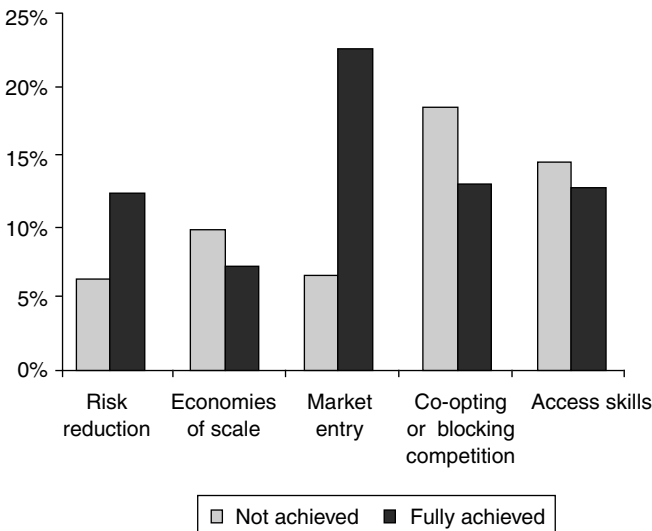


Appendices

Appendix 1 Alliance goals and outcomes

Various scholars have come up with many different reasons or motives why firms tend to ally (see e.g. Spekman et al., 1999). However, little research has been done to find out to what extent firms are able to realize the defined goals. In our study, five main categories were used to establish the primary motivations of firms to ally and the extent to which these particular goals are realized: (1) risk reduction, (2) economies of scale, (3) market entry, (4) co-opting or blocking competition and (5) access skills and resources. Despite the increase in importance of alliances as market value generator, our study shows that firms have great difficulty in realizing the objectives set. This appendix shows that only alliances aimed at facilitating new market entry (i.e. by entering new product or geographical markets) fully achieve their goals in 22.4 per cent of the cases. This is the only goal that showed higher success (22.4%) than failure rates (6.6%). Especially alliances aimed at co-option or blocking competition experience high failure rates: 18.0 per cent of respondents says they do not achieve these objectives at all. This figure becomes even worse if we also take into account the other categories: 53.0 per cent of the respondents indicate that they achieved only marginal co-option or blocking of competition using strategic alliances. Hence, this particular goal turns out to be the one that is most difficult to realize.



Appendix 2 Overview of experts interviewed (in alphabetic order)

John Bell

Director of Alliances
Royal Philips Corporation
Amsterdam, the Netherlands

Charles Billar

Alliance Manager
Oracle Corporation
De Meern, the Netherlands

Snehal Desai

Global Director of E-Business
The Dow Chemical Company
Midland, United States

Henk de Graauw

Director of Alliances
KLM-Air France
Amsterdam, the Netherlands

Aimé Heene

Associate Professor
Ghent University, De Vlerick School of Management
Ghent, Belgium

Ha Hoang

Associate Professor
INSEAD
Fontainebleau, France

Jan Jurriëns

Partner
Twynstra Gudde Management Consultants
Amersfoort, the Netherlands

Ard-Pieter de Man

Professor of Organization Science
CEO Centre for Global Corporate Positioning
Amsterdam, the Netherlands

Ron Sanchez

Professor of Strategy and Technology Management
IMD
Lausanne, Switzerland

Lorraine Segil

CEO and alliance specialist
The Lared Group
Los Angeles, United States

Peter Thurlby

Director Alliance Management
GlaxoSmithKline
United Kingdom

Wim Vanhaverbeke

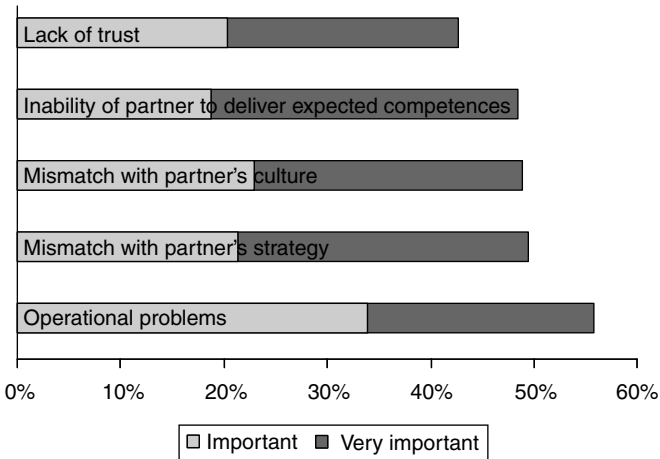
Assistant Professor

Eindhoven University of Technology

Eindhoven, the Netherlands

Appendix 3 Top five reasons for strategic alliance failure

As mentioned, over recent years extensive scholarly attention has been paid to the impact of inter-firm factors on alliance performance (e.g. Geringer, 1991; Medcof, 1997; Cullen et al., 2000; Koza and Lewin, 2000). In our survey among 192 firms (see Appendix 4), we also asked respondents to what extent they considered different dyadic issues to be of critical importance to alliance success. As can be seen in the above figure, many respondents considered issues such as operational hurdles or a mismatch with a partner's culture and strategy of importance to make their strategic alliance succeed. For a more detailed review, we refer to Duysters and Heimeriks (2005).

**Appendix 4 Methodology****Survey**

In line with numerous other studies in the area of alliance research, this study's quantitative analysis is mainly based on a survey technique to gather data on the organization of firms' alliance management processes (Anand and Khanna, 2000: 314). To this end, a survey questionnaire was developed in cooperation with a number of specialists. The survey was sent to 650 vice-presidents and alliance managers worldwide, who were responsible for managing the firm's

alliance portfolio. The membership databases of the Internet Society (ISOC) and the Association of Strategic Alliance Professionals (ASAP) were used to direct our survey questionnaires to the right person. ISOC is an internationally organized association that addresses important issues to maintain the viability of the Internet in the future (see www.isoc.nl for more information). Based in North America and Europe ASAP aims to share knowledge in the area of alliances in order to help firms cope with recurring problems (see www.strategic-alliances.org for more information). The membership databases of these associations have a number of characteristics that support the objective of this study. First, ISOC and ASAP are associations that have attracted a large variety of firms worldwide from a wide range of industries. As a consequence of the above-average use of alliances in technology-intensive industries (see e.g. Hagedoorn, 2001), the majority of our respondents were active in ICT and service-related sectors. Second, the databases enabled us to address the mailing to VP's of alliances or – in the absence of this particular function – to top managers in charge of corporate alliance management. These persons were used as key informants on their firm's alliance activities and related management practices. As Tippins and Sohi (2003: 757) note, the use of key informants is currently the standard methodology in strategy research when it comes to information on corporate level issues (Philips, 1981; see e.g. Simonin, 1997; Kale et al., 2002).¹ In this study, they are assumed to be able to appropriately judge the performance of the alliance portfolio they manage as well as have a sufficient degree of awareness of the intra-firm mechanisms their firm uses. In this way, we reckon that the people addressed are considered to be sufficiently knowledgeable about the organization's alliance matters.

