CHAPTER 20

WHY DO SMALL FIRMS BENEFIT LESS FROM ALLIANCES THAN LARGE FIRMS?

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The number of strategic alliances—cooperative organizational forms that promote the sharing and exchange of resources—has grown dramatically over the past decades. The increased use of alliances has stimulated research that suggests these hybrid forms of organization offer unique benefits, in comparison to internal organization (Park & Kim, 1997; Sarkar, Echambadi, & Harrison, 2001; Zahra, Ireland, & Hitt, 2000). In particular, alliances may provide lower cost access to activities critical to the success of high-technology entrepreneurial ventures (Powell, Koput, & Smith-Doerr, 1996), allowing resource-constrained firms to share expertise, assets, and risk without incurring significant debt (Baum, Calabrese, & Silverman, 2000; Stuart, 2000).

Existing alliance research has provided important insights, but it has often conceived of and analyzed these partnerships solely between large organizations. Alliances involving small firms, however, represent an increasing percentage of interorganizational activity—particularly in high-technology sectors (Rothaermel & Deeds, 2006). For instance, a 2004 National Federation of Independent Businesses report notes that nearly two thirds of small businesses have or are currently involved in alliances. Moreover, many small firms report alliance-related challenges due to the size of their partners (Alvarez & Barney, 2001). The increasing use of alliances by small firms and assertions that small firms face unique challenges when managing alliances suggest that opportunities exist to refine existing theory and develop new theory that better explicates whether and how small firms may gain and lose from collaboration.

This chapter aims to address this gap by examining how attributes associated with firm size might influence alliance organization and technological performance.

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The underlying logic of the chapter relies on the concept of a discriminating alignment between exchange or problem characteristics and governance choices. Following resource- and capability-based logic, we submit that the benefits that flow to firms via alliances vary with focal- and partner-firm capabilities. Following knowledge- and organizational economics–based logic, we propose that the problems firms attempt to solve via alliances vary in coordination and control requirements, alliance governance forms vary in their ability to manage these requirements, and performance is contingent on the alignment realized among problem characteristics and alliance governance.

Our contribution lies in the exploration of whether and how differences in the organizational architectures of small and large firms—that is, in the problems they find, frame, and formulate; in the attributes of the exchanges they initiate; in the organizational solutions they implement; and in their abilities to control and coordinate across boundaries—influence alliance organization and performance. In particular, we suggest that, as compared to large firms, small firms may (a) form alliances with less capable partners, (b) form alliances with a lower degree of technological compatibility with their partners, (c) utilize less appropriate governance structures with their partners, and (d) have less effective alliance management capabilities. In sum, we explore a series of arguments that suggest whether and why small firms may be constrained in their abilities to leverage alliances in comparison to large firms. We begin by reviewing previous theoretical and empirical research related both to alliance organization and performance and to small and large firm differences. We then review and develop insights on how partner firm technical capabilities and focal firm–partner firm technical capability "distance" are likely to affect alliance organization and performance. We next discuss why firms in general—and small and large firms in particular—vary systematically in the choice of problems to address through alliances, the attributes of exchanges managed via alliances, and their abilities to manage the costs and leverage the benefits of alliances. Finally, we conclude with a discussion of the implications for strategy and entrepreneurship research and practice.

Theoretical Background

A substantial body of research suggests that alliances provide mechanisms through which competing firms with otherwise opposing interests may enter into mutually beneficial exchange. This research is most easily classified along two research streams. The first stream describes why firms select different alliance arrangements, conceptualizing these approaches as discrete and intermediate forms of organization between markets (i.e., outsourcing or external organization) and hierarchies (i.e., insourcing or internal organization; Borys & Jemison, 1989). Empirical research in this area generally makes strong distinctions between nonequity and equity alliances, suggesting that the latter afford not only greater control and incentive alignment via ownership (Chi, 1994; Pisano, 1989) and residual sharing of gains (Hennart, 1988) but also superior coordination

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through common administrative organization (Gulati, 1995; Gulati & Singh, 1998; Osborne & Baughn, 1990) than the former. Performance implications are often inferred, but emphasis in this stream is placed predominantly on the factors that determine alliance organization.

The second stream emphasizes the motivations and performance implications associated with alliances. Although generally downplaying issues related to alliance organization, research in this area argues that alliances are a relatively effective mechanism to acquire (Kogut, 1988) or access (Grant & Baden-Fuller, 2004) the resources necessary to develop, manufacture, and market goods and services (Hamel, Doz, & Prahalad, 1989). This research stream suggests alliances can improve performance in myriad ways, broadly emphasizing firm and partner capabilities, alliance governance, and alliance management. More specifically, alliances improve firms' abilities to (a) realize scale economies (Gomes-Casseres, 1997; Dussauge, Garrette, & Mitchell, 2000) or spread risks (Powell, 1990) by pooling resources; (b) access complementary assets (Teece, 1996; Rothaermel, 2001), specialized capabilities (Dyer & Ouchi, 1993; Mowery, Oxley, & Silverman, 1996), or knowledge (Eisenhardt & Schoonhoven, 1996; Mowery, Oxley, & Silverman, 1998); and (c) facilitate learning and information sharing (Dyer & Nobeoka, 2000; Khanna, Gulati, & Nohria, 1998; Mowery et al., 1996).

Alliances, Capabilities, and Performance

One substream of alliance research examines whether and how the productive capabilities of partners affect alliance performance. Building on logic that highlights endowments of specialized capabilities that are heterogeneously distributed and difficult to transfer (e.g., Barney, 1991; Peteraf, 1993; Wernerfelt, 1984), this research asserts that collaborating with partners with superior capabilities provides performance benefits. For instance, prominent papers argue that more capable partner firms are better able to offer specialized knowledge (Dyer, 1996), better able to expand and deepen collaborative relationships (Heide & John, 1990), and better able to provide more novel and innovative approaches (Stuart, 2000).

Empirical work in this substream confirms and refines the intuition that alliance partner capability improves alliance performance. For instance, Sampson (2007) examines alliances between telecommunications equipment firms and finds that firms' abilities to learn from alliances are positively correlated with their partner capabilities and with their own abilities to absorb knowledge that overlaps with their partners' knowledge bases. More recently, Vanhaverbeke, Belderbos, Duysters, and Beerkens (2015) show that, in addition to technology capital (patent portfolios), alliance capital (technology alliance portfolios) has a positive effect on technological performance. Madsen and Leiblein (2015) show that firms' own production experience and the experience held by their partners contribute to temporary innovation advantages but firms' own production experience yields a more durable innovation advantage as compared to the experience held by their partners. These and related research efforts indicate that alliance

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performance is a function of the experiences and capabilities held by partner firms and that at least some of the benefits of these experiences and capabilities are "sticky."

Although some research suggests that it is advantageous for firms to ally with the most capable partners, the ability to utilize and benefit from partner capabilities is also affected by the degree of capability "overlap" between the focal and partner firms. For instance, Mowery et al. (1996) use patent data related to alliances and find that capability overlap with partners enhances absorptive capacity (Cohen & Levinthal, 1990). Firms seeking to internalize new and external technology-based capabilities should therefore not only select partners that extend and augment their own internal capabilities but also ensure that some degree of technological overlap remains with these partners (Mowery et al., 1998). If managerial, organizational, and technical challenges increase with the capability distance between partner firms, then alliance performance or success most likely improves by collaborating with partners whose skills simultaneously extend and overlap with the firm's capabilities. At least in choosing alliance partners, firms may thus trade off the potential benefits of accessing superior capabilities with the managerial, organizational, and technical challenges of absorbing more distal knowledge.

Given these joint and potentially competing effects, it is perhaps not surprising that empirical alliance research that examines the performance consequences associated with the degree of similarity between a focal firm and its partners' capability sets is mixed. Highlighting the complementary benefits of collaborations involving distinctive skill sets, some research suggests that alliances last longer and show greater stability over time when partner firms' alliance activities do not overlap (Dussauge et al., 2000). Other papers suggest that the degree of (a) knowledge overlap between partner firms facilitates information exchange and development (Mowery et al., 1998) and (b) organizational overlap (i.e., structures, policies) between partner firms enhances alliance success (Lane & Lubatkin, 1998). Some amount of capability or organizational overlap between partner firms is often necessary to engender communication and coordination or technical dialogue important to knowledge transfer (Monteverde, 1995). In sum, although focal firms gain access to and benefit from partner firms' capabilities, their abilities to understand and absorb this knowledge might prove problematic, given their lower acumen and understanding.

