Alliance structure choice in the telecommunications industry: between resource type and resource heterogeneity

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Abstract: This empirical research analyses how firm resources influence the choice of governance structures in strategic alliances in the German telecommunications industry. The results of the study indicate that the choice of governance structure is determined by knowledge-based resources rather than resource heterogeneity, and support the claim that partner firms will use equity to safeguard their knowledge-based resources against opportunistic behaviour and unintended transfer of such resources. This paper also shows that there is no significant impact of trust, the number of alliance partners and whether the alliance partner competes in the same business, on the choice of the governance structures. Nationality of the alliance partners, strategic importance of the alliance and asset specificity are strongly confirmed as factors significantly influencing the alliance structure choice in the German telecommunications industry.

Keywords: strategic alliances; governance; alliance structure; resource type; resource heterogeneity; telecommunications.


Biographical notes: Thomas Mellewigt is a Professor of Management and holds the Deutsche Telekom Foundation Distinguished Chair in Strategic Knowledge Management at the Free University of Berlin. His research interests include contractual design and governance mechanisms of strategic alliances. His research has been published in the Strategic Management Journal, Journal
1 Introduction

Governance choice has been a popular topic in strategic alliance research. The transaction costs and resource-based perspectives have been the two principal theoretical frameworks employed in this research area. The transaction cost theory continues to dominate the field of strategic alliances, even as there has been increasing criticism of it in recent years. Eisenhardt and Schoonhoven (1996, p.137) state that “The logic of transaction cost minimisation does not capture many of the strategic advantages of alliances such as learning, creation of legitimacy, and fast market entry”. In contrast, the Resource-Based View (RBV) has steadily gained momentum as a possible new paradigm of strategy research (Barney, 1991; Mahoney and Pandian, 1992; Amit and Schoemaker, 1993). Despite this progress, a rigorous theoretical and empirical application of the RBV to the field of strategic alliances is still lacking. This lack of research is surprising, as the RBV “seems particularly appropriate for examining strategic alliances because firms essentially use alliances to gain access to other firms’ valuable resources” (Das and Teng, 2000, p.33).

This paper examines how firm resources influence the choice of governance structures in strategic alliances by simultaneously adopting the resource-based and transaction costs perspectives in order to show their respective contributions to our understanding of governance choice. Our focus is on a key common feature of both perspectives, namely resource type and resource heterogeneity.

But which resource attributes influence the alliance structure choice? Is there a certain resource type driving the structuring of alliances, as proposed by Das and Teng (2000)? Or does resource complementarity, one major motive for engaging in an alliance, have an influence on the governance form? What impact does resource heterogeneity have on the alliance structure choice?

Although the resource endowments of the alliance partners have been analysed to some degree, in the form of knowledge, know-how, and R&D and technology resources, research is still lacking an adequate comprehension of the role of all strategically important resources (Das and Teng, 2003). It would, thus, appear that a fine-grained analysis of resource endowments of alliance partners might help in understanding how resources play a role in the choice of alliance structures. We empirically examine whether the choice of governance structure in strategic alliances depends more on the type of resource (knowledge-based and property-based) that the alliance partners contribute to the alliance or on the heterogeneity of the resources among the partners.
2 Resource type and governance structure

Oxley (1999) explains that the different appropriation hazards arising from the characteristics of a resource (resource type) lead to different governance structures. Given that specifying property-based resources is less complicated than specifying knowledge-based resources, appropriation hazards are often much greater in the context of knowledge-based resources. Equity participation has been identified as one feasible countermeasure to appropriation concerns and opportunism, because “opportunism by an equity partner is penalized through reductions in the value of its equity holding” (Pisano, 1989, p.112). Focusing on opportunism, Transaction Costs Economics (TCE) explains different governance structure choices with different degrees of appropriation hazards.

Turning to the RBV, the focus shifts from safeguarding against opportunism of the alliance partner to improving the flow of this knowledge: “difficulties in knowledge transfer between firms – such as when knowledge is tacit or firms lack absorptive capacity – imply greater benefits from internal organization” (Sampson, 2004a, p.421). According to Kogut (1988), equity-based joint ventures are more effective in transferring tacit knowledge as compared to, say, licensing agreements. This logic that equity-based joint ventures enhance the transfer of knowledge has been corroborated, for example, by Mowery et al. (1996).