In line with earlier studies, this survey was used to collect data on managerial assessments of a firm's alliance portfolio performance (Tuchi, 1996; Kale et al., 2002). It was set up so as to optimize the response rate (Kanuk and Berenson, 1975; Pressley, 1980; Erdogan and Baker, 2002; Rea and Parker, 2002). Although in the absence of other factors, there is no relationship between response rate and non-response bias, non-response bias is an important barrier in business research (Hunt, 1990; Tanner, 1999). In order to optimize the study's response rate and to not unnecessarily impose restrictions on the generalizability of the results, the two most effective techniques for increasing response rates were taken into account: follow-up and the use of incentives (for an overview see Jobber and O'Reilly, 1998). So, despite the lack of maturity of literature on large-scale international mail surveys in comparison to domestic settings (Jobber and Saunders, 1988; Angur and Natarajan, 1995; Harzing, 2000) and the ongoing debate about the required response rate in business research, various aspects were paid attention to so as to ensure we gathered sound data. These aspects relate to questionnaire design, reminder messages and incentives. First, with respect to questionnaire design, the questionnaire was developed along the steps proposed by Nunally and Bernstein (1994) and Churchill and Iacobucci (2001). This ensured that aspects such as questionnaire length, style of question and scoring were taken into account (see Special Issue of *Journal of Consumer Psychology*, 2001, 10(1, 2), pp. 55–69 and pp. 37–53, for an overview of critical issues in measurement and continuous and discrete variables respectively). In addition, fixed alternative responses or comparative scales were used to ask for facts (Greer et al., 2000). Moreover, the questionnaire was extensively pre-tested

with various experts so as to finalize it and erase any inconsequential aspects or aspects that could potentially be wrongly interpreted. Two panels reviewed the measures used in the questionnaire. The first panel consisted of academic researchers, who verified for the consistency and construct operationalizations. The second panel contained professionals from a manufacturing firm and a high-tech firm, who mainly addressed issues in relation to clarity and relevance of the questions and the terminology used. Furthermore, respondents were assured that responses would be treated confidentially and that results would be presented in an aggregated format. Last, the questionnaire was put online (at www.alliancecapability.com) so as to ease the filling out of the questionnaire and decrease the effort to reply. The e-mails that were used as cover letters of the questionnaire were personalized (Larson and Chow, 2003). Following these steps, our efforts were pinpointed towards optimizing the technical format of the questionnaire and ensuring a minimum amount of effort on the side of our respondents.

Second, after the survey was sent out to the respondents, a reminder message was used in order to maximize the response rate (Dillman, 1978; Paxson, 1992). Various follow-up techniques can be used for follow-up or reminder messages (for an overview see Erdogan and Baker, 2002). Of these various techniques, we used the original replacement follow-up (ORF) technique, which includes the same e-mail message as the original message, since this is likely to encourage a high response rate. There are a number of reasons for this. First, the initial or original message may be simply discarded by the recipient. In this case, it will allow to function as a simple reminder, as it will confront the potential respondent with the same graphic imaging and lay-out, which is most likely to appear familiar. Second, since questionnaire fatigue is considered as one of the prime aspects negatively influencing response rates (Bickart and Schmittlein, 1999; Harzing, 2000), resending the original message may also be interpreted by the recipient as a sign of commitment to the research on the side of the researcher.

Third, a relevant book on the topic as well as a copy of the study results was sent to those who cooperated in filling out the survey questionnaire, which served as an incentive. This was done to increase the perceived benefit of participating in the survey. Using these kinds of incentives has proved to contribute to the response rate (see e.g. Angur and Natarajan, 1995; Cychota and Harrison, 2002; Larson and Chow, 2003).

As mentioned earlier, the survey was conducted among 650 alliance managers and VPs, who together make up the total population of this study. After sending out the survey in two batches and a reminder message to all the potential respondents, I received 192 responses. This resulted in a response rate of 29.5 per cent. This response rate can be considered to be high in comparison to most international mail surveys, which obtain a rate between 6 per cent and 16 per cent (Harzing, 2000) and good in comparison to most research in strategic management (Snow and Thomas, 1994). However, it is equal to response rates obtained in various earlier alliance studies (see e.g. Kale et al., 2002; Reuer et al., 2002a; Zollo et al., 2002) and is very reasonable given the seniority of our respondents and the amount of surveys conducted in the area of alliances (Zollo et al., 2002). After data screening and removing outliers, the sample consisted of 192 firms from a variety of industries: chemicals (3%), ICT (17%), ICT services (26%), financial services (5%), other services (e.g. consultancies; 30%), pharmaceuticals and

Table App. 4.1 Distribution of firm size

	N	%
(1) Number of employees^a	81	42.2
1–500	8	4.2
500–1000	101	52.6
> 1000		
Total	190	100
(2) Sales revenues (in US\$)^b	46	24.0
Less than 1 million	44	22.9
1–100 million	24	12.5
100 million–1 billion	68	35.4
1–50 billion	9	4.7
> 50 billion		
Total	191	100

^a Two cases 'don't know'

^b One case 'don't know'

biotechnology (3%), other manufacturing (10%) and public sector (e.g. education and non-profit organizations; 4%), the rest (2%) is missing data. In total, 82 per cent of the respondents are active in ICT and service-related sectors. In total, the 192 firms in our dataset report on approximately 2973 alliances.²

The next table shows the distribution of the variable 'firm size' of firms in our dataset, which was measured on the basis of two variables: number of employees and sales revenues.

Firm size was measured in both the number of employees and the firm's sales revenues. With respect to the number of employees, the dataset proved to consist of two relatively balanced sets of firms: 42.2 per cent of the respondents works for a parent firm having between 1 and 500 employees and 52.6 per cent has over 1000 employees. With respect to sales revenues, the largest amount of respondents, namely 35.4 per cent, is found in the category of US\$ 1–50 billion worldwide sales per year. The rest is found in: 24.0 per cent below \$1m, 22.9 per cent between \$1–100m, 12.5 per cent between \$100m–\$1b, 4.7 per cent larger than \$50b, and the rest is missing data.