A related stream of research recognizes that firms may vary in their abilities to manage the ongoing activities associated with alliances: In short, differences in firms' alliance management capabilities affect performance by moderating the association between the pool of capabilities available through the alliance and performance outcomes. The very nature of an alliance implies that coordination across firm boundaries must be accomplished, but with only partial control and incentive alignment. This artifact implies that managers—often in the absence of established processes and procedures—must identify partners with not only relevant capabilities but also direct activity, facilitate communication, and incentivize firm–partner effort. For instance, Dyer, Kale, and Singh (2001) and Kale, Dyer, and Singh (2002) describe how a dedicated alliance function increases long-term alliance success. Kale and Singh (2009) underscore the importance of an organizational capability for finding, developing, and managing interorganizational relationships.

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Such dedicated alliance functions serve both as a knowledge base for best practices and lessons learned from previous alliances and as a monitoring function for identifying potential issues and resolving potential disputes that may arise from current alliances. Schreiner, Kale, and Corsten (2009) suggest that alliance management capabilities are a multidimensional construct of coordination, communication, and bonding, and find that each construct positively impacts alliance outcomes based in the software industry. More generally, empirical research supports the idea that alliance management capabilities are associated with firm performance (see Ireland, Hitt, & Vaidyanath, 2002, for a comprehensive review of the related empirical literature). As one specific example, Kauppila (2015) finds that alliance management capabilities have an inverted U-shaped performance effect on explorative alliances and a positive performance effect on exploitation alliances in Finnish manufacturing firms.

Alliances, Governance Choices, and Performance

A second substream of alliance research examines whether and how alliance organization affects performance. As a hybrid organizational form (Borys & Jemison, 1989), alliances are intermediate to the high-powered incentives of markets (i.e., outsourcing), their reliance on price and the low-powered incentives of hierarchies (i.e., insourcing), and their emphasis of administrative control and coordination (Mahoney & Pandian, 1992; Williamson, 1991). Alliances vary principally according to their ownership characteristics (Oxley, 1997). Distinctions in this latter category are often made among alliances that involve no shared equity (i.e., technology licenses, second-sourcing contracts, reciprocity agreements, and long-term contracts), alliances that involve equity exchange, and alliances (i.e., joint ventures) that involve equity exchange and separate administrative organizations (Gulati & Singh, 1998; Pisano, 1990).[1]

The variety of alliance arrangements observed suggests that certain alliances may be better suited for particular activities than others. More hierarchical alliances are argued to be better able to mitigate opportunism and improve monitoring by aligning incentives, improving control, and fostering coordination. Kogut (1988), for instance, argues that equity alliances better support the transfer of technological capabilities among firms—given the tacit nature of the knowledge exchanged—in comparison to nonequity alliances. Leiblein (1996) reports that alliance partner experience in codevelopment and sourcing agreements increases the hazard of new technology adoption in a multiyear study of the semiconductor industry.[2] Sampson (2007) similarly suggests that more hierarchical (e.g., equity) alliance arrangements improve firms' abilities and incentives to share information. There are limits to these benefits, however, as hierarchy dulls incentives and adds bureaucratic costs. As Williamson (1991) argues, when disturbances in the market impact autonomous entities and collaboration is not necessary to adjust position, price represents an excellent adaptive mechanism. But when such disturbances require coordinated responses and autonomous parties react to signals differently, hierarchy provides adaptation advantages in comparison. The resulting concept of

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"discriminating alignment" suggests that less hierarchical (e.g., nonequity) alliances are appropriate for more straightforward exchanges, whereas more hierarchical (e.g., equity or joint venture) alliances are appropriate for more complex exchanges.

Advancing Williamson's (1991) theoretical framework, Nickerson and Zenger (2004) develop a discriminating alignment proposition from the perspective of the knowledge-based view. These authors note that solution search can be either directional (i.e., local) or heuristic (i.e., cognitive). When problems are simple and solutions depend little on knowledge set interactions, directional search is optimal. But when problems are complex and high levels of interaction among various knowledge sets are required, heuristic search is beneficial. Nickerson and Zenger (2004) define "decomposable problems" as those for which directional search is recommended, "nondecomposable problems" as those for which heuristic search is needed, and "nearly decomposable problems" as those for which heuristic search is initially required to identify a finite pool of potential solutions and then directional search is utilized to determine which solution produces the best value. Macher (2006) adds to this perspective by introducing problem structure to solution search: Well-structured problems are those with well-defined initial and end states and explicit approaches for solving; ill-structured problems are those with poorly defined initial and end states and indefinite approaches for solving. Following this search logic, predictions are made that "easy" problems (i.e., simple and well-structured) are best solved using more market-based approaches, whereas "difficult" problems (i.e., complex and ill-structured) are best solved using more hierarchical-based approaches.

Leiblein and Macher (2009) adapt the problem-solving perspective to alliance organization and performance. Alliance arrangements are argued to vary in their abilities to support specific investment (i.e., through residual claimancy) and to facilitate information transfer and coordination (i.e., through the nature and level of interaction between employees of partner firms). These authors provide an alliance framework that varies according to the degree of alliance control and coordination: Cash- or license-based alliances offer limited control and coordination; equity partnerships offer better control helping to mitigate moral hazard and hold-up concerns, but limited coordination; and joint ventures offer superior control and coordination in comparison.

Empirical alliance performance research is generally supportive of these propositions. For instance, Sampson (2004) examines the cost of misaligned governance in the context of research and development (R&D) alliances using the telecommunication equipment industry and finds that firm performance degrades when alliance governance choices are misaligned with transaction cost predictions. In particular, too little organization (i.e., the selection of nonequity alliances in hazardous exchange conditions) or too much organization (i.e., the selection of joint ventures in nonhazardous exchange conditions) suffers performance degradations in comparison. Bercovitz, Jap, and Nickerson (2006) find that the value created in a collaborative partnership is reduced if the realized level of cooperative exchange norms falls below an expected level. The expected level of cooperative norms is predicted to increase in the presence of joint transaction-specific investments underlying the exchange and with the degree of transparency associated with the relationship. In alliances, joint transaction-specific investments create the means

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to impose sanctions on partner firms, in the event their actions are self-serving and detrimental to the agreed-upon goals. Bercovitz et al. (2006) show that if the level of observed collaboration does not match the expected level due to governance boundaries put in place, alliance performance suffers.

In sum, the extant alliance literature emphasizes the benefits of alliances in providing mechanisms through which firms can access complementary resources and facilitate knowledge transfer. The empirical alliance literature also highlights the importance of coordination and control mechanisms to allow firms to realize these potential benefits. Although some researchers posit whether small firms are able to benefit from alliances, surprisingly little empirical evidence directly examines whether small firms experience unique benefits or challenges as a result of their alliance activities, in comparison to large firms. But just such an examination is critical: Only by comparing the conditions under which small firms and large firms enter into alliances and the performance levels achieved can alliance-related research be advanced.

Small and Large Firms

The extant literature frequently portrays small and large firms as distinct entities with unique strengths and weaknesses. Many studies equate firm size with greater scale, scope, experience, and financial resources (e.g., Woo & Cooper, 1981) or link firm size with age and excessive formalization and bureaucracy (e.g., Lawrence & Lorsch, 1967; O'Reilly & Tushman, 1997). At least in part, these observations reflect fundamental assumptions regarding the abilities and organizational architectures of small and large firms.

Table 20.1 provides an illustrative summary of notable distinctions between small and large firms. The top half of this table summarizes theoretical and empirical research that links firm size and productive capabilities. The basic argument is that differences in the size of firms affect the scale, scope, and development of capabilities along the value chain. Large firms are generally older and more experienced, which may improve survival abilities (Hannan & Freeman, 1977; Carroll & Hannan, 1989). Large firms, by virtue of their size, also have a privileged ability to amortize fixed costs over larger volumes. If scale-based selection—the notion that firm survival decreases with aggregate distance from larger competitors (Dobrev & Carroll, 2003)—is present, large firms have inherent advantages. Moreover, if size confers broader scope, large firms may be better able to invest in refined downstream manufacturing, distribution, and marketing capabilities across multiple products and services (Baum et al., 2000; Cohen, 1995; Stuart, 2000). Small firms, by contrast, lack experience, scale, scope, and established market positions, and are thus more likely (pushed) to invest in novel upstream technological and innovative capabilities (Deeds & Hill, 1996; Eisenhardt & Schoonhoven, 1990).

