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Costs of Partner Search and Selection in Strategic Alliances

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Abstract

This study examines the costs associated with alliance partner search and selection as well as their antecedents. Based on transaction cost economics and the network perspective on inter-organizational relationships, the findings drawing on survey-based data from a sample of 83 firms in the German telecommunications industry reveal that partner search and selection costs are closely connected but differentially affected by task- and company-related factors. When firms must make alliance-specific investments, search and selection costs increase. A firm's number of current alliances decreases search and selection costs, whereas neither alliance scope nor firm performance significantly affect them. Additional analyses show that alliance-specific investments especially increase search costs but do not affect selection costs, whereas a firm's performance decreases search costs but does not reduce selection costs.

Keywords: *alliance formation, strategic alliances, search and selection costs, transaction cost economics, network perspective*

JEL Classification: *D23, L14, M13*

1 Introduction

How do task- and company-related factors affect the costs of partner search and selection that occur in the alliance formation stage? Alliances are “interorganizational entities through which two firms share resources and assets” (Hagedoorn et al. 2012, p. 283). They help partner firms to expand and collectively create and exploit business opportunities that they might otherwise have missed due to the limited availability of necessary resources (Alvarez and Barney 2001). Alliance formation involves decisions on partner search and selection that are costly in terms of money, time and human capital (Vlaar et al. 2006). These decisions are challenging for both established and entrepreneurial companies because they have implications for their status in their industries and the extent to which they can mitigate their risk of choosing inappropriate or opportunistic partner firms (Alvarez and Barney 2001; Castelluci and Ertug 2010; Gomes-Casseres 1997; Haeussler et al. 2012; Leiblein and Reuer 2004). Although the consideration of costs is crucial to strategic planning and the handling of exchange hazards (Blumberg 2001; Hoffmann and Schlosser 2001), researchers have seldom studied the types and drivers of the costs related to alliance formation.

Partner search and selection are components of a choice situation that starts with the initiating company’s definition of criteria for an appropriate alliance partner and continues with the identification and assessment of potential partner firms (Hoetker 2005; Nijssen et al. 1999). They cannot be performed for an indefinite period of time because they involve considerable effort. The alliance-initiating company must define a minimum threshold level for the potential partner’s satisfaction of pre-specified criteria for the opportunity to jointly perform a task (Nijssen et al. 2001). Firms that do not reach this threshold are inappropriate. Those exceeding this level are subject to closer examination. The process ends with the detection of a “satisficing” alternative in terms of a potential partner that is deemed to be sufficiently apt to jointly perform the task and therefore worthy of being invited to negotiate an alliance contract (Winter 2000).

Due to the apparent interdependence of search and selection, we suggest that the related costs must also be intertwined. Search involves expenses associated with the scanning of a firm’s environment and the financial investment in, for example,

employees or external consultants who support the search (Rangan 2000; Reuer et al. 2006). Selection requires a company's assessment of a potential partner's abilities, its expertise in performing the functions in question and its willingness and capacity to commit its efforts to pursue common goals and reap common benefits (Blumberg 1997; Khanna 1998; Meuleman et al. 2010; Shah and Swaminathan 2008).

With this study, we contribute to alliance management research in three ways: First, based on transaction cost economics (Williamson 1985) and the network perspective on inter-organizational relationships (Zaheer et al. 2010), we specify drivers of search and selection costs. Second, prior studies mainly include search costs as an independent variable or a dimension of overall costs (for example, Jones et al. 2002; Meuleman et al. 2010; Reuer et al. 2006; Whitten and Wakefield 2006). Drawing on primary data that we collected with a survey in the German telecommunications industry, we show that search and selection costs are connected but differentially affected by task- and company-related factors. Third, although much of the prior literature focuses on the importance of networks (for example, Hagedoorn et al. 2012; Robinson and Stuart 2007), we concentrate on firms that can mainly be characterized as new ventures that are engaged in an industry where prior ties are comparatively less relevant. Our data hence deviate from the wide-spread practice in empirical studies on inter-organizational relationships to predominantly investigate industries that are characterized by stable networks, although "[r]esearch in other contexts is clearly needed to gain a better understanding about the benefits (and limits) of network strategy" (Schulze 2007, p. 231). From a managerial perspective, our study is especially important for practicing managers in entrepreneurial firms whose experience with alliance formation is limited and who tend to underestimate search and selection efforts and costs (Reuer et al. 2006; Rothaermel and Deeds, 2006).

The article is organized as follows: First, we develop four hypotheses about factors that affect search and selection costs. Second, we describe our data and methods and report the results. Finally, we discuss our findings and suggest opportunities for further research.

2 Theory and Hypotheses

2.1 Prior Research on Alliance Formation

Alliances as a form of inter-firm cooperation have been a ubiquitous phenomenon in the field of management for about three decades (Kale and Singh 2009).

Collaborative strategies represent an opportunity for small firms in particular because they permit them to preserve their creativity and flexibility to detect and create business opportunities while mitigating the potential liabilities of being small, such as limited knowledge stocks and a lack of market power (Ketchen et al. 2007). Until now, researchers have concentrated on topics pertaining to all stages of the alliance management lifecycle. For instance, they have examined issues related to *alliance formation*, such as partner search and selection (Geringer 1991; Shah and Swaminathan 2008). They have focused on *alliance governance and design*, such as contract-making and control mechanisms (Hoetker and Mellewig 2009; Parkhe 1993). *Post-formation alliance management* has also attracted researchers' interest, such as inter-firm knowledge transfer and alliance evolution (Lane and Lubatkin 1998; Reuer et al. 2002). Finally, *alliance termination* has been studied, for example, with regard to alliance performance and renegotiations (Ariño et al. 2008; Gulati et al. 2009).

Previous studies on alliance formation have mainly focused on partner selection. For instance, in their literature review, Kale and Singh's (2009) description of alliance formation starts with partner selection, either implicitly assuming that selection includes partner search or indicating that most studies that concentrate on alliance formation tend to ignore firms' search efforts. Blumberg (1997, p. 217) clarifies the situation of alliance management research, asserting that, "although it is widely acknowledged that search costs are a part of transaction costs (Richter & Furubotn, 1996: 51; Milgrom & Roberts 1992: 291), searching for partners as a management instrument has been widely neglected both theoretically and empirically". Emphasizing search and selection is important because, in situations of conceived inter-organizational relationships, companies need to identify information about the cooperative abilities and trustworthiness of potential partners. The intentions of partner firms may go beyond joint value creation. They may be tempted to exploit an alliance for their own purposes and appropriate value from the relationship (Diestre and Rajagopalan 2012). The

collection and assessment of reliable information about partners is hence a salient problem in the alliance formation stage (Bangerter et al.2012).