To ensure that our data was not biased as a result of non-response, the data was screened to compare a number of respondent characteristics. These characteristics were investigated to understand if our sample was a good representation of the population. First of all, an analysis was performed to verify if any non-response bias was apparent using three variables to compare early versus late respondents. The three variables were: firm size measured as the number of employees of the parent company, firm size as measured by total worldwide sales revenues and alliance performance. Chi-square tests for each of these measures show that there is no difference between the different categories.³ This demonstrates that there is a relatively equal division between small to medium-sized and large firms in terms of both number of employees and sales as well as alliance performance level when comparing early and late respondents. As late

respondents can be assumed to be comparable to non-respondents (Kanuk and Berenson, 1975; Armstrong and Overton, 1977), this indicates that there was no significant non-response bias in our dataset. Second, the average alliance performance of our sample was 52 per cent, which is comparable to other studies on alliance performance (Park and Ungson, 2001). These results suggest that our sample is not skewed in terms of firm size or in terms of alliance performance, which implies that the validity of our dataset was not influenced as a consequence of non-response bias.

Expert interviews

In addition to the survey, in-depth expert interviews were conducted. For these interviews, twelve experts in the field of alliances and capability development were selected worldwide (see Appendix 2 for an overview of the experts interviewed). Within the group of experts, there was a sound division between practitioners (seven in number) and academics (five in number). However, some of the experts are active in academia and business. The experts interviewed were selected on the basis of their established reputation in the field and ability to sufficiently contribute to the goal of these interviews on the basis of their prior experience and related knowledge.

The interviews served two purposes. On the one hand, they allowed for a verification of the empirical findings. On the other hand, the interviews were aimed at validating and extending the argumentations for expected and unexpected results and the reasons why the study's findings were appropriate. Mirroring our findings against the opinion and insights of practitioners and academics should nurture stronger and more reliable results. The interviews consisted of two sections (part A and part B), were semi-structured and lasted between forty and sixty minutes. The interview questions were partly exploratory and mostly open-ended (Greer et al., 2000; see Appendix 5). Before interviewing the envisioned experts, a panel of interviewees allowed for informal pre-testing of the questionnaire (Churchill and Iacobucci, 2001). After the pre-tests, the interviews were recorded with the consent of the interviewees and thereafter transcribed to allow for comparison of the different interviews. Moreover, the results were summarized during the interview in order to ensure an adequate representation of the expert's answers. The results of these interviews were used to verify our findings. Analyses of the results were done by comparing individual arguments and comments of the interviewees to our findings and categorize any arguments given to provide additional support for our findings.

Explanatory variables

Given the infancy of the field of research, measurement of intra-firm mechanisms lying at the very roots of alliance capabilities is a challenging area. As mentioned, proxying alliance capabilities by the firm's number of prior alliances is a popular approach (Hoang et al., 2002; Kale et al., 2002; Zollo et al., 2002). However, in order to more meticulously examine the development of alliance capabilities at the micro-level, a more comprehensive measure for alliance capabilities is needed. Relying on expert input and in line with Draulans et al. (2003), this study has defined thirty intra-firm mechanisms that underlie the

development of alliances capabilities. Figure 4.1 lists these mechanisms, which make up the explanatory or independent variables of this study. In line with the logic followed by Gittell (2002) and Miller (2003), these mechanisms reflect the way in which firms develop alliance capabilities. They essentially function as intra-firm stimuli aimed at enhancing alliance performance. Following Afuah (2000) and Kale et al. (2002), the investigation of these thirty key variables of alliance capability are represented by thirty single-item dummy variables. Consequently, the existence of a certain mechanism is measured by a categorical variable. For each mechanism we defined, we created a dummy variable to analyse its relation to different performance levels. This is called a binominal semantic differential scale (Bagozzi and Phillips, 1982; Jobson, 1992; Nunally and Bernstein, 1994). The semantic differential scale is a scale where the end-points consist of two bipolar activities (i.e. 'good' versus 'bad' or 'yes' versus 'no'). In this study, we used a binominal scale to understand if firms have or do not have a certain mechanism in place. This type of scale is nominal and results in binary independent variables. This implies that either a firm has a certain mechanism ($X_c = 1$) or it does not have it ($X_c = 0$). In this way, the total set of mechanisms a firm has in place can be seen as a representation of its capability (Gittell, 2002) on basis of which differences between firms can be easily disseminated.

The underlying logic has been advanced in the early 1960s by Rotter (1966), who in a psychological study on the perception of causes of events made use of

Table App. 4.2 Intra-firm mechanisms

Intra-firm mechanisms^a	
Functions	(1) Vice-President of alliances, (2) alliance department, (3) alliance specialist, (4) alliance manager, (5) gatekeeper, (6) local alliance manager
Tools	(7) internal alliance training, (8) external alliance training, (9) international alliance training (11) joint business planning, (12) alliance database, (13) use of intranet to disperse knowledge, (14) best practices, (15) culture programme, (16) partner programme, (17) individual alliance evaluation, (18) comparison of evaluations, (19) joint evaluations
Control and management processes	(20) responsibility level for alliances (a. top management, b. business development, c. marketing, d. M&A department, e. R&D, f. strategy), (21) rewards and bonuses for alliance managers, (22) rewards and bonuses for business managers, (23) formally structured knowledge exchange between alliance managers, (24) use of own knowledge (25) alliance metrics, (26) country-specific alliance policies
External parties	(27) consultant, (28) lawyer, (29) mediator, (30) financial expert