The bottom half of this table summarizes theoretical and empirical research linking firm size and organizational attributes. The basic argument is that differences in the number, groups, and locations of employees across different-sized firms affect several

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organizational attributes, including the nature of communication (e.g., Allen, 1977); the intensity of managerial and performance incentives (e.g., Zenger, 1994); the ability to attract and then monitor human capital (e.g., Zenger, 1994; Zenger & Lazzarini, 2004); broad notions of formalization and bureaucracy (e.g., Lawrence & Lorsch, 1967); and finally, the formality of management systems (e.g., Damanpour & Gopalakrishnan, 1998, 2001), including alliance management capabilities (e.g., Kale et al., 2002; Kale & Singh, 2009). For instance, the smaller the firm—as measured by the number of employees—the easier and less costly it is to observe behavior and design (high-powered) incentive compensation systems (Zenger, 1994). As high-powered compensation systems typically attract better employees and elicit greater effort (Zenger & Lazzarini, 2004), small firms should be better able to motivate effort. If small firms have a narrower scope (Chandler, 1990) and/or less variation in the information processed within the firm (Hayek, 1945; Putterman, 1995), in comparison to large firms, they are more likely to realize lower influence costs (Milgrom & Roberts, 1990). Similarly, because coordination costs increase with both physical distance (Allen, 1977) and the number of interfaces that data has to cross (e.g., Merton, 1957; Crozier, 1964), small firms are privileged in coordinating data if their employees and organizations exhibit closer geographic proximity and fewer organizational layers (Leiblein & Madsen, 2009).

The literature summarized in Table 20.1 suggests that small and large firms differ in productive capabilities and organizational attributes. An important question, then, is whether these differences affect alliance organization and performance. One way to determine the potential impact of differences in the productive capabilities and organizational architectures of small and large firms on (especially alliance) organization and performance is through a comparative approach: in particular, one that takes either an organizational perspective (e.g., Williamson, 1985) or a problem-solving perspective (e.g., Nickerson & Zenger, 2004). Figures 20.1(a) and 20.1(b), respectively, adapt the logic developed in these perspectives to assess the costs and benefits of (alliance) organization and performance across an "average" (i.e., neither small nor large) firm. We examine each figure in turn.

First consider Figure 20.1(a), which adopts an organizational perspective. The horizontal axis represents the level of an exchange attribute (i.e., investments with limited alternative uses or users, uncertainties in partner intentions, frequencies of interaction) facing an organizational arrangement (i.e., market, hybrid, or hierarchy). The vertical axis depicts the expected costs of governing an organizational arrangement. Governance costs are not surprisingly expected to increase as the level or levels of certain exchange attribute(s) increase(s). For alliances, these costs would include finding appropriate partners, coordinating activities with partners, and monitoring efforts and output of partners. As is by now familiar, the "market" line represents the use of outsourcing and indicates that governance costs are initially low but increase sharply with exchange specificity and other complicating exchange attributes. The "hierarchy" line represents the use of insourcing and indicates that governance costs are initially high to reflect the added administrative costs of organizing activities within the firm but increase at a comparatively more modest rate with exchange attributes. The "alliance" line represents the

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Table 20.1 Firm Size and Productive Capabilities and Organizational Attributes

	Association With Firm Size		Representative Citations
	Small	Large	
Level and Type of Productive Capabilities			
Age/experience	0	++	Hannan and Freeman (1977), Evans (1987), Carroll and Hannan (1989), Rothaermel and Deeds (2006), Arora, Gambardella, Magazzini, and Pammolli (2009), and Woo and Cooper (1981)
Scale	0	++	Dobrev and Carroll (2003), Woo and Cooper (1981), Baum et al. (2000), Cohen (1995), Stuart (2000), and Deeds and Hill (1996)
Upstream technology	++	+	Santoro and Chakrabarti (2002), Knott and Vieregger (2014), Knott and Vieregger (2016), and Eisenhardt and Schoonhoven (1990)
Level and Type of Organizational Attributes			
Incentive intensity	++	0	Allen (1977), Zenger (1994), Cockburn, Henderson, and Stern (1999), Zenger and Marshall (2000), Zenger and Lazzarini (2004), and Leiblein and Madsen (2009)
Monitoring/coordination	++	0	Williamson (1967), Putterman (1995), Zenger (1994), Leiblein and Madsen (2009), Merton (1957), and Crozier (1964)
Formalization/bureaucracy	0	++	Lawrence and Lorsch (1967), O'Reilly and Tushman (1997), Moch and Morse (1977), Lorsch (1977), Macher and Mayo (2015), Audia and Greve (2006), Shaver and Mezias (2009), Haveman (1993), Madsen and Walker (2007), and Elfenbein, Hamilton, and Zenger (2010)
Formal management systems	0	++	Damanpour and Gopalakrishnan (1998), Damanpour and Gopalakrishnan (2001), and Voss and Voss (2013)
Alliance function/experience	0	++	Kale, Dyer, and Singh (2002), Kale and Singh (2009), Lahiri and Narayanan (2013), Lavie, Kang, and Rosenkopf (2011), Rothaermel and Deeds (2004, 2006), and Leiblein and Madsen (2009).
Form of search	Heuristic	Trial	Pisano (1996), Kogut and Zander (1992), Levitt and March (1988), and Nickerson and Zenger (2004)

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use of hybrid forms of organization and is intermediate in both level and slope. An "average" firm (i.e., neither small nor large) would optimally manage to address these differences by using outsourcing to perform an activity to the left of exchange attribute EA_1, alliances for an activity between EA_1 and EA_2, and insourcing for an activity to the right of EA_2, where EA_1 and EA_2 represent particular types of exchange attributes.

Next consider Figure 20.1(b), which adopts a problem-solving perspective. The horizontal axis represents the level of problem difficulty—that is, complexity and structure—facing an organizational arrangement.[3] The vertical axis depicts the expected performance of an organizational arrangement. Performance is a broadly defined term, but suppose in this example it represents measures related to the "effectiveness" (e.g., speed, cost, quality) of problem solving. For alliances, performance would include finding capable partners, coordinating solution search with partners, and transferring knowledge from partners. Performance is expected to "degrade" somewhat with more difficult problems (e.g., problem solving takes longer, is more costly, etc.), regardless of the chosen organizational arrangement.

The "market" line represents the use of outsourcing and indicates that problem solving is initially effective but decreases sharply with the degree of problem difficulty. The "hierarchy" line represents the use of insourcing and indicates that problem solving is initially less effective, reflecting the dulled incentives and bureaucracy of organizing activities within the firm, but decreases at a comparatively more modest rate with problem difficulty, reflecting the benefits of organizing search through better control and coordination approaches. The "alliance" line—representing hybrid organizational forms—is intermediate in both level and slope. The level and slope of these lines thus depict the ability of these different institutional mechanisms to solve more or less difficult problems. Similar to Figure 20.1(a), an "average" firm would optimally manage to address these problem characteristic differences by using outsourcing to solve "easy" problems (i.e., an activity to the left of exchange attribute EA_3), alliances for solving

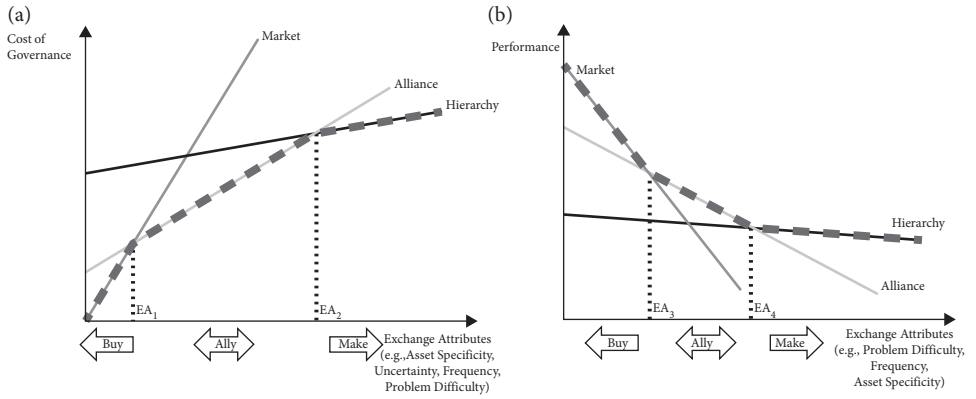

FIGURE 20.1 Governance and exchange specificity/problem difficulty (average firms).