Prior research provides insights into the potential drivers of the costs of alliance partner search and selection. Based on Al-Khalifa and Peterson (1999), Geringer (1991) and Cummings and Holmberg (2012), we identify task- and company-related factors that affect alliance formation. A shortcoming of these studies is that they do not explicitly focus on the costs of alliance formation, although this stage in the alliance management lifecycle involves costly and time-consuming actions and processes (Vlaar et al. 2006).¹

Task-related factors refer to the expected problem potential that is affected by the scope of the alliance and the dependence on a partner firm (Blumberg 1997; Rothaermel and Deeds 2006). They imply a partner's potentially opportunistic behavior while jointly performing a specific task with a certain scope.

Firms put themselves at the risk of value appropriation by their partner if they make specific investments in a transaction that have little alternative value outside the relationship (Williamson 1991). Li et al. (2008) assert that partner selection is an alternative governance mechanism to safeguard intellectual assets in R&D alliances. Shah and Sawaminathan (2008) demonstrate that partner selection is contingent on the alliance project type, whereas Li and Rowley (2002) stress the role of inertia. The threat of potentially opportunistic partner behavior requires control from the beginning of a relationship (Leiblein and Reuer 2004). It motivates a firm to increase the thoroughness of partner search and selection processes. This thoroughness enhances the costs of alliance formation.

Whereas transaction cost economics explains the risks inherent to strategic alliances, the network perspective on inter-organizational relationships emphasizes their chances of reducing uncertainty by relying on the capabilities of alliance partners and the quality of their relationships (Ketchen et al. 2007). These *company-related factors* are cooperation-oriented criteria at the level of a firm that

¹ Geringer (1991) and Al-Khalifa and Peterson (1999) identify task- and partner-related factors in analyzing the partner selection process in international joint ventures. More recently, Cummings and Holmberg (2012) specify task-related, learning-related, partnering-related and risk-related critical success factors that are supposed to be crucial for decision-making in a dynamic alliance partner selection framework. A review and synthesis of the factors outlined in these studies led us to differentiate between *task-related factors* comprising aspects that refer to the task at hand and the expected learning outcomes, on the one hand, and *company-related factors* including aspects that concern the attributes of potential partner firms and the relationship between them, on the other hand.

seeks to ally. They affect the extent to which it can use its existing inter-organizational linkages and attractiveness in the marketplace to facilitate the identification and attraction of potential partners (Ahuja et al. 2009; Chung et al. 2000; Stuart 1998), hence decreasing the costs of alliance formation. Prior research shows that networks provide valuable information on potential partners, increase partner selection efficiency (Gulati 1995b; Meuleman et al. 2010; Nijssen et al. 2001; Rangan 2000) and inform control design (Dekker and Van den Abbeele 2010). Podolny (1994) reveals that market uncertainty leads to the selection of partners with whom companies have transacted in the past, whereas Hoetker (2005) claims that when uncertainty increases, prior relationships are relatively more important for partner selection than superior technical capabilities. In R&D alliances, the establishment of ties with a local alliance partner tends to reduce technological uncertainty unless a distant partner is better able to provide a precise specification of the relevant technology than the local partner (Hagedoorn et al. 2012). Other studies reveal that the institutional setting affects alliance formation. Companies from emerging markets stress the importance of financial, technical and intangible assets and the willingness to share knowledge to a higher extent than firms from developed markets (Hitt et al. 2000). Thereby, there are differences in the planning horizons of companies that seek to ally in emerging markets. If the institutional context is supportive, firms adopt a longer-term view of alliance partner selection and emphasize potential partner firms' capabilities, whereas an unstable institutional setting fosters short-termism and the selection of partners that provide access to financial assets and complementary resources (Hitt et al. 2004).

Overall, although it is widely understood that the actions alluding to alliance formation are not costless, neither these costs nor their drivers have been tested empirically (for example, Ahuja 2000; Chung et al. 2000; Li et al. 2008).

2.2 Task-Related Factors Affecting Partner Search and Selection

Costs

According to transaction cost economics, search and selection costs are a part of transaction costs (Williamson 1985). Alliance formation involves and requires an alignment of the expectations, intentions and incentives of partners under conditions of uncertainty regarding future states of nature and future partner

behavior (Picot 1991).² Alliance formation is an investment under uncertainty because it draws on imperfect information on the characteristics of potential partner firms (Bangerter et al. 2012). “It is not until an exchange takes place that a firm can clearly observe the true quality of the chosen partner” (Castellucci and Ertug 2010, p. 150). Activities related to partner search and selection aim to minimize the transaction costs that are caused by this uncertainty. The relational risk of alliance partners is heightened in the presence of alliance-specific investments and a broad alliance scope because both factors increase the threat of partner opportunism (Blumberg 1997, 2001).

Alliance-specific assets can be physical and/or human (Poppo and Zenger 2002). They affect the choice of a partner firm because the initiating company must evaluate whether a potential partner is reliable and able to perform the respective tasks in the joint project (Blumberg 1997; Dekker and Van den Abbeele 2010). For instance, when a firm plans to invest in facilities or equipment that are tailored to a task that is to be performed jointly with a partner firm, it must take into account that this partner could threaten to terminate the relationship from the outset of the alliance. In this case, the initiating company would experience a value loss (Reuer et al. 2006). In addition, face-to-face meetings among employees to exchange knowledge on the practices and processes of a partner firm represent a specific investment in an alliance because this knowledge may be embedded in organizational structures and internal social networks and thus custom-tailored to that company to a high extent (Blumberg 1997; Poppo and Zenger 2002). This human capital is not only company-specific but also task-specific because it is embedded in the occupations of the individuals who are involved in the alliance (Gathmann and Schönberg 2010; Gibbons and Waldman 2004). The joint performance of a task in an alliance improves its visibility and eventually presents alternative usages (Neffke and Henning 2013), thus increasing the risk of expropriation by a partner firm. Thereby, the goal of the alliance has implications for the extent to which cooperating firms disclose their knowledge

² We follow Hoetker and Mellewigt (2009, p. 1027, footnote 2) and focus on an existing alliance as a selected governance form in which the involved parties interact and implement governance mechanisms to reduce exchange hazards and achieve a desirable outcome. We view search and selection costs as transaction costs that occur at the beginning of the alliance management process due to firm needs for safeguarding, coordination and contingency planning. The collection and evaluation of information on potential partners reduces the risk of cooperation and coordination problems from the outset of the relationship (Blumberg 2001).

and the risk of value appropriation by a partner. In R&D alliances, for instance, firms need to be protective because the expected amount of technological assets and capabilities that they aim to invest in later on tend to be highly specific (Hagedoorn et al. 2012; Oxley and Sampson 2004).