^a See Appendix 5 for definitions of different mechanisms

a technique to define his construct. Rotter defined a 29-item instrument consisting of binary variables, which when one adds up the items generates a total score ranging from 0 to 29. The total score represents to what extent someone has a preference or interest (see also Lambin, 1993, the importance–performance matrix). For this study's purposes, despite the fact that it suffers from limitations such as the assumption that all mechanisms are equally important, we use the same logic to define a construct for measuring a firm's alliance capability for a number of reasons (see also Hopkins, 2004). First of all, using binary variables to measure whether a firm deploys a certain intra-firm mechanism provides an objective way to measure the issue under investigation. For instance, asking a respondent whether his firm has an alliance department can be answered straightforwardly by responding 'yes' or 'no'. In doing so, we follow a recent study by Knott (2003), who investigates the effect of franchise routines on franchise performance. Second, using alternative scales such as a Likert scale would seriously complicate the comparison and summing up of the individual mechanisms. Given the different nature of the mechanisms, it would have been practically impossible to use one definition of a Likert scale for all mechanisms (e.g. the use of intranet could be quantified by for instance daily or weekly use, the contribution of a vice-president would have to be measured differently). Therefore, in case we would have used different scales for the mechanisms, this would have resulted in difficulty to interpret results and substantial loss of information. Third, as this study seeks to examine the use of mechanisms by management aimed at alliance capability development and intends to gather data using a large-scale survey, it is also important to take into account the unruly nature of practice. Adding a third option to the 0–1 scale, for instance the option 'don't know' or 'no opinion', is not likely to improve the quality of our study results as there is little ambivalence in having or not having a mechanism in place. Moreover, adding such a category makes people more prone to opt for the alternative 'no opinion' (DeVellis, 1991; Baarda and De Goede, 1995). The option of ascribing different weights to different mechanisms was not considered appropriate, because of the different nature of the mechanisms and a lack of insight into the specific (quantitative) contribution each mechanism makes. Hence, given these arguments, we reckon that the use of a binominal semantic differential scale suits the purposes of this study, as it allows us to examine the extent to which firms make use of internal mechanisms to develop alliance capabilities.

Dependent variable

Triggered by the dissatisfaction with performance of many alliances (Khanna et al., 1998), the topic of alliance performance and its measurement has been dealt with extensively over the last years. Although this area has been baptized as being 'challenging' due to measurement problems and data access (Anderson, 1990; Gulati, 1998), various studies have used different measures and levels of analysis (for a critical review see Gulati, 1998; for an overview see Park and Ungson, 2001). With respect to measurement, Venkatraman and Ramanujam (1986) propose three groups of measures: financial, operational and organizational effectiveness performance. The first group includes measures such as profitability and growth (e.g. Parkhe, 1993; Hagedoorn and Schakenraad, 1994;

Aulakh et al., 1996; Combs and Ketchen, 1999; Sarkar et al., 2001). Longevity, survival and duration are part of the second group and are therefore examples of operational performance measures (e.g. Killing, 1983; Harrigan, 1988a; Kogut, 1988). The third and most common way to measure alliance performance is to use organizational effectiveness measures. These measures determine the overall satisfaction with the alliance or the extent to which objectives have been met (e.g. Geringer and Hebert, 1991; Mohr and Spekman, 1994). Whereas the former two groups of measures are objective, the third group is more subjective.

Various studies have investigated the need to use objective, subjective or a composite index to measure alliance performance (e.g. Arino, 2003). Geringer and Hebert (1991) have shown that objective and subjective measures tend to be highly correlated. In spite of early criticism on the use of managerial assessments as a measure for alliance performance, there is an emerging consensus that managerial assessments of performance provide a sound reflection of alliance performance (Kale et al., 2002). Given the fact that companies form alliances for specific reasons, asking alliance managers to what extent the stated alliance objectives were achieved, is an effective and scientifically established manner to assess the success of an alliance (Geringer and Herbert, 1991; Tuchi, 1996; Kale and Singh, 1999).

With respect to the level of analysis used, earlier studies relied primarily on measuring the performance of the individual alliance or on measuring the partner benefits from the alliance (Olk, 2002). Using the individual alliance as the unit of analysis provides an indication of how the entity performs, whereas the partner perspective allows researchers to differentiate between the assessments of different partners. Especially the latter type level of analysis has been used in studies focusing on knowledge transfer *between* firms (e.g. Jap, 2001). An obvious detriment to using this level of analysis is that each alliance is treated as a single and independent transaction (Doz and Prahalad, 1991).

However, as researchers have recently started to analyse knowledge transfer *within* firms, doubts arise whether an alliance or partner level of analysis is the appropriate level to measure alliance performance (Levinthal, 2000; Duysters et al., 2002b; Sarkar et al., 2004). Using the performance of a firm's alliance portfolio as a level of analysis is preferred for a number of reasons. First, it allows us to analyse the *average* impact of a firm's alliance capability on its alliance performance. This is in line with Ray et al. (2004), who suggest that performance is only a viable dependent when it represents the specific business processes the study seeks to investigate. We follow their argumentation, as this study measures whether alliance capabilities explain persistent heterogeneity in firm alliance performance. Second, using the firm's alliance portfolio as dependent variable is more likely to average out biases than when a firm's alliance capability is linked to its performance in one alliance. The impact of a firm's alliance capability is by nature not restricted to one alliance but is centred on the creation of a firm-wide ability to deal with its entire alliance portfolio. Third, the performance of a firm's alliance is not an isolated issue, but should be seen in the context of a firm's alliance experience (Gulati, 1998). When it comes to developing alliance capabilities, it is important to leverage knowledge across a firm's alliances by considering alliances as a portfolio rather than a separate activity (Lorenzoni and Baden Fuller, 1995). Isolation of an alliance by viewing it as a stand-alone activity would unnecessarily limit the firm's learning abilities

(Khanna et al., 1998). Last, it is worth mentioning that, for this study's purposes, it would be illogical to include additional performance items (such as learning or relationship quality) given the fact that we investigate the performance of a firm's alliance portfolio. These items in general relate to performance in individual alliances and can be considered less useful when analysing a firm's alliance portfolio. For all of these reasons, we follow Anand and Vassalo (2002) and use the performance of the entire alliance portfolio rather than the performance of an individual alliance, as we argue it allows for a better understanding of the role alliance capabilities play.

In this study, alliance performance is defined as the percentage of alliances where the firm's initial goals were realized, which is in line with earlier studies (Hamel et al., 1989; Hamel, 1991; Zollo et al., 2002). It is measured as a composite of a firm's alliance portfolio performance over the period 1997 to 2001 and therefore reflects the percentage of a firm's alliances in its alliance portfolio that was considered successful over this period. Following Geringer (1988) and Parkhe (1993), a 5-point interval scale with integers ranging from 1 to 5 (1 = 0%–20%, 2 = 21%–40%, ..., 5 = 81%–100%) was used to measure alliance performance (see DeVellis, 1991 and Special Issue of *Journal of Consumer Psychology*, 2001, 10(1, 2), pp. 55–69, for an overview of critical issues in measurement). We also added a category 'don't know' as an option. This scale allows respondents to rate the degree to which alliances in the firm's alliance portfolio reach their initial objectives and can be seen as an indicator of overall performance satisfaction (Arino, 2003).