Part (a) adapted from Williamson (1991, p. 284).

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problems between EA_3 and EA_4, and insourcing for "difficult" problems to the right of EA_4, where EA_3 and EA_4 represent problem characteristic levels.

There are several advantages to adopting the comparative approach summarized in the prior paragraphs. First, the organizational and problem-solving perspectives provide precise sets of predictions that are consistent with well-established research concerning the boundaries of the firm. If there are reasons to believe that the distinctions summarized in Table 20.1 affect the cost of managing an activity via insourcing, alliances, or outsourcing, implications for the types of exchange conditions or types of problems addressed by small and large firms can be systematically examined. Similarly, if it is believed that small and large firms face different exchange conditions or address different types of problems (as dictated by the "EA_i" parameters), implications for the "appropriate" form of governance can be explored. Second, the comparative approach offers the ability to refine existing theory or identify opportunities to develop entirely new theory. For instance, if predictions from the framework yield implications that are inconsistent with existing intuition or evidence, we then know that either unexplored boundary conditions exist or the theory needs to be revised.

More specifically, Figure 20.1(a) and Figure 20.1(b) also provide a ready way to explore potential sources of performance differences in the alliance activities of small and large firms. For instance, if small firms are in fact disadvantaged vis-à-vis large firms in these interorganizational arrangements, then we would expect that their costs of governing alliances would be higher at all levels of exchange specificity and that their performance in alliances would be lower at all levels of problem difficulty. In short, the "alliance" line would shift up in Figure 20.1(a) as shown in the dotted line in Figure 20.2(a), and the "alliance" line would shift down Figure 20.1(b) as shown in the dotted line in Figure 20.2(b). If the governance costs of using alliances increase or the performance from using alliances degrades for small firms, a net decrease in the use of alliances by these firms occurs: at low levels of a particular exchange attribute greater

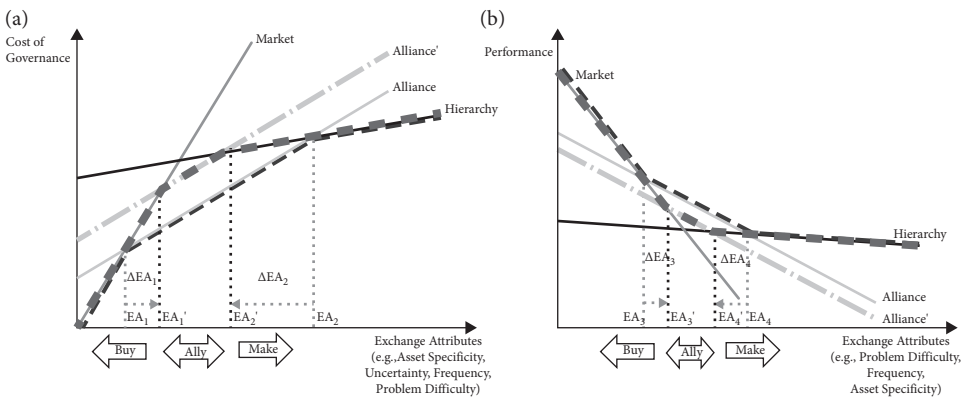

FIGURE 20.2 Governance and exchange specificity/problem difficulty (average firms vs. small firms with ineffective alliance governance).

Part (a) adapted from Williamson (1991, p. 284).

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outsourcing is favored (compare EA_1 to EA_1' in Figure 20.2[a] and EA_3 to EA_3' in Figure 20.2[b]); for high levels of a particular exchange attribute greater insourcing is favored (compare EA_2 to EA_2' in Figure 20.2[a] and EA_4 to EA_4' in Figure 20.2[b]).

The combination of the differences in productive capabilities and organizational attributes across small and large firms highlighted in Table 20.1 suggests several reasons that such shifts for small firms are obtained. One reason that supports an alliance shift is that small firms have a smaller professional network than their large rivals. The size of the professional network of a firm is most likely correlated with its age, history, and experience, as well as its scale and reach. Given evidence suggesting that between 43% and 57% of firms in the CRSP/Compustat database receive analyst coverage in a given year (Litov, Moreton, & Zenger, 2012), it seems likely that many small firms receive very little analyst or news coverage. With more limited coverage it will be more difficult for potential partners to self-identify, which suggests that small firms will face "thin" markets for potential alliance partners. In either case, if partner resources are important to alliance performance—and small firms have smaller networks of potential partners — then small firms are likely to exhibit lower alliance performance, either in terms of higher governance costs or restrained problem solving.

A second reason that supports an alliance shift is that small firms may have a weaker or less capable professional network than large firms. Even if small firms enjoy a similarly sized network of potential alliance partners, their partner pools may be perceived as less attractive in comparison to those attracted by large firms. The potential for uncertain or limited revenue or profit opportunities from allying with relatively less attractive partners subsequently puts small firms at a disadvantage. As noted by Mindruta, Moeen, and Agarwal (2016), it is possible that small firms are limited in their abilities in identifying and selecting suitable partner firms. Again, we would expect to see the same shift in the governance cost and problem-solving curves.

A third reason that supports an alliance shift is that small firms may lack the reputation and power to support mutually beneficial collaboration. Collaboration implies the need for a dyadic perspective that considers the goals and objectives of both the focal firm and the partner firm (e.g., Wang & Zajac, 2007; Zajac & Olsen, 1993). Khanna et al. (1998) and Simonin (1997) suggest that alliances involving small and large firms may create power imbalances that subsequently hinder the costs of governing the alliance. If small firms have lower acumen or less established reputations in comparison to large firms, then problem-solving challenges become endemic. That is, even if small firms are able to identify attractive and capable alliance partners, their compromised bargaining position suggests that they are also less able to exert pressures on their alliance partners to influence the arrangement terms to their advantage. As noted by Yang, Zheng, and Zhao (2014. p. 147), "Small firms are often at a high risk of appropriation by large firms .... It is accordingly difficult for small firms to manage asymmetric alliances with large firms, which often have much stronger bargaining power."

A fourth reason that supports an alliance shift is that small firms face particular handicaps in monitoring, transferring, and absorbing knowledge in comparison to their larger counterparts. Knowledge complementarities and partner-specific absorptive capacity

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(Cohen & Levinthal, 1990) are argued important determinants of the partner selection process. Even if small firms collaborate with equally or more capable partner firms and are able to avoid issues associated with power imbalances, their relatively smaller endowment of productive resources suggests knowledge-related challenges. Monitoring difficulties accrue to small firms given their more limited scale, scope, and experience. Absorptive capacity and transfer difficulties accrue due to the more limited processes, systems, and procedures in place. Moreover, the capabilities, working styles, and cultural differences between small and large firm partner pairs also create performance difficulties. In short, the larger the differences are in technological, organizational, and cultural aspects, the greater the likelihood that neither alliance partner will be willing to make known and certain short-term sacrifices for unknown and uncertain long-term benefits (e.g., Kale & Singh, 2009). No matter the partner complementarities, low partner compatibility—which is exacerbated with firm size—suggests more limited alliance benefits.

A fifth and final reason that supports an alliance shift is that small firms realize different performance levels in their alliance activities because they are disadvantaged in their abilities to productively manage interorganizational activities. In short, small firms have lower alliance management capabilities that either add governance costs or delay effective problem solving. The alliance management literature equates alliance experience with alliance success (Kale & Singh, 2009; Anand & Khanna, 2000; Kale et al., 2002). Because larger firms tend to also be older, they are more likely to have more alliance experience, and are therefore better able to benefit more from partnerships.