If a firm plans to make specific, non-recoverable investments in an inter-firm relationship, it puts itself at risk of value appropriation by an alliance partner (Williamson 1991). The risk of value appropriation can never be fully eliminated because the skills accumulated in an alliance can be transferred into other contexts that require similar skills through imitation and learning-by-doing in the performance of a joint task (Gathmann and Schönberg 2010; Neffke and Henning 2013). An investment will be beneficial outside the alliance if a partner firm is willing to bear additional costs of, for example, adjusting to another context. Moreover, depending on the goals pursued with an alliance, managers may expect that the required investments will further increase over the alliance management lifecycle. Hence, specific investments lead to dependence, which increases the potential damage that a partner's opportunistic behavior could lead to.

Transaction cost economics suggests that high asset specificity promotes the internalization of transactions. Under certain circumstances, this internalization is difficult. For instance, if a company is young and small, it may lack the required resources to create or exploit a business opportunity internally, such as the completion of a full new product development cycle. The resources and capabilities that are needed to complete this task are costly and take time to develop. Such an entrepreneurial company needs a more experienced cooperation partner, such as an industry incumbent, that possesses the required resources and for which sharing them with another company represents a sound option. The young and small firm must consider that such a higher-status partner may try to expropriate its knowledge (Haeussler et al. 2012).

Established firms may also have good reasons for choosing alliances over other strategic options that relate to the attributes of a planned transaction and the assessment of the associated relational and performance risks (Cummings and Holmberg 2012; Picot 1991). If an established firm that has a high status due to its reputation and position in its industry's hierarchy decides to cooperate with a smaller and lower-status company, it bears the risk of a decline of its own status due to this relationship, which acts as a signal in the marketplace (Castellucci and

Ertug 2010). Therefore, in order to avoid losses due to alliance-specific investments, an initiating company may find it beneficial to safeguard against a partner's potentially opportunistic behavior from the outset of the alliance by increasing search and selection comprehensiveness.

The more thorough search and selection, the more valuable information on a potential partner firm's characteristics, skills and resources are available to help assess the potential for problems in an alliance in advance (Blumberg 2001). Consequently, in accordance with transaction cost economics, we argue that managers are farsighted enough to take the need for alliance-specific investments into account when searching for and selecting potential partners (Williamson 1991). They have expectations regarding the necessary amount of alliance-specific investments from the outset of the relationship. Simultaneously, the more comprehensive search and selection are, the higher the associated costs.

Hypothesis 1: Expected alliance-specific investments are positively related to partner search and selection costs.

The range of operations that an alliance covers is limited with regard to the independent activities of the partner firms (Khanna, 1998). Following Oxley and Sampson (2004, p. 726), alliance scope, as the functional or vertical scope of an inter-firm relationship, is the extent to which partners jointly operate multiple value chain activities such as R&D, manufacturing, marketing and/or sales. The number of functions that the partner firms jointly operate determines the value and complexity of their relationship and the potential for opportunistic behavior. More precisely, alliance scope is characterized by a tension between value creation and value appropriation. Alliances covering a broad range of functions and operations may be more strategically important than "low scope"-alliances (Reuer et al. 2006) but may also bear a higher risk due to moral hazard and adverse selection (Leiblein and Reuer 2004). "Broad scope"-alliances may bear a higher potential of expected performance gains and hence be particularly attractive for firms seeking growth and expansion into new markets. Nonetheless, they are also likely to increase the potential for a partner's opportunistic behavior and the costs of the control mechanisms that need to be established in subsequent stages of the alliance management lifecycle (Dekker and Van den Abbeele 2010; Oxley and Sampson 2004). For instance, a broad scope increases the frequency and intensity of contacts between partners and enhances the potential for

unintended knowledge transfer from one partner firm to the other because “the extent of knowledge sharing and coordination inevitably increases (Reuer et al. 2002), resulting in a concomitant reduction in control over information flows across the relevant organizational boundaries (Khanna 1998; Oxley & Sampson 2004; Teece 1992)” (Li et al. 2008, p. 322). Therefore, firms will prefer allying with partners that they deem to be trustworthy over selecting partners that they hardly know if they engage in “broad scope”-alliances. Although “broad scope”-alliances may have a higher potential for expected performance gains, relatively inexperienced companies may be likely to prefer “low scope”-alliances, whose establishment is less costly and hence less risky.

Diestre and Rajagopalan (2012) argue and provide evidence that when firms have the ability to create value while simultaneously having good opportunities to reap private benefits, they use the resulting power to appropriate rather than create value. A broad alliance scope bears more chances and opportunities for partner firms to create value, that is, to generate common benefits for the involved companies, than one with a low scope. Simultaneously, the higher the number of functions that the partners jointly operate, the more opportunities the firms have to reap private benefits, that is, to appropriate value.

We argue that managers look ahead and are able and willing to realistically estimate the scope of the planned project from the outset of the partnership. Likewise, in their decisions, they consider that the higher the number of joint activities in an alliance, the higher the potential for problems is (Blumberg 1997) in terms of the private benefits that a firm can earn by adopting skills from the partner firm and using them for its own purposes, which go beyond the joint operations that the partners have agreed upon (Khanna et al. 1998; Leiblein and Reuer 2004). The investments in search and selection will be higher in “broad scope”-alliances than ones with “low scope” because scope determines the complexity and amount of information that is needed for a thorough assessment of potential partners.³

³ A knowledge-based argument can lead to the same hypothesis as the TCE-based logic that we apply. If a company aims to establish an alliance to seize opportunities to learn and combine capabilities, it may even intensify its search and selection processes in the alliance formation stage to find an appropriate partner. The broader the intended alliance scope is, the higher the complexity of the tasks that are to be specified and performed as well as the number and intensity of interactions that are required between partner firms to transfer and combine knowledge in order to generate innovative outcomes (Novak and Eppinger 2001). Firms tend to prefer tighter control modes, for instance, in terms of more thorough search and selection

Hypothesis 2: The planned alliance scope is positively related to partner search and selection costs.

2.3 Company-Related Factors Affecting Partner Search and Selection Costs

The network perspective on inter-organizational relationships concentrates on the impact of inter-firm linkage patterns on the behavior and outcomes of firms. Zaheer et al. (2010, p. 63) assert that “while there is no single theory of inter-organizational networks, the research is embedded in multiple yet distinct theoretical approaches (at times intertwined) to explain the phenomenon”. Drawing on their organizing framework for inter-organizational network research with regard to levels of analysis, our study adopts a dyadic level perspective because we want to understand how the nature of a relationship between two companies affects alliance formation costs. By specifying theoretical mechanisms, we consider existing relationships between companies to be opportunities to access resources and a firm’s performance and resulting status to be a signaling mechanism in its industry (Bangerter et al. 2012; Castellucci and Ertug 2010). Although the network perspective does not explicitly focus on costs, it helps to explain ex ante alliance management because networks and knowledge on the capabilities and characteristics of potential partner firms are likely to facilitate search and selection (Blumberg 1997, 2001; Gulati 1995b; Ketchen et al. 2007). The extent of a firm’s current alliances represents a network that provides access to information. Gulati (1998) asserts that firms strongly rely on existing alliance partners when they aim to form new alliances. The degree of connectedness associated with the structural cohesion among actors that are embedded in the same network is important for understanding the flow of information. The network consists of ties that range from weak to strong. The strength of a network tie affects the quality of information transfer (Granovetter 1973). Strong ties, that

processes in the alliance formation stage because they facilitate the anticipated integration and coordination of joint activities and prevent conflicts from the outset of the alliance (Erramilli and Rao 1993). An alliance-initiating company’s higher need for control need not be an outcome of its fear of partner opportunism but can also reveal its desire to stimulate a joint identity with a potential alliance partner that facilitates the intended knowledge transfer between partner firms (Kogut and Zander 1996). Although the underlying reasons differ, both transaction cost economics and the knowledge-based perspective imply that a broader alliance scope leads to more costly search and selection efforts in the alliance formation stage. We thank an anonymous reviewer for bringing this point to our attention.