Appendix 5 Summary of survey items

Please indicate which of the following mechanisms exist in your company to support alliance management.

	In place
1. Vice-President of alliances	<input type="checkbox"/>
2. Alliance department	<input type="checkbox"/>
3. Alliance specialist	
a. At top management level only	<input type="checkbox"/>
b. At middle management level only	<input type="checkbox"/>
c. At both levels	<input type="checkbox"/>
4. Alliance manager	<input type="checkbox"/>
5. Gatekeeper	<input type="checkbox"/>
6. Formal alliance training	
a. Internal training	<input type="checkbox"/>
b. External training	<input type="checkbox"/>
7. Standard partner selection approach	
8. Joint business planning	<input type="checkbox"/>
9. Metrics	<input type="checkbox"/>
10. Alliance database	
a. Accessible for top management only	<input type="checkbox"/>
b. Accessible to all involved	<input type="checkbox"/>
11. Alliance best practices	<input type="checkbox"/>
12. Culture programme	<input type="checkbox"/>
13. Partner programme	
a. Yes, and allows partner to access information via the internet	<input type="checkbox"/>
b. Yes, but it does not allow partner to access information via the internet	<input type="checkbox"/>
14. Evaluation techniques	
a. Each alliance is evaluated individually	<input type="checkbox"/>
b. Company alliances are compared	<input type="checkbox"/>
15. Joint evaluation with partners	<input type="checkbox"/>
16. The majority of alliances are formed via:	
a. A formal, 'top-down' process	<input type="checkbox"/>
b. An informal, 'bottom-up' process	<input type="checkbox"/>

17. The main responsibility for alliances lies with:
- a. Top management
 - b. Business development
 - c. Marketing
 - d. Mergers and acquisition department
 - e. Research and development
 - f. Strategy
 - g. Other (specify)
18. Rewards and bonuses for alliance managers are tied to alliance success
19. Rewards and bonuses for business managers are tied to alliance success
20. Alliance managers from different units/divisions formally exchange their experiences
21. Use of own (international) alliance knowledge
22. International alliance management training for alliance managers
23. Country-specific alliance policies
24. Local alliance managers
25. Consultants
26. Legal experts
27. Mediators
28. Financial experts
29. Other external sources (specify)

Appendix 6 Test of equality of group means

	Wilks' lambda	F-value	Sig.
VP of alliances (1)	0.930	10.285	.002**
Alliance department (2)	0.975	3.476	.034*
Alliance specialist (3)	0.989	1.488	.225
Alliance manager (4)	0.948	7.578	.007**
Gatekeeper (5)	0.992	1.146	.286
Local alliance managers (6)	0.977	3.224	.075+
Internal alliance training (7)	0.993	0.986	.327
External alliance training (8)	0.975	3.448	.065+
International alliance training (9)	0.989	1.504	.222
Partner selection programme (10)	0.951	7.099	.009**
Joint business planning (11)	0.999	0.080	.778
Alliance database (12)	0.897	15.758	.000***
Use of intranet to disperse alliance knowledge (13)	0.935	9.514	.002**
Alliance best practices (14)	0.975	3.538	.062+
Culture programme (15)	1.000	0.003	.956
Partner programme (16)	0.994	0.882	.366
Individual alliance evaluation (17)	0.960	5.777	.018*
Comparison of alliance evaluations (18)	0.998	0.303	.583
Joint alliance evaluation (19)	0.959	5.825	.017*
Rewards for alliance managers tied to alliance performance (21)	0.982	2.535	.114
Rewards for business managers tied to alliance performance (22)	0.983	2.414	.123
Formally structured knowledge exchange between alliance managers (23)	0.957	6.102	.015*
Use of own (international) alliance knowledge (24)	0.948	7.578	.007**
Alliance metrics (25)	0.963	5.196	.024*
Country-specific alliance policies (26)	0.999	0.157	.693
Consultants (27)	0.986	1.992	.160
Legal experts (28)	0.999	0.177	.675
Mediators (29)	0.973	3.796	.053+
Financial experts (30)	0.991	1.247	.266

*** $p < .001$; ** $p < .01$; * $p < .05$; + $p < .10$

Appendix 7 Pearson correlation matrix

	1	2	3	4	5	6	7
1. SUCADJ	1						
2. VP	.219**	1					
3. DEP	.101	.59**	1				
4. SPEC	-.111	-.49**	-.43**	1			
5. MANAGER	.112	.444**	.594**	-.318**	1		
6. GATEKP	.074	.131	.221**	-.199**	.29**	1	
7. LOCALMAN	.072	.332**	.488**	-.213**	.459**	.249**	1
8. INTTRAIN	.028	.249**	.359**	-.248**	.331**	.159*	.422**
9. EXTTRAIN	.139	.133	.094	-.057	.147*	.065	.153*
10. INTCULTR	.149*	.146*	.155*	-.132	.15*	.116	.107
11. PARTSEL	.166*	.428**	.413**	-.293**	.362**	.190**	.264**
12. JPB	-.010	.200**	.334**	-.169*	.251**	.099	.295**
13. DATABS	-.238**	-.442**	-.553**	.372	-.515**	-.202**	-.385**
14. INTRANT	.164*	.275**	.388**	-.32**	.365**	.179*	.289**
15. BESTPRAC	.171*	.169*	.194**	-.152*	.241**	.197**	.255**
16. CULTPROG	.038	.023	-.059	.000	.059	.116	.141
17. PPG	-.009	-.193**	-.296**	.178*	-.201**	-.209**	-.153*
18. EVALIND	.161*	.251**	.31**	-.234**	.346**	.118	.199**
19. EVALCOMP	.014	.25**	.394**	-.255**	.327**	.165*	.261**
20. JOINTEV	.136	.149*	.167*	-.117	.235**	.141	.250**
21. REWALLM	.098	.431**	.519**	-.363**	.458**	.079	.475**
22. REWBUSM	.141	.174*	.15*	-.096	.131	.070	.142*
23. FORMEXCH	.117	.251**	.395**	-.257**	.395**	.254**	.485**
24. KNOWUSE	.196**	.215**	.122	-.288**	.171*	-.024	.297**
25. METRICS	.140	.276**	.336**	-.231**	.362**	.277**	.322**
26. CNTRYPOL	.035	.2**	.292**	-.182*	.296**	.118	.325**
27. CONSULT	.105	.000	-.063	.040	-.002	-.028	-.113
28. LEGALEXP	-.026	-.099	-.096	.126	-.141	-.023	-.107
29. MEDIATE	.211**	-.044	-.155*	.094	-.043	.037	-.078
30. FINANCE	.085	-.024	-.106	.119	-.115	.075	.018