Managing complex activities such as alliances requires judgement that is often only gained through experience. If small firms are simultaneously younger and less experienced, they will realize lower alliance performance because their judgments are inferior in comparison to their older and more experienced counterparts. Searching for the "right" alliance partners is costly, given the resources consumed in scanning the potential partner landscape, the due diligence required, and the vetting of alternatives evaluated. One way to mitigate these costs is to form a dedicated alliance function (i.e., an alliance management capability), which can serve not only as a knowledge base for best practices and lessons learned (Dyer et al., 2001; Kale et al., 2002) but also as a monitoring function for current alliances resolving any potential issues that arise. The very existence of a dedicated alliance function, however, implies that the firm is of a sufficient scale or scope in its alliance activities to support this function. Small firms thus face comparatively greater obstacles and bear larger information and search costs than large firms in establishing and managing these activities.

A corollary to these arguments is that small firms may realize lower performance in their alliance arrangements precisely because they use these interorganizational approaches for more complex exchanges or for more difficult problems that should, at least theoretically, be internalized. Per Table 20.1, small firms have more limited productive capabilities or unique organizational attributes in comparison to their larger brethren. For instance, smaller scale or scope or more limited downstream capabilities suggest that small firms often cannot successfully manage or afford to "go it alone." That

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is, managers at small firms may understand the needs or benefits to internalizing a complex exchange or a difficult problem, but hierarchy is simply an infeasible organizational solution given the costs and complexities.

Small firms thus turn to the "next best" organizational arrangement of alliances. But underdeveloped alliance management capabilities suggest that small firms are limited in identifying, screening, and selecting alliance partners and limited in sufficiently absorbing and transferring knowledge—especially as the capability distance between alliance partners increases—in comparison to their larger counterparts.

If either condition is obtained, two potential outcomes are likely in comparison to large firms: first, small firms make suboptimal (i.e., misaligned) organizational decisions; and second, small firms form collaborations with less technically "appropriate" partners. We illustrate these potential outcomes via the dotted "hierarchy" lines in Figures 20.3(a) and 20.3(b). These dotted lines shift the "hierarchy" line up and down, respectively, and relative to the position in Figures 20.1(a) and 20.1(b). Because smaller firms have more limited scale, scope, or downstream capabilities, insourcing adds governance costs or hinders performance in comparison to large firms and thereby shifts the hierarchy lines. If the governance cost of using hierarchy increases or the performance from using hierarchy degrades for small firms relative to large firms, a net increase in the use of alliance results: At low levels of a particular exchange attribute the organizational approaches are identical as depicted in Figures 20.1(a) and 20.1(b), but for high levels of a particular exchange attribute alliances are favored (compare EA_2 to EA_2' in Figure 20.3[a] and EA_4 to EA_4' in Figure 20.3[b]). In both cases, a net increase in the use of alliances is obtained as small firms replace hierarchical arrangements with the next best organizational alternative.

Small firms are thus subject to greater adverse selection in their alliance organization decisions. If small firms either enter into alliances when hierarchy is preferable or form alliances with less technically appropriate partners, they are systematically

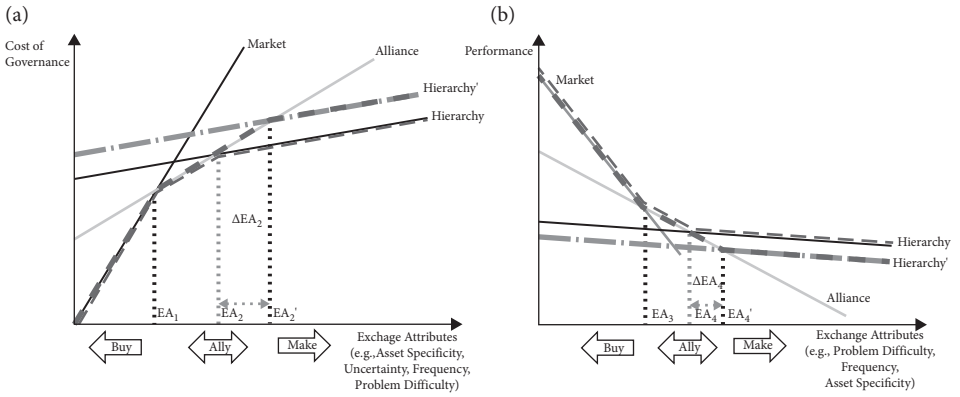

FIGURE 20.3 Governance and exchange specificity/problem difficulty (average firms vs. small firms with hierarchy constraint).

Part (a) adapted from Williamson (1991, p. 284).

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disadvantaged in their abilities to achieve performance levels commensurate with their larger counterparts.

A dual to the aforementioned formulations is that small firms and large firms may choose to undertake different value chain activities. Of course, if the activities undertaken by small and large firms differ, then the exchange attributes of activities undertaken by small and large firms are also likely to differ. In other words, small and large firms may select exchange attributes based on their understanding of their specific organizational costs and performance benefits: Firms choose activities that are more appropriate for the strengths and weaknesses within their respective organizations, or firms choose organization arrangements based on the exchange attributes faced. That is, our theories may focus on the chosen organizational decisions (as indicated by the market, hybrid, or hierarchy lines) or the chosen exchanges and problems (as indicated by the "EA_i" parameters), but these are endogenous choices that are likely made simultaneously.

Some theoretical and empirical support for this argument exists. For instance, although small and large firms both engage in R&D, the type of R&D conducted differs: Small firms are more likely to do R&D related to entrepreneurial and spin-out ideas while still relying heavily on large firms for knowledge spillovers; large firms are more likely to do incremental and process R&D and basic research (Knott & Vieregger, 2016). Evidence of this endogenous activity separation also is found in several vertically specialized industries—that is, industries that have shifted from vertically integrated control of value chains by a single firm to market-based coordination along value chains among separate firms (Macher & Mowery, 2004). In biopharmaceuticals, Pisano (1991) finds that more mature new biotechnology firms seek to build downstream capabilities to commercialize their R&D, whereas established biotechnology firms continue to conduct R&D in-house. The trend toward vertical integration is limited, however, by the rate at which these respective firms can expand boundaries: New biotechnology firms are impeded by the scale and scope of commercialization endeavors; established biotechnology firms face constraints in continued innovation, and, subsequently, pick off desirable new biotechnology firms via acquisitions. In the chemicals industry, a large set of products (e.g., commodity-based chemicals) are largely separated along the value chain by firms that provide design and engineering and by firms that conduct manufacturing. In the semiconductor industry, a similarly large set of products (i.e., nonmemory and nonmicroprocessor) are designed by fabless firms but manufactured by pure-play foundries (Macher, 2006).

Discussion

This chapter examines whether and why small and large firms may differ in their abilities to enter into and benefit from strategic alliances. Motivated by assertions that small firms are penalized in their use of alliances, the chapter describes how differences in alliance organization and performance across small and large firms may be predicted using

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existing theory. More specifically, our analysis combines aspects of organizational and problem-solving perspectives with empirical observations regarding the productive capabilities and organizational attributes of small and large firms to explore alliance organization and performance differences between these classes of firms. In so doing, we first note the differences that exist in the productive capabilities and organizational attributes of small and large firms and then describe how these differences affect alliance organization and performance.

Our analysis and comparative framework suggest at least four broad avenues for future conceptual, theoretical, and empirical research. One such research opportunity is to better identify the salient differences in organizational architectures across small and large firms. Our review of the academic literature suggests that different-sized firms are likely to possess distinct productive capabilities and organizational attributes. As a simple example, one might note how limitations in the number of projects a small firm is able to initiate or the number of alliances a small firm is able to form limits the applicability of portfolio logic to these firms—it makes little sense to apply portfolio theory when one is engaging in a small number of projects. More generally, the existence of government agencies and consulting services that focus on different-sized firms, such as Deloitte's Middle Market Services division or the National Center for the Middle Market, suggests that the problems, the organizational solutions, and the consequences of particular solutions may vary across organizations of different sizes. Our framework suggests that additional research is needed to empirically verify whether and how small and large firms differ across central dimensions that are thought to affect collaborative behavior. If one accepts the existence of distinctions in organizational architectures across small and large firms as discussed in this chapter, then future research may productively examine whether and how these differences affect alliance organization and performance.