is, relationships between actors that have a central position in a network, facilitate the subsequent formation of new alliances. They nurture mutual trust and mitigate the uncertainty inherent to alliance formation processes. Weak ties are beneficial in supporting a firm to reach out to potential partner firms that are less centrally embedded in a network. According to Burt's (1992) structural holes theory, companies' opportunities to form alliances are contingent on their network positions. Potential alliance partners can be members of the same network but they may be disconnected. An alliance between these firms may be established, or brokered, by a third party (Stephens et al. 2009). Be they strong or weak, direct or brokered, the higher the number of a company's current alliances, the more opportunities it has to collect relevant information on further potential alliance partners. Alliances represent channels for the transmission of signals in relation to activities that were not originally dedicated to alliance partner search and selection but can be used for these purposes (Bangerter et al. 2012).

Opportunities for allying are frequently identified via existing social ties rather than through systematic searches (Ellis 2000). A company seeking to ally can rely on its existing alliances, especially if partner search and selection prove to be problematic due to spatial dispersion or the expectation of low margins or low production volumes in the planned cooperative project (Rangan 2000). Because the identification and evaluation of potential partners involves significant costs, companies are urged to use sources of information that keep these costs down (Wong and Ellis 2002). Most firms simultaneously manage multiple alliances with different partners (Hoffmann 2007) and therefore have access to a network that helps them to conveniently collect information, such as by calling a business partner, that is of a higher quality and comes at a lower cost (Blumberg 1997; Gulati 1995a; Zaheer et al. 2010). The existing network has a reciprocal effect. On the one hand, existing ties serve as signaling mechanisms of the searching firm as a more or less attractive resource holder; on the other hand, potential alliance partners can benefit from the attractiveness of a searching company and, based on the latter firm's interest, enhance their reputation in the marketplace (Chang 2004; Hoang and Antoncic 2003; Zaheer et al. 2010), thus facilitating search and selection.

Rangan argues that "while social networks are ubiquitous, their significance in explaining patterns of economic actions and outcomes will be greatest in those

spheres of economic activity where *search* and *deliberation* pertaining to potential exchange partners are important but problematic” (2000, p. 814, italics in the original), such as for companies lacking important resources to be invested in these processes and experience with alliances (Haeussler et al. 2012). The potential for problems of the search process depends on the extent to which potential partner firms are able to exchange supply-demand signals at acceptable costs either independently or via market mechanisms (Rangan 2000). The alliance network as a non-market mechanism serves as a collection of information and a pool of potential alliance partners. It complements market prizes for information (Blumberg 1997) and hence has the potential to reduce search and selection costs:

Hypothesis 3: The number of a firm’s current alliances is negatively related to partner search and selection costs.

Whereas Hypothesis 3 asserts that it is important to examine *how many* alliances companies have previously formed, the consideration of firm performance suggests that *with whom* they cooperate also matters. Although alliances are jointly negotiated and created by two or more partners, the decision to form an alliance is mainly initiated and made by one firm (Shah and Swaminathan 2008). This firm uses its network as a signaling mechanism to obtain reliable information about potential partners from their observable characteristics (Bangerter et al. 2012; Zaheer et al. 2010). It makes decisions on alliance formation based on its assessments of these characteristics.

The quality of a company that seeks to ally can be inferred from its status, which is an indicator of its position in an industry’s hierarchy (Shipilov et al. 2011). A company that seeks to ally will be more likely to attract a potential partner’s interest if it is endowed with resources and power in its respective market (Ahuja 2000; Hoffmann and Schlosser 2001). A company that is characterized by high performance, which indicates its size, power and legitimacy in the marketplace, is viewed as an attractive partner (Hoang and Antoncic 2003). If a high-performing company seeks to ally, other firms will be likely to perceive it as an attractive partner. A partnership with a high-performing company has a signaling function, “meaning that quality of an actor can be inferred from its relationships, particularly when there is no effective way to measure the quality of that actor” (Zaheer et al. 2010, p. 65). Such a company can be perceived easily by other companies (Castellucci and Ertug 2010). “Lower-quality” companies in terms of

reputation and power in the marketplace, for example, may feel motivated to present themselves as potential partners and disclose information on their capabilities to an attractive alliance-initiating company because they expect to benefit from this firm's attractiveness and enhance their reputation as a competent and reliable actor in the marketplace. Such an alliance has a chance to improve that company's position in its industry's hierarchy. It may motivate the "lower-quality" firm to disclose relevant information and present itself as a potential alliance partner to the searching company. By inducing self-selection on the part of potential alliance partners, a searching company can get access to the required information about potential partner firms more easily and at a lower cost (Bangerter et al. 2012). For a higher-status alliance-initiating company, this disclosure of information represents cost savings. In the case of potential alliance partners that have a similar status, cost savings are also likely because these alliance formation processes are characterized by higher levels of trust and ease of cooperation (Shipilov et al. 2011). Overall, the motivation and higher willingness to disclose information that is relevant to the initiating company for the formation of a partnership are likely to decrease search and selection costs.

Hypothesis 4: Firm performance is negatively related to partner search and selection costs.

3 Methodology

3.1 Sample and Data Collection

The data are based on a sample of firms engaged in alliances in the German telecommunications sector. This industry is of interest to the study of alliances because it is a relatively young sector in Germany. Most companies in our sample were not founded before 1994, after the decision of the European Union to liberalize the telecommunications market in Europe. Alliances between providers of telecommunications services were not allowed before January 1, 1998. At the time of our survey, which was conducted in autumn 2001, alliances were a still new phenomenon in the German telecommunications industry.⁴

⁴ The dataset has been used for the following previous publications: Mellewigt T, Das TK (2010) Alliance structure choice in the telecommunications industry: between resource type and resource heterogeneity. *Int J Strateg Change Manag* 2(2/3): 128-144; Hoetker G, Mellewigt T (2009) Choice and performance of governance mechanisms: Matching alliance governance to

According to Section 4 of the German telecommunications law, companies that aim to offer telecommunications services in Germany are obliged to notify the regulatory authorities. This requirement provides the opportunity to identify potential sample firms from a publicly available registry that is updated twice a year. According to Section 6 of the German telecommunications law, the sample firms owned a network license permitting them to build network infrastructure (class 3 license) or a service license allowing them to offer voice telephony to the public (class 4 license). A total of 257 companies that owned class 3, class 4 or both licenses were identified.

