties in emerging entrepreneurial firms. *Entrepreneurship Theory and Practice*, *29*(1), 113–144.

Hite, J.M. & Hesterly, W.S. (2001). The evolution of firm networks: From emergence to early growth of the firm. *Strategic Management Journal*, *22*, 275–286.

Hosmer, L.T. (1995). Trust: The connecting link between organizational theory and philosophical ethics. *Academy of Management Review*, *20*, 379–403.

Ibarra, H. (1993). Personal networks of women and minorities in management: A conceptual framework. *Academy of Management Review*, *18*(1), 56–87.

Jarillo, J.C. (1989). Entrepreneurship and growth: The strategic use of external resources. *Journal of Business Venturing*, *4*(2), 133–147.

Johnson, D. & Grayson, K. (2005). Cognitive and affective trust in service relationships. *Journal of Business Research*, *58*, 500–507.

Jones, G.R. & George, J.M. (1998). The experience and evolution of trust: Implications for cooperation and teamwork. *Academy of Management Review*, *23*, 531–546.

Joshi, A.W. & Stump, R.L. (1999). The contingent effect of specific asset investments on joint action in manufacturer-supplier relationships: An empirical test of the moderating role of reciprocal asset investments, uncertainty, and trust. *Journal of the Academy of Marketing Science*, *27*, 291–305.

Khanna, T. & Palepu, K. (1997). Why focused strategies may be wrong for emerging markets. *Harvard Business Review*, *4*, 41–51.

Kienzle, R. & Shadur, M. (1997). Developments in business networks in East Asia. *Management Decision*, *35*(1), 23–32.

Killen, C.P., Hunt, R., Ayres, B., & Janssen, C. (2002). Strategic alliances for world competitiveness. *International Journal of Technology Management*, *24*, 5–6, 569.

Kleinbaum, D.G., Kupper, L.L., & Muller, K.E. (1988). *Applied regression analysis and other multivariate methods*. Belmont, CA: Duxbury Press.

Kline, R.B. (1998). *Principles and practices of structural equation modeling*. New York: The Guildford Press.

Krackhardt, D. (1995). Entrepreneurial opportunities in an entrepreneurial firm: A structural approach. *Entrepreneurship Theory and Practice*, *19*(3), 52–69.

Larson, A.L. (1992). Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Administrative Science Quarterly*, *37*, 76–104.

Larson, A.L. & Starr, J.A. (1993). A network model of organization formation. *Entrepreneurship Theory and Practice*, *17*(2), 5–15.

Laumann, E.O. (1982). Microstructural analysis in interorganizational systems. *Social Networks*, *4*(4), 329–348.

Lee, C., Lee, K., & Pennings, J.M. (2001). Internal capabilities, external networks, and performance: A study on technology-based ventures. *Strategic Management Journal*, *22*(6/7), 615–640.

Leonard-Barton, D. (1992). Core capabilities and rigidities: A paradox in managing new product development. *Strategic Management Journal*, *13*, 111–125.

Lin, B., Li, P., & Chen, J. (2006). Social capital, capabilities, and entrepreneurial strategies: A study of Taiwanese high-tech new ventures. *Technological Forecasting and Social Change*, *73*, 168–181.

Lippman, S.A. & Rumelt, P.R. (1982). Uncertain limitability: An analysis of interfirm differences in efficiency under competition. *Bell Journal of Economics*, *13*, 418–438.

Madhok, A. (1995). Revisiting multinational firms' tolerance for joint ventures. *Journal of International Business Studies*, *26*(1), 117–137.

Mahoney, J.T. & Pandian, J.R. (1992). The resource-based view within the conversation strategic management. *Strategic Management Journal*, *13*, 363–380.

Mayer, R.C., Davis, J.H., & Schoorman, F.D. (1995). An integrative model of organizational trust. *Academy of Management Review*, *20*, 709–734.

McAllister, D.J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, *38*(1), 24–59.

Mishra, D.P., Heide, J.B., & Cort, S.G. (1998). Information asymmery and levels of agency relationships. *Journal of Marketing Research*, *35*(3), 277–295.

Nahapiet, J. & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, *23*(2), 242–266.

Nesheim, J.L. (2000). *High tech start up: The complete handbook for creating successful new high tech companies*. New York: Free Press.

Nooteboom, B., Berger, H., & Noorderhaven, N.G. (1997). Effects of trust and governance on relation risk. *Academy of Management Journal*, *40*(2), 308–338.