The chapter outlines several opportunities for such research. First, future research might explore the "market" for alliance partners between small firms and large firms. If small firms face "thin" or less effective alliance partner markets, then we would expect that these firms would, on average, achieve lower performance from their alliance arrangements. Second, and beyond this general observation, future research might explore both the sources of these performance shortfalls and the efficacies of potential mitigating strategies. Some potentially important research questions to consider are as follows: Do small firms actually have smaller networks of potential alliance partners? Are the potential partners in the consideration set of small firms or the actual partners of small firms more or less capable than those encountered by large firms? Do performance shortfalls exist in careful comparisons of similar alliances across small and large firms?

A second research opportunity is to explore the implications of differences in the level or type of productive capabilities important for alliance performance across different-sized firms. Even if small firms partner with equally capable partners, the more limited absorptive capacities or alliance management capabilities of these firms suggest performance challenges. As Table 20.1 highlights, small firms are generally younger and less experienced and have more limited scale and scope, in comparison to their larger counterparts. On average, small firms may form alliances that encompass greater

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"distance"—either in product or service, geographic, or value chain dimensions—and have less skill in managing alliances. Some important potential research questions to consider are as follows: Are differences in "distance" measures across small and large firms engaged in alliances obtained? Do these differences affect reported levels of performance or satisfaction with the underlying partnerships?

A third research opportunity is to explore how differences in the organizational architecture of small and large firms affect alliance organization and performance. Although a few scholars have identified clever ways to distinguish how incentive and monitoring differences affect a narrow band of behaviors across small and large firms (e.g., Zenger, 1994), there are likely many more opportunities to explore the causes and consequences of other distinctions across these firms. Some important potential research questions to consider are as follows: Is firm size correlated with incentive intensity and monitoring? Do any observed differences in incentive intensity and/or monitoring across small and large firms affect performance? Do these differences vary across industries? To what extent do these differences result from variation in location and geographic scope (Allen, 1977), scale and fixed investment, or more subtle differences in organizational attributes such as loyalty (Simon, 1974) across firms of various sizes? In particular, it would be worthwhile to present empirical evidence supporting a parsimonious list of mechanisms that effectively identify the performance consequences of alliances across these classes of firms.

A fourth research opportunity is perhaps of greatest interest, but arguably the most challenging. The ideas presented in this chapter may potentially be leverage to develop new theory by exploring the boundary conditions regarding the causes and consequences of alliance organization. One interesting avenue is to exploit the different exchange attributes and problem characteristics undertaken by small and large firms to address trade-offs between these attributes and organizational approaches. Standard applications of transaction cost economics reasoning presume that the level of specific investment is set exogenously prior to selection of an appropriate governance form. As noted by Williamson (1991, p. 82), however, "the value of specificity and the type of governance are determined simultaneously (endogenously) rather than sequentially." Creative research efforts might therefore examine how small firms decide whether to reduce exchange specificity conditions or focus efforts on simple and well-structured problems—thereby avoiding particular activities that are too difficult to internalize—or instead enter into these activities via alliances that present increased costs and complexities and organizational misalignment.

Conclusion, Limitations, and Future Research

This chapter combines the comparative approach of transaction cost economics with the capability orientation of the resource-based view of the firm in an examination of alliance organization and performance. Several propositions and research questions are

0004336310.INDD 453 Dictionary: NOAD 4/9/2019 8:59:24 AM

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developed around whether and why small firms might achieve lower alliance performance than large firms.

The chapter posits that alliance organization and technological performance are determined by a host of alliance-, firm-, and partner-level factors. Our theoretical framework indicates that partner technical capabilities and the distance in technical capabilities between focal firms and partner firms are important drivers of alliance organization and performance. These conclusions suggest that firms must determine not only who the "right" partner firms are in their alliances but also how best to ally with those partners. Although firms' own technological capabilities are not surprisingly important in determining alliance technological performance, so too are partner firms' technical capabilities and the relative distance in technical capabilities between these firms. We provide a comparative framework that suggests that small firms systematically benefit less from collaborative activity in comparison to their larger counterparts. Large firms are superior at managing the control and coordination requirements of alliances and gain more from their partners' technical knowledge. Size might facilitate the creation of superior control mechanisms or coordinative routines that are necessary when operating across organizational boundaries. Size also appears to proffer benefits related to the absorptive capacity of new knowledge. Although our framework suggests that all firms face managerial, organizational, and technical challenges, we propose that these constraints are particularly acute for small firms in comparison to large firms.

Finally, the chapter suggests four broad avenues for future conceptual, theoretical, and empirical research. First, the salient differences in organizational architectures across small and large firms can be better identified. Second, the implications of differences in the level or type of productive capabilities important for alliance performance across different-sized firms can be more acutely explored. Third, differences in the organizational architecture of small and large firms and how they affect alliance organization and performance can be more closely examined. And fourth, endogenous choices between exchange attributes and organizational approaches by small firms can be considered.

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Notes

1. Recent research offers finer grained distinctions between alliance types. For example, Reuer and Devarakonda (2012) argue that nonequity alliances could offer similar control and incentive alignment benefits as equity alliances through the use of committees empowered to control alliance governance structure. Laroia and Krishnan (2005) suggest that by specifying reporting and auditing requirements and establishing board-like administrative structures with particular decision rights and resource allocation authority, nonequity alliance partners can reduce contracting costs and promote ex post efficiency as committees

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and administrative boards use existing (and incomplete) contracts as reference points and fill in any existing agreement gaps. Reuer and Devarakonda (2012) show that more than a third of nonequity alliances are governed using elements of hierarchy and a rich set of administrative mechanisms beyond contractual safeguards. The size, structure, and reach of these committees are determined directly by the monitoring and coordination needs presented by the alliance.

2. This research indicates that the effect of experience managed within the firm is higher than the effect of experience managed within codevelopment partnerships, and the effect of experience managed within codevelopment partnerships is higher than the effect of experience accessed through sourcing partnerships. This effect is robust to controls for equity stakes in codevelopment or sourcing partnerships (the presence of equity magnified the difference). Consistent with the assumption that a technology becomes standardized over time, the effect changes over time—the positive influence of sourcing relationships and nonequity alliances increases as a technology diffuses through the industry ecosystem.
3. By problem complexity, we mean to imply the number of components and degree of interdependence between these components. A classic example is the complexity associated with the moves one might make in games of checkers (relatively simple) and chess (relatively complex). By problem structure, we mean to imply the degree to which a problem may be easily formulated. For instance, one might consider baking a cake from a box mix as a well- formulated problem and baking a cake from scratch using an ancestor's recipe with "a little of this and a little of that" as a poorly formulated problem.

References

Allen, T. J. (1977). *Managing the flow of technology: Technology transfer and the dissemination of technological information within the R and D organization*. Cambridge, MA: Massachusetts Institute of Technology.

Alvarez, S. A., & Barney, J. B. (2001). How entrepreneurial firms can benefit from alliances with larger partners. *Academy of Management Executive*, *15*(1), 139–148.

Anand, B. N., & Khanna, T. (2000). Do firms learn to create value? The case of alliances. *Strategic Management Journal*, *21*(3), 295–316.

Arora, A., Gambardella, A., Magazzini, L., & Pammolli, F. (2009). A breath of fresh air? Firm type, scale, scope, and selection effects in drug development. *Management Science*, *55*(10), 1638–1653.

Audia, P. G., & Greve, H. R. (2006). Less likely to fail: Low performance, firm size, and factory expansion in the shipbuilding industry. *Management Science*, *52*(1), 83–94.

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

Baum, J. A. C., Calabrese, T., & Silverman, B. S. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, *21*, 267–294.

Bercovitz, J., Jap, S. D., & Nickerson, J. A. (2006). The antecedents and performance implications of cooperative exchange norms. *Organization Science*, *17*, 724–740.

Borys, B., & Jemison, D. B. (1989). Hybrid arrangements as strategic alliances: Theoretical issues in organizational combinations. *Academy of Management Review*, *14*, 234–249.

Carroll, G. R., & Hannan, M. T. (1989). Density dependence in the evolution of populations of newspaper organizations. *American Sociological Review*, *54*(4), 524–541.