Similarly to prior studies on inter-organizational relationships (for example, Wong et al. 2005), we used the key informant approach. The study was supported by two letters of recommendation from the leading federations in the German telecommunication industry (the Association of Telecommunications and Value-Added Service Providers [VATM] and the German broadband federation – Bundesverband Breitbandkommunikation e. V. [BREKO]). Due to this support and the follow-up procedure of sending a reminder letter and making supplemental phone calls, we obtained 83 usable answers, yielding a response rate of 32 percent, which is satisfactory for a mail survey directed toward top executives (Baruch 1999). Our respondents were competent key informants because 65 percent were members of the board and involved in alliance formation. They were qualified and in the right position to report on alliance management because they were aware of all the stages of the alliance management lifecycle. Because most of the identified companies were small and young, the data obtained from single key informants adequately represented their respective organizations' perspectives. The selection of multiple respondents to provide data on predictors on the one hand and outcome variables on the other hand is rarely possible in small organizations (Rindfleisch et al. 2008).

We designed a paper-based questionnaire including questions referring to the organizations' most important alliance and sent it to the identified firms. Many researchers ask their respondents to focus on a selected alliance, such as the most important or most recent one (for example, Kale et al. 2000; Kotabe et al. 2003;

asset type. *Strateg Manag J* 30: 1025-1044; and Reuer JJ, Ariño A, Mellewigt T (2006) Entrepreneurial alliances as contractual forms. *J Bus Venturing* 21(3): 306-325. The dependent variable *search and selection costs* has not been used in previous studies. In addition, in this study we have no omitted variables bias ($F(3, 72) = 2.5$; $\text{Prob} > F = 0.1$).

Reuer and Ariño 2007). This approach allowed our respondents to refer to a specific alliance and provide more precise information on its costs during the formation stage instead of generally thinking about partnerships with other companies (Wong et al. 2005). In order to ensure face validity, we asked four management researchers and nine managers from the telecommunications industry to review prior versions of the questionnaire. We operationalized our variables as carefully as possible and relied on established measures from prior literature whenever possible. Variables that had been adopted from Anglophone studies were translated into German and reviewed by two German-speaking researchers. Expert interviews with alliance managers revealed that our items were relevant and understandable. We conducted a pretest with potential respondents and scientists in the alliance management field. A table with the variables and measures is included in the appendix.

Most companies in our sample were relatively small and young. Approximately 30 percent of the firms had less than ten employees and generated a turnover of less than one million Euros. On average, the firms had 47 employees and generated a turnover of 15.5 million Euros. They could mainly be viewed as new ventures because they were likely to be less than eight years old (McGee 1994). A significant number of our sample firms were still in the start-up stage because 31 companies were not older than three years (Ferrary 2010). The number of current alliances ranged from one to fifty alliances per firm. More than 77 percent of the sample firms had five or less alliances that could provide information on other potential alliance partners.

As outlined above and illustrated by the table of variables and measures in the appendix, we rely on perceptual data collected from knowledgeable individuals in our sample firms, which may be a limitation. However, we cope with the problem that no objective data were available on our sample firms' alliance management activities and partner search and selection costs, and are confident in findings from extant research that show that perceptual data can lead to reliable results (for example, Poppo and Zenger 2002; Zollo et al. 2002).

Because we rely on a single source self-reported data, we need to consider the possibility of common method bias. Such a procedure may lead to artifactual covariance that is independent of the content of our constructs. Considering all variables included in our questionnaire, Harman's (1967) single-factor test

(Podsakoff et al. 2003) showed that there was no evidence of common method bias. Four factors emerged from an unrotated factor analysis (eigenvalue-greater-than-one criterion). The first factor accounted for 21 percent of variance in the data. Based on this test, there is no evidence of common method bias.

Nonetheless, the risk that relevant information may be omitted from the model may exist. It is likely that our respondents overestimated uncertainty associated with alliances as well as partner search and selection costs. From a transaction cost economics perspective, it can be argued that uncertainty is likely to drive transaction costs. Likewise, the network perspective implies that under conditions of uncertainty, the role of existing relationships influences these costs.

Unfortunately, we have not asked our respondents to indicate their perceptions of different types of uncertainty. However, at least data on our respondents' perceptions of the strategic importance of the alliance and the market-induced risk are available. If we assert that these aspects are related to the uncertainty associated with alliances as well as the assessments of these costs, they can be used as proxies for uncertainty and we may control for the impact of eventually omitted variables on our dependent variable. When we compare the results of this test with our regression models, the selected proxy variables do not have a significant impact on our dependent variable. Moreover, they do not add to the explanatory power of our models as indicated by a comparison of the R-square values.⁵

3.2 Dependent Variable

Blumberg (1997, p. 243) concentrates on time as an indicator of costs whereas Shah and Swaminathan (2008, p. 473) refer to management time, personnel,

⁵ The results of this additional model, which are compared to the results referring to our hypotheses reported in Table 3, Model 4, are available from the authors upon request. We are grateful for an anonymous reviewer's thorough comment referring to common method bias. We are aware of the fact that the reported "plug-in solution to the omitted variables problem" bears considerable pitfalls (see, for instance, Chenhall and Moers 2007 for more details). Instrumental variables estimation may represent another technical solution. For our four independent variables, we would need at least four theoretically sound instrumental variables that must be appropriately strong (Bascle 2008). Unfortunately, we do not have this opportunity due to the limitations of our dataset and cannot collect additional data *ex post*. Moreover, we must provide a solution that is both *technically* and *theoretically* sound. The question of whether the chosen instrumental variables are appropriate is always an issue of debate and may raise severe theoretical concerns. Furthermore, our sample is limited in its size. Instruments from 2SLS are biased in small samples. The consistency of using the instrumental variables approach is hence at risk. We thus prefer a technically inferior solution that at least allows us to provide a theoretical rationale that is rooted in the perspectives that we use to explain our hypotheses.

mental involvement and emotional stress. The required amount of money has not been measured. In this study, we focus on money, time and employees that are necessary to identify and evaluate potential alliance partners. As outlined above, no secondary data were available on costs throughout the alliance management lifecycle. Thus, we relied on our respondents' subjective assessments to collect relevant data. In contrast to Shah and Swaminathan (2008), we do not include psychological aspects because we do not study decision-making processes and underlying heuristics in terms of why an alliance-initiating company will choose a particular partner from several options. One item (*search costs*) asked for the amount of resources dedicated to partner search (Patterson and Smith 2003; Reuer et al. 2006). Another item (*selection costs*) was used to assess the amount of money, time and human capital committed to partner selection.