Nunnally, J.C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Ostgaard, T.A. & Birley, S. (1996). New venture growth and personal networks. *Journal of Business Research*, *36*(1), 37–50.

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

Peteraf, M.A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, *14*, 179–188.

Pfeffer, J. & Salancik, G.R. (1978). *The external control of organizations: A resources dependence perspective*. New York: Harper and Row.

Phillips, L.W. (1981). Assessing measurement error in key informant reports: A methodological note on organizational analysis in marketing. *Journal of Marketing Research*, *18*(4), 395–415.

Powell, W. (1990). Neither market nor hierarchy: Network forms of organization. *Research in Organizational Behavior*, *12*, 295–336.

Prahalad, C.K. & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, *66*, 79–91.

Ray, G., Barney, J.B., & Muhanna, W. (2004). Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resources-based view. *Strategic Management Journal*, *25*, 23–37.

Reed, R. & DeFillippi, R.J. (1990). Casual ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review*, *15*, 88–102.

Ring, P.S. & Van de Ven, A.H. (1994). Developmental processes of cooperative inter-organizational relationships. *Academy of Management Review*, *19*, 90–118.

Ronald, M. (1999). A framework for sustainable advantage in global hi-tech markets. *International Journal of Technology Management*, *17*(3), 240–258.

Rousseau, D.M., Sitkin, S.B., Burt, R.S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, *23*, 393–404.

Rumelt, R.P. (1984). Toward a strategic theory of the firm. In R.B. Lamb (Ed.), *Competitive strategic management* (pp. 556–570). Englewood Cliffs, NJ: Prentice Hall.

Schildt, H.A., Maula, M.V.J., & Keil, T. (2005). Explorative and exploitative learning from external corporate ventures. *Entrepreneurship Theory and Practice*, *29*(4), 493–515.

Schoemaker, P.J.H. (1990). Strategy, complexity and economic rent. *Management Science*, *36*(10), 1178–1192.

Sivadas, E. & Dwyer, F.R. (2000). An examination of organizational factors influencing new product success in internal and alliance-based processes. *Journal of Marketing*, *64*(1), 31–49.

Starr, J.A., Bygrave, W.D., & Tercanli, D. (1993). Does experience pay? Methodological issues in the study of entrepreneurial experience. In S. Birley & I.C. MacMillan (Eds.), *Entrepreneurship Research: Global Perspectives* (pp. 125–155). New York: Elsevier Science Publishers B.V.

Teece, D.J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*, 509–533.

Tinsley, D.B. (1996). Trust plus capabilities. *Academy of Management Review*, *21*(2), 335–337.

Tsai, W. & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, *41*(4), 464–476.

Venkataraman, N. (1989). The concept of fit in strategy research: Toward verbal and statistical correspondence. *Academy of Management Review*, *14*(3), 423–444.

Wernerfelt, B. (1984). A resource-base view of the firm. *Strategic Management Journal*, *5*(2), 171–180.

Williamson, O.E. (1975). *Market and hierarchies: analysis and anti-trust implication*. New York: The Free Press.

Williamson, O.E. (1993). Calculativeness, trust, and economic organization. *Journal of Law and Economics*, *36*, 453–486.

Wu, S.H. (1999). The network dynamics of Taiwan IC industry. In L.Y. Cheng (Ed.), Network of Taiwan: *Personal relationships and economic rational of business*, (pp. 65–127). Taipei: Yuan-Liu (In Chinese).

Yu, C.J. (2000). Restructuring of production networks in foreign markets: The case of Taiwanese firms. In J. Chen (Ed.), *Foreign Direct Investment*. Basingstoke, Hampshire, UK: Macmillan.

Zaheer, A. & Bell, G.G. (2005). Benefiting from network position: Firm capabilities, structural holes, and performance. *Strategic Management Journal*, *26*, 809–825.

Zaheer, A. & Venkataraman, N. (1995). Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic behavior. *Strategic Management Journal*, *16*, 373–392.

Zaheer, A., McEvily, B., & Perrone, V. (1998). Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science*, *9*(2), 141–159.

Zucker, L.G. (1986). Production of trust: Institutional sources of economic structure, 1840–1920. In B.M. Staw & L.L. Cummings (Eds.), *Research in Organizational Behavior* (Vol. 8, pp. 53–111). Greenwich, CT: JAI Press.

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