0004336310.INDD 455 Dictionary: NOAD 4/9/2019 8:59:24 AM

OUP • UNCORRECTED PROOF

Chandler, A. D. (1994). *Scale and scope: The dynamics of industrial capitalism*. Cambridge, MA: Harvard University Press.

Chi, T. (1994). Trading in strategic resources: Necessary conditions, transaction cost problems, and choice of exchange structure. *Strategic Management Journal*, *15*, 271–290.

Cockburn, I., Henderson, R., & Stern, S. (1999). *Balancing incentives: The tension between basic and applied research* (No. w6882). Cambridge, MA: National Bureau of Economic Research.

Cohen, W. (1995). Empirical studies of innovative activity. In P. Stoneman (Ed.), *Handbook of the economics of innovation and technological change* (pp. 182–264). Oxford, UK: Blackwell Publishers.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*(1), 128–152.

Crozier, M. (1964). *The bureaucratic phenomenon*. Chicago, IL: University of Chicago Press.

Damanpour, F., & Gopalakrishnan, S. (1998). Theories of organizational structure and innovation adoption: The role of environmental change. *Journal of Engineering and Technology Management*, *15*(1), 1–24.

Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, *38*(1), 45–65.

Deeds, D. L., & Hill, C. W. (1996). Strategic alliances and the rate of new product development: An empirical study of entrepreneurial biotechnology firms. *Journal of Business Venturing*, *11*, 41–55.

Dobrev, S. D., & Carroll, G. R. (2003). Size (and competition) among organizations: Modeling scale-based selection among automobile producers in four major countries, 1885–1981. *Strategic Management Journal*, *24*(6), 541–558.

Dussauge, P. B., Garrette, P. B., & Mitchell, W. (2000). Learning from competing partners: Outcomes and durations of scale and link alliances in Europe, North America and Asia. *Strategic Management Journal*, *21*(2), 99–126.

Dyer, J. H. (1996). Specialized supplier networks as sources of competitive advantage: Evidence from the automobile industry. *Strategic Management Journal*, *17*, 271.

Dyer, J. H., Kale, P., & Singh, H. (2001). How to make strategic alliances work. *MIT Sloan Management Review*, *42*(4), 37.

Dyer, J. H., & Nobeoka, K. (2000). Creating and managing a high performance knowledge-sharing network: The Toyota case. *Strategic Management Journal*, *21*, 345–367.

Dyer, J. H., & Ouchi, W. (1993, Fall). Japanese style partnerships: Giving companies a competitive edge. *Sloan Management Review*, *35*(1), 51–63.

Eisenhardt, K. M., & Schoonhoven, K. (1990). Organizational growth: Linking founding team strategy, environment and growth among U.S. semiconductor ventures, 1978–1988. *Administrative Science Quarterly*, *35*, 504–529.

Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organization Science*, *7*(2), 136–150.

Elfenbein, D. W., Hamilton, B. H., & Zenger, T. R. (2010). The small firm effect and the entrepreneurial spawning of scientists and engineers. *Management Science*, *56*(4), 659–681.

Evans, D. S. (1987). The relationship between firm growth, size, and age: Estimates for 100 manufacturing industries. *Journal of Industrial Economics*, *35*(4), 567–581.

Gomes-Casseres, B. (1997). Alliance strategies of small firms. *Small Business Economics, 9*(1), 33–44.

0004336310.INDD 456 Dictionary: NOAD 4/9/2019 8:59:24 AM

OUP • UNCORRECTED PROOF

Grant, R. M., & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of Management Studies*, *41*(1), 61–84.

Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal*, *38*(1), 85–112.

Gulati, R., & Singh, H. (1998). The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly*, *43*(4), 781–814.

Hamel, G., Doz, Y. L., & Prahalad, C. K. (1989). Collaborate with your competitors and win. *Harvard Business Review*, *67*, 133–139.

Hannan, M. T., & Freeman, J. (1977). The population ecology of organizations. *American Journal of Sociology*, *82*(5), 929–964.

Haveman, H. A. (1993). Organizational size and change: Diversification in the savings and loan industry after deregulation. *Administrative Science Quarterly*, *38*, 20–50.

Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review*, *35*(4), 519–530.

Heide, J. B., & John, G. (1990). Alliances in industrial purchasing: The determinants of joint action in buyer-supplier relationships. *Journal of Marketing Research*, *27*(1), 24–36.

Hennart, J. F. (1988). A transaction costs theory of equity joint ventures. *Strategic Management Journal*, *9*, 361–374.

Ireland, R. D., Hitt, M. A., & Vaidyanath, D. (2002). Alliance management as a source of competitive advantage. *Journal of Management*, *28*, 413–446.

Kale, P., Dyer, J. H., & Singh, H. (2002). Alliance capability, stock market response, and long term alliance success: The role of the alliance function. *Strategic Management Journal*, *23*(8), 747–768.

Kale, P., & Singh, H. (2009). Building firm capabilities through learning: The role of the alliance learning process in alliance capability and firm-level alliance success. *Strategic Management Journal*, *28*, 981–1000.

Kauppila, O-P. (2015). Alliance management capability and firm performance: Using resource-based theory to look inside the process black box. *Long Range Planning, 48*(3), 151–167.

Khanna, T., Gulati, R., & Nohria, N. (1998). The dynamics of learning alliances: Competition, cooperation and relative scope. *Strategic Management Journal*, *19*, 193–210.

Knott, A. M., & Vieregger, C. (2014, January). RQ and endogenous firm growth. *Academy of Management Proceedings, 2014*(1), 16910.

Knott, A. M., & Vieregger, C. (2016). Reconciling the firm size and innovation puzzle. US Census Bureau Center for Economic Studies Paper No. CES-WP-16-20. Available at SSRN: https://ssrn.com/abstract=2756232 or doi:10.2139/ssrn.2756232

Kogut, B. (1988). Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal*, *9*(4), 319–332.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, *3*(3), 383–397.

Lahiri, N., & Narayanan, S. (2013). Vertical integration, innovation, and alliance portfolio size: Implications for firm performance. *Strategic Management Journal*, *34*(9), 1042–1064.

Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, *19*(5), 461–477.

Laroia, G., & Krishnan, S. (2005). Managing drug discovery alliances for success. *Research-Technology Management*, *48*, 42–50.

Lavie, D., Kang, J., & Rosenkopf, L. (2011). Balance within and across domains: The performance implications of exploration and exploitation in alliances. *Organization Science*, *22*(6), 1517–1538.

0004336310.INDD 457 Dictionary: NOAD 4/9/2019 8:59:24 AM

OUP • UNCORRECTED PROOF

Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and integration in complex organizations. *Administrative Science Quarterly*, *12*(1), 1–47.

Leiblein, M. J. (1996). *The impact of internal fabrication experience and external collaborative linkages on the adoption of process technology innovations in the North American semiconductor industry.* West Lafayette, IN: Purdue University.

Leiblein, M. J., & Macher, J. T. (2009). The problem solving perspective: A strategic approach to understanding environment and organization. In *Economic institutions of strategy* (pp. 97–120). Bingley, UK: Emerald Group Publishing.

Leiblein, M. J., & Madsen, T. L. (2009). Unbundling competitive heterogeneity: Incentive structures and capability influences on technological innovation. *Strategic Management Journal*, *30*, 711–735.

Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology*, *14*(1), 319–338.

Litov, L. P., Moreton, P., & Zenger, T. R. (2012). Corporate strategy, analyst coverage, and the uniqueness paradox. *Management Science*, *58*(10), 1797–1815.

Lorsch, J. W. (1977). Organization design: A situational perspective. *Organizational Dynamics*, *6*(2), 2–14.

Macher, J. T. (2006). Technological development and the boundaries of the firm: A knowledge-based examination in semiconductor manufacturing. *Management Science*, *52*(6), 826–843.

Macher, J. T., & Mayo, J. W. (2015). Influencing public policymaking: Firm-, industry-, and country-level determinants. *Strategic Management Journal*, *36*(13), 2021–2038.

Macher, J. T., & Mowery, D. C. (2004). Vertical specialization and industry structure in high technology industries. In J. A. C. Baum & A. M. McGahan (Eds.), *Business strategy over the industry lifecycle—Advances in strategic management* (Vol. 21, pp. 317–356). New York, NY: Elsevier Press.