Prior studies have measured these types of costs as dimensions of the costs related to switching from one partner firm to another, for example (Jones et al. 2002; Whitten and Wakefield 2006). Being aware of the multidimensionality of alliance management costs, we also asked our respondents to assess the resources invested in subsequent stages of the alliance management lifecycle. Responses were all recorded on five-point Likert scales ranging from 1 = "very low" to 5 = "very high". We conducted an exploratory factor analysis of all types of costs in order to identify whether and how they were interdependent (Blumberg et al. 2008).

Insert Table 1 about here

The results are reported in Table 1. The items load on three factors that can best be described as *costs of search and selection*, *costs of negotiation and contract-making* and *costs of post-formation alliance management*. As expected and supporting our argument regarding the interconnectedness of search and selection in the alliance formation stage, the costs of search and selection are intertwined because the associated items load on a single factor. We built a reflective measure (*search and selection costs*) and used it as main dependent variable in our analyses (Cronbach alpha = 0.87).

3.3 Independent Variables

The task-related factors affecting partner search costs that we use to test Hypotheses 1-2 are alliance-specific investments and alliance scope. The measure of *alliance-specific investments* was constructed as an unweighted index based on three items (Poppo and Zenger 2002). The Cronbach alpha is 0.60, indicating acceptable reliability for a newly developed scale (Hair et al. 1998). In order to measure the intended *alliance scope*, we suggested a variety of functions that an alliance can address, ranging from procurement and the operation of basic infrastructure to billing systems and customer relationship management. The selected functions were summed, leading to values for that variable that could range from 1 to 7 and indicating how many functions fell under the operational responsibility of an alliance (Reuer et al. 2006). The variety of functions that we have suggested is the result of a thorough review of the literature on the telecommunications industry in Germany (Friese 1998; Gerpott 1998; Gries 1998; Lubritz 1998; Pausenberger and Nöcker 2000). In addition, expert interviews in the field helped us to verify whether the selected functions realistically captured the scope of an alliance in the German telecommunications industry.

The company-related factors affecting search and selection costs that we use to test Hypotheses 3-4 are the number of a firm's current alliances and its performance. The *number of current alliances* is an indicator of the extent of social capital (Ahuja 2000; Hoang and Rothaermel 2005). It reflects the size of a firm's network and partnering experience (Nijssen et al. 2001; Zollo et al. 2002). The measure of *firm performance* was captured with three items (Cronbach alpha = 0.66). Respondents were asked to indicate on a five-point Likert scale how they assessed their achievement of objectives concerning net utilization, profits and growth as compared to their competitors.

We are aware that a low reliability of measures may artificially inflate the scores for some cases in our sample and artificially deflate them for others. As a rule of thumb, 0.70 is generally considered to be the minimum value that is deemed acceptable. A value of 0.60 is also acceptable for new scales (Lienert 1969; Nunally 1978) but is rather unsatisfactory. Alpha increases as the number of items that are included in a single scale increases. The minimum number of items that are needed to calculate Cronbach alpha is three, which is the number of items that

our *alliance-specific investments* and *firm performance* variables are composed of. Our relatively low alphas are also caused by this circumstance.

3.4 Control Variables

We included several control variables that might affect the costs of alliance partner search and selection in our analyses. First, we incorporated *firm age* in terms of the logarithm of the number of years since foundation and, second, we considered *firm size* in terms of the logarithm of the number of employees in our models. Third, we asked our respondents to indicate whether they were looking for a partner firm that was engaged in the same or a different stage in the *value chain*, more or less reflecting competition among partners (Haeussler et al. 2012). Rivalry among potential alliance partners may increase search and selection costs due to a higher need to safeguard against potentially opportunistic behavior.

3.5 Data Analysis

We used OLS regressions with robust standard errors in order to test our hypotheses (Blumberg et al. 2008; Hair et al. 1998). First, we estimated a baseline model that included the control variables described above. Second, we calculated two separate models for task- and company-related factors. Third, we provided a full model that combined both types of predictors of alliance partner search and selection costs.

For comparison purposes and going beyond our hypotheses, we estimated additional models that isolated *search costs* and *selection costs* as dependent variables. We tested whether the pre-specified factors exerted differential influences on these components of the overall costs of alliance formation. For this test, we used Zellner's seemingly unrelated equations (SUR). This method is still used relatively rarely in management studies. It enables the simultaneous regression of a system of multiple regression equations. SUR models are used when error terms may be correlated given that the equations are estimated using the same observations (Zellner 1962). SUR is hence an extension of linear regression analysis that allows for the correlation of errors between equations. The correlation of errors between equations with different dependent variables is likely if both equations draw on the same dataset, as is the case in our study. We must consider that the residuals of two separate OLS models with *search costs* and

selection costs as dependent variables are correlated because the data stem from the same set of observations (Keshk 2003; Weigelt 2009).⁶

4 Results

Table 2 reports means, standard deviations, ranges and correlations. There is no evidence of multicollinearity because the maximum VIF is 1.257 and the minimum tolerance value is 0.796 for *alliance scope* (Hair et al. 1998).

Insert Table 2 about here

Table 3 presents the results of the regression analyses and the simultaneous equations. Among the task-related factors, only *alliance-specific investments* have a positive and significant influence on search and selection costs, supporting Hypothesis 1. *Alliance scope* does not affect search and selection costs and Hypothesis 2 is therefore not supported. Among the company-related factors, the effect of the *number of current alliances* is negative and significant as expected, supporting Hypothesis 3. Lending no support to Hypothesis 4, a company's *performance* does not significantly decrease the costs of partner search and selection.

Insert Table 3 about here

Going beyond our hypotheses, the simultaneous equations reveal that *alliance-specific investments* and *firm performance* significantly drive search costs, but they do not affect selection costs. Selection costs are only significantly reduced by a firm's *number of current alliances*. A company's high *performance* seems to motivate other firms to present themselves as potential partners without disclosing a large amount of information at the outset of the alliance management lifecycle. A firm's *number of current alliances* can function as a network that includes

⁶ We used STATA 9, especially the `sureg` command and the `small`, `corr` and `dfk` options for small sample sizes to estimate the simultaneous equations that serve an exploratory purpose and are additionally shown in Table 3. SUR models are not identical to subgroup analyses that require post hoc-tests, which examine whether the differences between coefficients across models are significant. The interpretation of the results based on the SUR models is based on the coefficients and the respective p-values (for studies using SUR models, see, for example, Kennedy and Fiss 2009; Kim et al. 2011; Weigelt 2009).

actors who can connect two companies that would otherwise not be able to establish a relationship. Existing alliance partners can work as “convenors” (Brass et al. 2004, p. 804) that provide a company with information on a potential partner firm. They thus support its selection process and decrease the associated costs.