Continued

Appendix 7 Continued

	8	9	10	11	12	13	14
1. SUCADJ							
2. VP							
3. DEP							
4. SPEC							
5. MANAGER							
6. GATEKP							
7. LOCALMAN							
8. INTTRAIN	1						
9. EXTTRAIN	.088	1					
10. INTCULTR	.181**	.189*	1				
11. PARTSEL	.278**	.148*	.101	1			
12. JPB	.190**	.142*	.061	.344**	1		
13. DATABS	-.471**	-.112	-.179*	-.472**	-.185*	1	
14. INTRANT	.326**	.134	.026	.333**	.26**	-.372**	1
15. BESTPRAC	.463**	.354**	.206**	.329**	.238**	-.267**	.317**
16. CULTPROG	.147*	.030	.288**	.071	.152*	.074	-.004
17. PPG	-.194**	.024	-.028	-.336**	-.263**	.259**	-.197**
18. EVALIND	.166*	.108	.038	.279**	.218**	-.282**	.269**
19. EVALCOMP	.382*	.147*	.146*	.294**	.248**	-.366**	.242**
20. JOINTEV	.286**	.105	.063	.241**	.327**	-.173*	.276**
21. REWALLM	.34*	.013	.143*	.264**	.281**	-.47**	.252**
22. REWBUSM	.053	-.064	-.054	.117	.028	-.073	.051
23. FORMEXCH	.291**	.261**	.127	.257**	.225**	-.362**	.263**
24. KNOWUSE	.191**	.107	.169*	.242**	.209**	-.281*	.178*
25. METRICS	.406**	.326**	.217*	.388**	.285**	-.349**	.234**
26. CNTRYPOL	.223**	.05	.099	.240**	.268**	.317**	.189**
27. CONSULT	.091	.094	.124	.023	-.086	-.054	-.094
28. LEGALEXP	-.025	-.123	-.090	-.009	-.032	.095	-.105
29. MEDIATE	-.075	.251**	.272**	-.086	-.074	.012	-.076
30. FINANCE	.052	-.131	.071	.018	-.077	.100	-.129

15	16	17	18	19	20	21	22	23
1								
.238**	1							
-.093	0.17	1						
.199*	.166*	-.125	1					
.282**	.038	-.305**	.015	1				
.229**	.248**	-.140	.192**	.237**	1			
.146*	.016	-.221**	.131	.359**	.186*	1		
.126	.027	-.076	.158*	.055	.127	.184*	1	
.306**	.094	-.173*	.264**	.274**	.175*	.4**	.121	1
.227*	.047	-.156*	.1	.147*	.131	.205**	.019	.276**
.448**	.186**	-.171*	.258**	.337**	.274**	.229**	.014	.311**
.158*	.099	-.254**	.109	.188**	.188**	.259**	.076	.280**
.023	.062	.052	.139	-.024	.082	.023	.077	-.003
-.125	.098	-.016	-.048	-.019	.070	-.103	-.005	-.065
.190**	.056	.086	-.042	-.062	-.040	-.066	-.099	.01
-.085	.167*	.048	.047	-.05	.035	-.016	.123	-.007

Continued

Appendix 7 Continued

	24	25	26	27	28	29	30
1. SUCADJ							
2. VP							
3. DEP							
4. SPEC							
5. MANAGER							
6. GATEKP							
7. LOCALMAN							
8. INTTRAIN							
9. EXTTRAIN							
10. INTCULTR							
11. PARTSEL							
12. JPB							
13. DATABS							
14. INTRANT							
15. BESTPRAC							
16. CULTPROG							
17. PPG							
18. EVALIND							
19. EVALCOMP							
20. JOINTEV							
21. REWALLM							
22. REWBUSM							
23. FORMEXCH							
24. KNOWUSE	1						
25. METRICS	.152*	1					
26. CNTRYPOL	.268**	.237**	1				
27. CONSULT	.076	.060	-.043	1			
28. LEGALEXP	-.064	-.104	-.063	.063	1		
29. MEDIATE	.034	.110	-.067	.027	-.021	1	
30. FINANCE	-.047	-.032	-.066	.135	.415**	-.055	1

** $p < .01$; * $p < .05$

Appendix 8 Variance matrix of mechanisms

	DUMSUC01 = 0 (N = 52)			DUMSUC01 = 1 (N = 87)		
	Mean	Std. dev.	SE	Mean	Std. dev.	SE
VP***	.2692	.44789	.06211	.5402	.50127	.05374
DEP**	.3654	.48624	.06743	.5517	.50020	.05363
SPEC	.7115	.45747	.06344	.6092	.49076	.05261
MANAGER***	.3846	.49125	.06812	.6207	.48803	.05232
GATEKP	.1346	.34464	.04779	.2069	.40743	.04368
LOCALMAN*	.1731	.38200	.05297	.3103	.46532	.04989
INTRTRAIN	.2115	.41238	.05719	.2874	.45515	.04880
EXTTRAIN*	.2692	.44789	.06211	.4253	.49725	.05331
INTCULTR	.1154	.32260	.04474	.1954	.39881	.04276
PARTSEL***	.4038	.49545	.06871	.6322	.48501	.05200
JPB	.4808	.50450	.06996	.5057	.50287	.05391
DATABS***	.8269	.38200	.05297	.5057	.50287	.05391
INTRANT***	.3269	.47367	.06569	.5862	.49537	.05311
BESTPRAC*	.2885	.45747	.06344	.4483	.50020	.05363
CULTPROG	.1346	.34464	.04779	.1379	.34683	.03718
PPG	.9231	.26907	.03731	.8736	.33427	.03584
EVALIND**	.5000	.50488	.07001	.7011	.46041	.04936
EVALCOMP	.2115	.41238	.05719	.2529	.43718	.04687
JOINTEV**	.2885	.45747	.06344	.4943	.50287	.05391
REWALLM	.2692	.44789	.06211	.4023	.49320	.05288
REWBUSM	.0962	.29768	.04128	.0962	.29768	.04128
FORMEXCH**	.1923	.39796	.05519	.3908	.49076	.05261
KNOWUSE***	.3846	.49125	.06812	.6207	.48803	.05232
METRICS**	.2885	.45747	.06344	.4828	.50260	.05388
CNTRYPOL	.1923	.39796	.05519	.2644	.44355	.04755
CONSULT	.3269	.47367	.06569	.4483	.50020	.05363
LEGALEXP	.4038	.49545	.06871	.3678	.48501	.05200
MEDIATE*	.0000	.0000	.000	.0690	.25486	.02732
FINANCE	.3077	.46604	.06463	.4023	.49320	.05288

*** $p < .01$; ** $p < .05$; * $p < .1$

Appendix 9 Classification matrix (predicted group membership)

		DUMSUC01	0	1	Total
0 = 0%–40%	Count	0	27	21	48
		1	16	53	69
		ungrouped cases	19	25	49
1=61%–100%	%	0	56.3	43.8	100
		1	23.2	76.8	100
		ungrouped cases	40.8	59.2	100

A total of 68.4 per cent of the original grouped cases is correctly classified.