Madsen, T. L., & Leiblein, M. J. (2015). What factors affect the persistence of an innovation advantage? *Journal of Management Studies*, *52*(8), 1097–1127.

Madsen, T. L., & Walker, G. (2007). Incumbent and entrant rivalry in a deregulated industry. *Organization Science*, *18*(4), 667–687.

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

Merton, R. K. (1957). *Social theory and social structure.* New York, NY: Free Press.

Milgrom, P., & Roberts, J. (1990). The economics of modern manufacturing: Technology, strategy, and organization. *American Economic Review*, *80*(3), 511–528.

Mindruta, D., Moeen, M., & Agarwal, R. (2016). A two-sided matching approach for partner selection and assessing complementarities in partners' attributes in inter-firm alliances. *Strategic Management Journal*, *37*, 206–231.

Moch, M. K., & Morse, E. V. (1977). Size, centralization and organizational adoption of innovations. *American Sociological Review*, *42*(5), 716–725.

Monteverde, K. (1995). Technical dialog as an incentive for vertical integration in the semiconductor industry. *Management Science*, *41*(10), 1624–1638.

Mowery, D., Oxley, J. E., & Silverman, B. (1998). Technological overlap and interfirm cooperation: Implications for the resource based view of the firm. *Research Policy*, *27*(5), 507–523.

Mowery, D. A., Oxley, J. E., & Silverman, B. (1996, Winter). Strategic alliances and interfirm knowledge transfer [Special issue]. *Strategic Management Journal*, *17*, 77–91.

Nickerson, J. A., & Zenger, T. R. (2004). A knowledge-based theory of the firm—The problem-solving perspective. *Organization Science*, *15*(6), 617–632.

0004336310.INDD 458 Dictionary: NOAD 4/9/2019 8:59:24 AM

OUP • UNCORRECTED PROOF

O'Reilly, C. A., & Tushman, M. L. (1997). Using culture for strategic advantage: Promoting innovation through social control. In Michael L. Tushman and Philip Anderson (Eds.), *Managing strategic innovation and change: A collection of readings* (pp. 200–216). Oxford: Oxford University Press.

Osborne, R. N., & Baughn, C. C. (1990). Forms of interorganizational governance for multinational alliances. *Academy of Management Journal*, *33*(3), 503–519.

Oxley, J. E. (1997). Appropriability hazards and governance in strategic alliances: A transaction cost approach. *Journal of Law, Economics and Organization*, *13*(2), 387–409.

Park, S. H., & Kim, D. (1997). Market valuation of joint ventures: Joint venture characteristics and wealth gains. *Journal of Business Venturing*, *12*(2), 83–109.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, *14*(3), 179–191.

Pisano, G. P. (1989). Using equity participation to support exchange: Evidence from the biotechnology industry. *Journal of Law, Economics and Organization*, *5*(1), 109–126.

Pisano, G. P. (1991). The governance of innovation: Vertical integration and collaborative arrangements in the biotechnology industry. *Research Policy*, *20*, 237–249.

Pisano, G. P. (1996). Learning-before-doing in the development of new process technology. *Research Policy, 25*(7), 1097–1119.

Powell, W. W. (1990). Neither market nor hierarchy: Network forms of organization. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 12, pp. 295–336). Greenwich, CT: JAI.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, *41*, 116–145.

Putterman, L. (1995). Markets, hierarchies, and information: On a paradox in the economics of organization. *Journal of Economic Behavior and Organization*, *26*(3), 373–390.

Reuer, J. J., & Devarakonda, S. V. (2012). Beyond contracts: Governing structures in non-equity alliances. *Academy of Management Proceedings*. Retrieved from http://proceedings.aom.org/content/2012/1/1.25.short

Rothaermel, F. T. (2001). Incumbent's advantage through exploiting complementary assets via interfirm cooperation. *Strategic Management Journal*, *22*, 687–699.

Rothaermel, F. T., & Deeds, D. (2006). Alliance type, alliance experience, and alliance management capability in high-technology ventures. *Journal of Business Venturing*, *20*, 1–32.

Rothaermel, F. T., & Deeds, D. L. (2004). Exploration and exploitation alliances in biotechnology: A system of new product development. *Strategic Management Journal*, *25*(3), 201–221.

Sampson, R. C. (2004). The cost of misaligned governance in R&D alliances. *Journal of Law, Economics and Organization*, *20*(2), 484–526.

Sampson, R. C. (2007). R&D alliances and firm performance: The impact of technological diversity and alliance organization on innovation. *Academy of Management Journal*, *50*(2), 364–386.

Santoro, M. D., & Chakrabarti, A. K. (2002). Firm size and technology centrality in industry–university interactions. *Research Policy*, *31*(7), 1163–1180.

Sarkar, M., Echambadi, R., & Harrison, J. S. (2001). Alliance entrepreneurship and firm market performance. *Strategic Management Journal*, *22*, 701–711.

Schreiner, M., Kale, P., & Corsten, D. (2009). What really is alliance management capability and how does it impact alliance outcomes and success? *Strategic Management Journal*, *30*(13), 1395–1419.

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Shaver, J. M., & Mezias, J. M. (2009). Diseconomies of managing in acquisitions: Evidence from civil lawsuits. *Organization Science*, *20*(1), 206–222.

Simon, H. A. (1974). How big is a chunk?: By combining data from several experiments, a basic human memory unit can be identified and measured. *Science*, *183*(4124), 482–488.

Simonin, B. L. (1997). The importance of collaborative know-how—An empirical test of the learning organization. *Academy of Management Journal*, *40*(5), 1150–1174.

Stuart, T. E. (2000). Interorganizational alliances and the performance of firms: A study of growth and innovation rates in a high-technology industry. *Strategic Management Journal*, *21*(8), 791–811.

Teece, D. J. (1996). Firm organization, industrial structure, and technological innovation. *Journal of Economic Behavior and Organization*, *31*(2), 193–224.

Vanhaverbeke, W., Belderbos, R., Duysters, G., & Beerkens, B. (2015). Technological performance and alliances over the industry life cycle: Evidence from the ASIC industry. *Journal of Product Innovation Management*, *32*(4), 556–573.

Voss, G. B., & Voss, Z. G. (2013). Strategic ambidexterity in small and medium-sized enterprises: Implementing exploration and exploitation in product and market domains. *Organization Science*, *24*(5), 1459–1477.

Wang, L., & Zajac, E. J. (2007). Alliance or acquisition? A dyadic perspective on interfirm resource combinations. *Strategic Management Journal*, *28*(13), 1291–1317.

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

Williamson, O. E. (1967). Hierarchical control and optimum firm size. *Journal of Political Economy*, *75*(2), 123–138.

Williamson, O. E. (1985). *The economic institutions of capitalism*. New York, NY: The Free Press.

Williamson, O. E. (1991, June). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, *36*, 269–296.

Woo, C. Y., & Cooper, A. C. (1981). Strategies of effective low share businesses. *Strategic Management Journal*, *2*(3), 301–318.

Yang, H., Zheng, Y., & Zhao, X. (2014). Exploration or exploitation? Small firms' alliance strategies with large firms. *Strategic Management Journal, 35*, 146–157. doi:10.1002/smj.2082

Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal*, *43*, 925–990.

Zajac, E. J., & Olsen, C. P. (1993). From transaction cost to transactional value analysis: Implications for the study of interorganizational strategies. *Journal of Management Studies*, *30*(1), 131–145.

Zenger, T. R. (1994). Explaining organizational diseconomies of scale in R&D: Agency problems and the allocation of engineering talent, ideas, and effort by firm size. *Management Science*, *40*(6), 708–729.

Zenger, T. R., & Lazzarini, S. G. (2004). Compensating for innovation: Do small firms offer high-powered incentives that lure talent and motivate effort? *Managerial and Decision Economics*, *25*(607), 329–345.

Zenger, T. R., & Marshall, C. R. (2000). Determinants of incentive intensity in group-based rewards. *Academy of Management Journal*, *43*(2), 149–163.

0004336310.INDD 460 Dictionary: NOAD 4/9/2019 8:59:24 AM