5 Discussion and Conclusions

5.1 Drivers of Alliance Formation Costs

The findings of our study provide insights into the impact of task- and company-related drivers of different but interrelated costs in the alliance formation stage. By emphasizing alliance management costs in terms of money, time and personnel, this study offers a novel perspective on the antecedents of alliance success. We directly measure search and selection costs and use them as dependent variables, whereas prior studies include search costs, for instance, as an independent variable (Blumberg 1997; Reuer et al. 2006) or dimension of an overall cost construct (Whitten and Wakefield 2006). Although the separation of search and selection is conceptually appealing (Blumberg 1997), our data suggest that the associated costs are intertwined. This study thus extends the findings of Nijssen et al. (1999), which reveal that selection is at least partly dependent on an initiating company’s search efforts.

Alliance-specific investments and the *number of current alliances* are strong drivers of search and selection costs. *Alliance-specific investments* especially increase search costs but do not affect selection costs, as revealed by the additional simultaneous equations model. Only *firm performance* is likely to decrease search costs in isolation. During the alliance formation stage, companies seeking to ally seem to benefit from their size and power, which is likely to confer legitimacy to their partners. This finding might indicate that a company that is relatively visible due to its high performance has access to a larger pool of potential alliance partners than less visible firms. Search costs may hence decrease. However, the ease of information collection does not necessarily facilitate selection. The more options a company that aims to establish a new alliance has, the higher the potential investments in money, time and dedicated personnel to assess the adequacy of potential alliance partners.

A firm's *number of current alliances* significantly decreases its overall search and selection costs. Using existing alliances as an established pool of opportunities for further partnerships, firms seeking to form a new alliance can limit their search and selection efforts. The simultaneous equations thereby show that an existing network significantly reduces selection costs while exerting a negative although insignificant influence on search costs. Due to their extant experiences, firms may be able to more easily assess whether one of their current partners is appropriate to jointly perform a new task at hand, resulting in a significant decrease in selection costs.

In addition, from a network perspective, a current alliance partner can establish a relationship between a firm seeking to ally and one of its own business partners. These companies would remain unconnected without this current alliance partner's bridging efforts (Brass et al. 2004; Zaheer et al. 2010). For instance, "cupid alliances" are established by a third party that benefits from the brokered and somewhat involuntary relationship between other firms (Stephens et al. 2009). Whereas prior research on networks predominantly concentrates on organizations occupying the bridging position (Hoang and Antoncic 2003, p. 173), this study provides insights into the outcomes for companies that rely on one of their current alliance partners' bridging efforts. The findings imply that an existing network seems to facilitate the assessment of the adequacy of a pre-specified pool of companies rather than the search for completely new partners. The evaluation of the quality and intentions of previously identified firms is likely to be more specific and require less time-consuming clarifications than the identification of new partners. Hence, a current alliance partner can more easily support a firm's selection processes than its search efforts, thus significantly reducing the selection costs associated with alliance formation.

In contrast to our expectations, *alliance scope* does not increase alliance partner search and selection costs. This finding can be specific to the selected industry because it echoes prior findings on telecommunication companies by Oxley and Sampson (2004, p. 737). Half of the sample firms indicated that they mainly performed two functions jointly with an alliance partner (median value = 2). "Low scope"-alliances were likely to be preferred. As a potential consequence, the lack of experience with "broad scope"-alliances might foster the belief, especially among entrepreneurial companies, that these types of alliances are attractive

because a broad scope may signal the promise of higher profit margins. It might nurture the viewpoint that a broad scope does not require more care and investments in search and selection processes, hence explaining the insignificant negative effects in our analyses.⁷ Furthermore, as outlined above, our sample consists of young firms. Alliances are relatively new to them. Due to their limited experience with alliance formation, they may be likely to start with “low scope”-alliances that might have the potential for a future increase in the scope of functions. In addition, “low scope”-alliances are less costly to form and require less extensive governance mechanisms later on (Oxley and Sampson 2004). In the context of this study, lower alliance formation costs despite relatively lower prospective benefits may be acceptable.

5.2 Limitations and Implications for Future Research on Alliance Formation

We see three salient limitations in this study. These limitations provide implications for further research on search and selection costs.

The first limitation that we see is that we solely concentrate on task- and company-related factors. Future studies could incorporate more details on *planned projects*, such as project type (Shah and Swaminathan 2008) or the size and complexity of the joint operations that are to be accomplished (Khanna et al. 1998; Oxley and Sampson 2004), *partner-related criteria*, such as resource complementarity or status similarity (Chung et al. 2000; Shipilov et al. 2011) and *industry-level factors*, such as the extent of competition or market development (Hitt et al. 2000). The consideration of additional factors requires more complex and multi-theoretic approaches (Hoffmann and Schlosser 2001; Ketchen et al. 2007). From a network perspective, it could be interesting to go beyond the dyadic level of analysis to constellations of numerous partner firms or alliance portfolios (Zaheer et al. 2010) due to “the fact that individual alliances increasingly are embedded in a tight network of interorganizational relationships” (Hoffmann 2007, p. 850). Additionally, two-sided measurement approaches may be beneficial because each alliance partner has to make substantial investments in

⁷ An alternative explanation is that when companies are planning a broad alliance scope, they exclude many potential partner firms from the outset. Only large firms that are highly visible due to their reputations in the marketplace can provide a broad range of functions to be covered in an alliance (Castellucci and Ertug 2010). Because their number is limited, search and selection are relatively straightforward and cost-effective.

time, money and personnel in order to establish and manage the relationship (Chung et al. 2000; Wong et al. 2005).

A second limitation is that we rely on key informants' subjective assessments of the amount of money, time and human capital dedicated to alliance partner search and selection. Objective data in conjunction with subjective assessments would provide the opportunity for triangulation and more details of the costs that emerge during alliance formation. Prior evidence suggests that repeated alliance contracting processes support organizational learning such that companies learn to create better alliance contracts over time. Our study extends the literature pertaining to alliance capabilities by showing how firms can learn in stages of the alliance management lifecycle that precede contract design. Because a company's capabilities to form alliances need time to develop and the skills and routines required for partner search and selection as well as the availability and relevance of resources are likely to change over time (Kale and Singh 2007; Winter 2000), the evolution of search and selection costs could be used as an indicator for whether and how well firms learn to create alliances. Based on the learning curve literature, cost savings in terms of a decrease in the extent to which alliance managers need to invest in money, time and personnel could be viewed as an indicator that a company has improved its capability to find and select an appropriate partner over time (Zollo et al. 2002). If a firm-level alliance formation capability is built through repeated search and selection processes, savings in search and selection costs can be viewed as tangible and observable benefits that accrue from this dynamic capability and contribute to alliance performance (Rothaermel and Deeds 2006).