Appendix 10 Robustness checks for discriminant analysis

Table App. 10.1 Box's M test of equality of covariance matrices Log determinants

0 = 0%–40%; 1 = 61%–100%	Rank	Log determinant
0	6	-1.997
1	6	-1.258
Pooled within groups	6	-1.338
Test results		
Box's M		25.480
F	Approx.	1.142
	df1	21
	df2	37568.139
	Sig.	.294

The Box's M test verifies whether the variance-covariance matrices are homogeneous (see e.g. Knudsen and Madsen, 2002; Von Taysen, 2003).⁴ The results indicate a Box's M value of 25.480 and a *p*-value of .294, although this value lies above the critical value of .05, which provides strong evidence that the matrices do not differ among the two performance groups (Hair et al., 1998). Moreover, as sample sizes of the two groups are reasonably comparable while having reasonable homogeneity of variance given the two-tailed tests, the robustness of the results does not seem to be negatively influenced.

Table App. 10.2 Hit ratio

See Appendix 9: 68.4 per cent of the original grouped cases is correctly classified.

Table App. 10.3 Variance matrix of mechanisms (for DUMSUC01 = 0 and DUMSUC01 = 1)

See Appendix 8.

Table App. 10.4 Pearson correlation matrix

See Appendix 7: nine predictors are significantly related to the dependent variable at the 5 per cent level.

Appendix 11 Mean differences by experience level

	Mean(sd)			F-test ^a	Eta sq ^b	F-test ^c
	Low experience group(N = 88)	Moderate experience group (N = 47)	High experience group(N = 31)			
Control						
Firm size				6.937***	.078	
ICT industry				.929	.011	
Service industry				1.683	.020	
Factor 1^d	.205	.381	.597			
Organization level Learning mechanisms	2.05(2.21)	3.81(2.79)	5.97(2.23)	32.388***	.284	4.369**
Factor 2^e	.220	.298	.348			
Group level learning mechanisms	1.10(1.31)	1.19(1.32)	1.74(1.39)	3.120*	.037	3.878**
Interaction effect						
Factor 1*factor 2	3.70(6.93)	7.17(9.75)	11.456(10.15)	10.31***	.111	1.791
Performance						
Alliance performance	2.78	3.67	3.37	7.713***		

*** $p < .001$; ** $p < .01$; * $p < .05$

Continued

Appendix 11 Continued

^a T-test for mean difference

^b Eta is a measure of association and reflects the proportion of variance in the dependent variable (alliance experience) that is explained by differences among groups. It is the ratio of the between-groups sum of squares and the total sum of squares.

^c One-way ANOVA on alliance performance

^d The number of mechanisms included in this factor is 10, therefore the average of this factor is divided by ten to obtain a comparable figure with group-level learning mechanisms.

^e The number of mechanisms included in this factor is 5, therefore the average of this factor is divided by five to obtain a comparable figure with organization-level learning mechanisms.

Notes

1 Introduction

1. This study finds that alliance success also depends on the goal of the alliance (see Appendix 1).

2 A Literature Review of Alliance Research

1. Although it is a related topic, we leave the field of study which is dedicated to analysing alliance networks undiscussed. This field of study also has paid attention to alliance portfolios (see e.g. Gomes-Casseres, 1996; Lemmens, 2003; Beerkens, 2004; De Man, 2004).
2. Our study confirms that dyadic factors are important antecedents of alliance performance (see Appendix 3). Moreover, we acknowledge that some dyadic factors may be positively influenced by intra-firm mechanisms (for a more elaborate overview see also Heimeriks and Schreiner (2002b)).
3. For a comparison of principles underlying transaction cost theory, RBV and social exchange theory, we refer to Das and Teng (2002a: 455).
4. As it is not the intention of this study to provide a complete overview or discussion of developments in strategic management, we refer to Conner (1991) and Sanchez and Heene (1997) for a more complete overview of developments in streams of research in the field of strategic management.
5. Nelson and Winter (1982: 10) underscore the need for a dynamic or evolutionary element in organization theory when suggesting that pure economic reasoning has become an orthodoxy as 'much of contemporary economic theory appears faintly anachronistic... It is as if economics has never really transcended the experiences of its childhood.'
6. As it is not our intention to provide an extensive overview of the vast amounts of literature on RBV and DCV, we wish to refer to other texts for more elaborate reviews (Peteraf, 1993; Teece et al., 1997; Dosi et al., 2000a; Fujimoto, 2000).
7. Although extensively investigated in the context of the DCV, other theories such as the RBV and OL theory have also used this concept to explain a firm's rent-generation capacity.
8. For a more extended overview of specific contributions of the CBV, we refer to Prahalad and Hamel (1990), Hamel and Heene (1994) and De Leo (1994).
9. As a firm's ability to share knowledge is limited and influenced by all kinds of limitations and factors, such as organizational forgetting (Martin de Holan and Philips, 2003), tacitness (Tsoukas, 2003), stickiness (Szulanski, 1996) and the link between individual and organizational learning (Lorino, 2001), knowledge sharing should certainly not be seen as a goal in itself (Grant, 1996b).
10. Organizational learning theory has also paid significant attention to learning barriers such as turnover, organizational forgetting, memory, fragmented

learning, competence traps, communication, tacitness and superstitious learning (see e.g. Stata, 1989; Senge, 1990b; Levinthal and March, 1993; Argyris, 1994).

11. For a complete overview of theories and paradigms related to the field of strategy research, we refer to Lewin and Volberda (1999).

3 Describing the Phenomenon: Alliance Capabilities

1. For more elaborate reviews, see Sanchez et al. (1996b), Dosi et al. (2000a) and Sanchez (2001c).
2. For an extensive discussion on characteristics, typologies and definitions of 'knowledge', we refer to Polanyi (1962), Winter (1987), Nonaka (1994) and Spender (1996).
3. In OL theory, this is also referred to as the exploitation–exploration dilemma (March, 1991).