A third limitation refers to our questionnaire. We asked our respondents to refer to their most important alliance but did not ask them to indicate the exact date of alliance formation and the number of alliances that had already existed at that point in time. Due to the particular situation of the German telecommunications industry at the time of our survey, we did not expect to find companies with a long tradition of cooperative relationships and did not control for this circumstance. Future survey-based studies may include an additional control variable that captures this aspect and is likely to explain network effects on alliance formation.

Although our study provides insights for both established and young companies, our findings are interesting in the entrepreneurship setting. On the one hand, a lack of resources and limited market power enhance smaller firms' endeavors to form alliances with other, more powerful companies to exploit promising market opportunities that they would otherwise miss. On the other hand, these constraints make them vulnerable to the potential expropriation of their knowledge (Ketchen et al. 2007). Prior studies mainly focus on later stages in the alliance management lifecycle in order to demonstrate how entrepreneurial firms can safeguard against their alliance partners' potentially opportunistic behavior, such as by designing contracts (Reuer et al. 2006) or encouraging the specialization of firms' internal technological capabilities (Haeussler et al. 2012). In contrast, our study illustrates that control is possible and necessary from the outset of an inter-firm relationship but requires considerable investments that may be difficult for young companies to bear.

Our findings are relevant for managers of both established and entrepreneurial firms because they highlight the need to view alliance management as costly from the outset of an inter-firm relationship. Partner search and selection are important at the beginning of the alliance management lifecycle because they help to clarify which allying opportunities and potential partners a searching firm can select and how costly this process is in terms of money, time and human capital. Thus, this study extends both researchers' and managers' understanding of the importance of considering not only the activities associated with creating alliances and the opportunities that they represent, but also the partner search and selection costs and their drivers.

Table 1. Factor Analysis

Alliance management costs				
(1 = “very low”, ..., 5 = “very high”)				
3 factors extracted (eigenvalues > 1); Kayser-Meyer-Olkin criterion: 0.653; Chi ² : 242.865				
(df = 21), Bartlett test: p < 0.001; N = 83.				
Factor	Eigenvalue	% of Variance		Cum. Variance
1	3.141	44.875		44.875
2	1.512	21.606		66.481
3	1.069	15.272		81.753
Item		Factor 1: Costs of Partner Search and Selection	Factor 2: Costs of Negotiation and Contract- Making	Factor 3: Costs of Post- Formation Alliance Management
(1) Partner search.		0.893	0.226	0.138
(2) Partner evaluation and selection.		0.937	0.093	0.084
(3) Negotiation with a partner.		0.370	0.822	0.228
(4) Contractual agreement.		0.049	0.939	0.059
(5) Ongoing monitoring efforts.		0.211	0.293	0.756
(6) Outcome control.		0.112	0.084	0.873
(7) Subsequent adjustments due to competition.		0.004	0.005	0.852

Table 2. Means, Standard Deviations, Ranges and Correlations

	1	2	3	4	5	6	7	8
1 search and selection costs	1							
2 firm size ^a	0.058	1						
3 firm age ^a	-0.214	0.134	1					
4 value chain	0.166	-0.006	-0.025	1				
5 alliance-specific investments	0.249*	0.020	-0.115	0.089	1			
6 alliance scope	-0.080	-0.058	0.132	-0.041	0.236*	1		
7 number of current alliances	-0.233*	0.187	-0.002	0.009	0.025	0.334**	1	
8 firm performance	-0.158	0.157	0.188	0.279*	0.110	0.100	0.217	1
mean	3.229	1.575	0.631	0.133	2.558	2.614	5.320	4.516
standard deviation	1.072	0.735	0.321	0.341	0.879	1.521	6.860	1.043
minimum	1	0.000	0.000	0	1.000	1	1	1.667
maximum	5	3.653	1.813	1	4.333	6	50	7.000

N=83. Significance levels: ** p < 0.01; * p < 0.05.

^a logarithm

Table 3. Regression Analyses

Variables	Models Hypotheses	<u>OLS</u> Search and Selection Costs				<u>SUR</u> Search Costs Selection Costs	
		1	2	3	4	5	6
intercept		3.435*** (0.382)	2.835*** (0.509)	4.154*** (0.553)	3.507*** (0.610)	3.310*** (0.688)	3.704*** (0.691)
firm size		0.122 (0.155)	0.098 (0.171)	0.212 (0.159)	0.212 (0.173)	0.263 (0.177)	0.141 (0.178)
firm age		-0.737 (0.466)	-0.594 (0.462)	-0.670 (0.444)	-0.557 (0.418)	-0.458 (0.391)	-0.656* (0.393)
value chain		0.507* (0.270)	0.429 (0.268)	0.644** (0.283)	0.601** (0.281)	0.608* (0.363)	0.593 (0.365)
alliance-specific investments	H1 (+)		0.293* (0.150)		0.288* (0.147)	0.369** (0.142)	0.208 (0.142)
alliance scope	H2 (+)		-0.074 (0.093)		-0.009 (0.085)	-0.007 (0.087)	-0.010 (0.087)
number of alliances	H3 (-)			-0.036** (0.014)	-0.036** (0.012)	-0.029 (0.020)	-0.042** (0.020)
firm performance	H4 (-)			-0.161 (0.126)	-0.188 (0.115)	-0.259** (0.130)	-0.118 (0.131)
F		1.84	2.34**	3.68**	4.34***	2.88**	2.25**
R ²		0.08	0.13	0.16	0.21	0.21	0.17
adj. R ²		0.04	0.08	0.10	0.14		

Standard errors in parentheses. Significance levels: * p < 0.100; ** p < 0.050; *** p < 0.001.

Appendix. Variables and Measures

Variable	Items	Scale
Dependent Variable		
search and selection costs	amount of money, time and personnel dedicated to ... <ul style="list-style-type: none"> alliance partner search alliance partner evaluation and assessment 	1 = very low, ..., 5 = very high $\alpha = 0.87$
Independent Variables		
alliance-specific investments	<ul style="list-style-type: none"> Our investment in dedicated personnel specific to this venture is ... Our investment in dedicated facilities specific to this venture is... If we decided to terminate the alliance, the difficulty we would have in redeploying our people and facilities to other uses would be... 	1 = negligible, ..., 5 = substantial $\alpha = 0.60$
alliance scope	<ul style="list-style-type: none"> procurement operation of basic infrastructure (access and backbone) operation of switching centers services and marketing sales billing systems customer care 	1 = function is jointly operated, 0 = otherwise index
number of current alliances	number of existing alliances at the time of the survey	count measure
firm performance	How would you assess your achievement of the following objectives as compared to your competitors? <ul style="list-style-type: none"> net utilization profits growth (increase in sales and market share) 	1 = highly inferior to competitors, ..., 5 = highly superior to competitors $\alpha = 0.66$
Control Variables		
firm size	number of employees	logarithm
firm age	number of years since foundation	logarithm
value chain	partner is at the same stage in the value chain	1 = yes, 0 = no

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