4 Towards a Micro-level Understanding of Alliance Capabilities

1. For a critical overview of the use of discriminant analysis, we refer to Crask and Perreault (1977) and Huberty (1984).
2. Please note that this analysis includes 139 of the 192 cases since the average performance group (41%–60%) was left out of the analysis and the variables related to the responsibility levels were left out due to measurement constraints.
3. The canonical correlation coefficient is related to the eigenvalue and can be calculated using the following formula:

$$r_i = \sqrt{\frac{\lambda_i}{1 + \lambda_i}}$$

where i denotes the discriminant function and λ_i the eigenvalue (Klecka, 1980).

4. The standardized coefficients reflect the relative importance of a variable. It can be computed as follows:

$$c_i = u_i \sqrt{\frac{w_{ii}}{n - g}}$$

where u_i is the unstandardized coefficient, w_{ii} is the sum of squares for variable i , n is the total number of cases and g is the number of groups. The obvious disadvantage is that the standardized coefficients are affected by relationships with other variables.

5. For a more elaborate discussion on critical issues in exploratory factor analysis with dichotomous items, we refer to Bernstein et al. (1988), Nunally and Bernstein (1994) and McLeod et al. (2001).
6. For dichotomous items, this is also referred to as the KR20 formula (Kuder and Richardson, 1937; Moll, 1995; Yaffee, 1998).

7. In this context, it seems relevant to mention that the predictors in this study all refer to the internal process of alliance capability development. Inherently, this excludes all external factors influencing a firm's performance, including for instance the alliance capabilities of the partner, competitive pressures and technological challenges. We are therefore less likely to find very high correlations, as this study focuses on internal organization drivers of alliance performance.
8. An additional analysis was performed to verify if – as suggested in Section 4.4 – firms use different mechanisms at different experience levels. The results are shown in Appendix 11 and confirm that firms at different experience levels use different combinations of group-level and organization-level learning mechanisms. These findings are in line with results of earlier studies (e.g. Harbison and Pekar, 1998b; Draulans et al., 2003).
9. The 4I framework is summarized by Mintzberg et al. (1998) (in Vera and Crossan, 2004: 225): '*Intuiting* is a subconscious process that occurs at the level of the individual. It is the start of learning and must happen in a single mind. *Interpreting* then picks up on the conscious elements of this individual learning and shares it at the group level. *Integrating* follows to change collective understanding at the group level and bridges to the level of the whole organization. Finally, *institutionalizing* incorporates that learning across the organization by imbedding it in its systems, structures, routines and practices' (1998: 212).

5 An Analysis of the Alliance Capability Development Process

1. This chapter is partly based on 'Alliance capability as mediator between experience and alliance performance: an empirical investigation into the alliance capability development process' by Heimeriks and Duysters (2007). Part of this chapter is reprinted with permission of the *Journal of Management Studies*. Copyright 2007 Blackwell Publishing.
2. For a comparison of these theories, we refer to Teece et al. (1994) and Sanchez (2001a).
3. For an extensive overview of the concept 'routines', we refer to Nelson and Winter (1982), Prahalad and Hamel (1990), Cohen et al. (1996) and Coriat (2000).
4. This was also confirmed during the expert interviews, in which we verified for face validity with respect to the operationalization of alliance capability used in this study. Please refer to Appendix 4 for a more elaborate discussion on construct validity.
5. A number of additional analyses were performed to verify for any biases in the methodology used. This means the hypotheses were also tested using binary logistic regression; the results were comparable.
6. We prefer the likelihood ratio test to alternative tests such as the Wald test as various studies express doubts with respect to the latter test (see e.g. Hauck and Donner, 1977; Menard, 1995).
7. This procedure tests the following formulas: $Y_{\text{success}} = \text{fn}(\text{experience})$, $Y_{\text{mechanisms}} = \text{fn}(\text{experience})$ and $Y_{\text{success}} = \text{fn}(\text{experience}, \text{mechanisms})$.
8. In order to ensure sound results, additional logistic regression analyses were performed using another independent variable for mechanisms, which

consisted of only the significant mechanisms as was concluded from Chapter 5. So, this independent variable was defined as a composite variable consisting of eleven instead of fifteen intra-firm mechanisms. As expected, the results showed comparable significance levels for all independent variables.

9. We also tested whether alliance capability has a moderating effect on experience using the procedure suggested by Sharma et al. (1981); these results also suggested to reject hypothesis 3B.
10. Simonin (1997) also finds that collaborative know-how mediates between alliance experience and performance and concludes that experience must be internalized to engender future collaborative benefits. However, he falls short of identifying and measuring the intra-firm mechanisms that help internalize this know-how.

6 Conclusions, Implications, Limitations and Future Research

1. For an overview and comparison of definitions of strategic alliances, we refer to Douma (1997).

Appendices

1. Although we carefully selected the key informants involved, there are a number of limitations to the use of key informants. For instance, making use of key informants implies that one asks for perceptions thereby potentially creating bias in the data gathered. We refer to Philips (1981), John and Reve (1982) and Frechtling (2002) for a critical overview of pros and cons of using key informants. Overall, different scholars define different opinions about the utility of the key informant approach. However, despite these varying opinions on its influence on the validity and reliability of the data gathered, using key informants to gather subjective information on organizational issues has become an accepted practice in management research and consensus seems to have been established with respect to the fact that subjective information correlates highly with objective information (Geringer and Hebert, 1991; Kale et al., 2002; Tippins and Sohi, 2003). Although we tried to carefully select our respondents, the drawbacks of using a single-respondent survey should be not negated and therefore poses a limitation to this study.
2. The variable measuring the number of alliances consists of five categories (see Appendix 4). For the last category (> 40 alliances), the average was set at 50 alliances. Hence, the total number of alliances is an estimate of 2973 alliances.
3. None of the three variables was significant at the 5 per cent level. The chi-square statistic shows a χ^2 -value of 2.386 (p -value is 0.122) for number of employees, a χ^2 -value of 1.947 (p -value is 0.163) for sales revenues and a χ^2 -value of 3.133 (p -value is 0.077) for alliance performance. Therefore, no significant correlations were found between item scores and survey response time.
4. Multicollinearity is not an issue here, as SPSS protects against this by means of tolerance (Tabachnick and Fidell, 2001).

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