Das and Teng (2000) submit that the type of resources contributed to an alliance influences the member firm’s preferred governance structure. Resources are categorised according to their imitation barriers in terms of their property rights as proposed by Miller and Shamsie (1996), namely property-based resources and knowledge-based resources. Thus, a member firm will prefer a governance structure that better enables it to procure valuable resources from its partner firms without losing control of its own resources. Das and Teng (2000) point out that companies usually contribute multiple types of resources to the partnership, but that the dominant type of resources is decisive in the choice of the governance structure; “therefore, it is important to identify which types of resources ought to be committed to the alliance at a significant level – that is, which is their primary resource type” (Das and Teng, 2000, p.44).

Both TCE and RBV come to the conclusion that knowledge and knowledge transfer play a vital role in the governance structure choice, but for different reasons. While TCE concentrates on protection against the unintended transfer of knowledge, RBV pursues the idea of optimal knowledge transfer within alliances as a desirable goal, which is supported by an optimal governance choice. Norman (2002) integrates TCE and RBV by describing this situation of enabling knowledge transfer on the one hand and protecting one’s own knowledge on the other hand as a ‘boundary paradox’. Kale et al. (2000) find that the twin goals of protecting one’s proprietary assets and enabling the transfer of know-how from an alliance partner may not be mutually exclusive. It would, thus, seem that the two different mechanisms proposed by RBV and TCE perspectives lead to the same conclusion about the role of knowledge-based resources in influencing the governance structure.

Hypothesis 1: Alliances are more likely to be equity-based when the dominant resource type is knowledge.

3 Resource heterogeneity and governance structure

Mitchell et al. (2002, p.206) define a firm as “a governance structure, where governance includes coordinating the use of existing resources, creating new resources and protecting the value of resources”. Their theoretical approach comprises both RBV and TCE. The
first approach, RBV, explains the coordination of current resources and the creation of new resources, and the second, TCE, focuses on the protection of current assets. Their study investigated scale and link alliances among competitors, based on the distinction between similar or different resources contributed to alliances. Scale alliances are partnerships in which members contribute primarily similar resources, whereas substantially different or complementary resources prevail in link alliances.

Mitchell et al. (2002) also suggest that different types of alliances tend to require different governance mechanisms, and predict that parent equity holdings tend to be needed in the case of link alliances, when the combination of different resources might create learning opportunities for the partner firm that might result in unwanted resource transfer. Moreover, there is greater uncertainty in terms of the quality of the allied firm’s resources and the results of the partnership. Their hypothesis that parent equity holdings are more likely in link alliances than in scale alliances was supported. Mitchell et al. (2002, p.221) summarise their results about the correlation between resources and governance mechanisms as follows: “We also find that firms tend to use different governance mechanisms for link and scale alliances: firms are more likely to choose stronger protection mechanisms for link alliances which create greater appropriation risks, and tend to seek higher levels of coordination in scale alliances”.

Sampson (2004a) has examined R&D alliances from both RBV and TCE perspectives. Diversity in technological expertise is described as a continuum with the two extremes of identical technological capabilities and no similar capabilities. Using TCE, it is contended that technological diversity has an impact on the incentives and the ability of alliance partners to behave opportunistically, leading to the threat of unintended knowledge leakage. The logic is that technological diversity implies that partners possessing unique capabilities become vulnerable to losing these capabilities to a potentially opportunistic partner. As the diversity in technology rises, the incentive for opportunistic behaviour rises as well. In terms of RBV, Sampson (2004a) maintains that higher diversity in technology leads to higher coordination needs and, consequently, to more hierarchical governance structures. Equity joint ventures offer the flexibility to counter complexities arising from diversity in capabilities.

Many other scholars have also concentrated on R&D alliances (Sakakibara, 1997; Folta, 1998; Pangarkar and Klein, 2001; Caloghirou et al., 2003) to examine the relationships between capability (technology diversity) and alliance structure choice. Maintaining that knowledge-based resources are the major driver for these alliances can be seen as tantamount to a self-fulfilling exercise. Another bias originates from the fact that research studies often concentrate on alliances in which partners are from a particular industry, so that the resources would tend to be more similar as compared to alliances with partners from different industries.

Recognising the shortcomings of concentrating only on the attribute of heterogeneity of resources within the setting of a particular industry, it seems desirable to broaden the research focus. The coverage needs to encompass a wider range of strategically important resources instead of concentrating only on knowledge resources. Conner (1991) more generally speaks of an asset base instead of concentrating on knowledge resources. Additionally, taking into account the diversity of property-based resources also should lead to unique insights into the interrelationship between resource heterogeneity and alliance structure choice.

In summary, from a TCE perspective, resource heterogeneity is perceived as a question of appropriation hazards, which are safeguarded by the choice of an appropriate governance form. The RBV, in comparison, identifies this heterogeneity as a major
motivation to enter into alliances, so as to gain access to partners’ resources (Eisenhardt and Schoonhoven, 1996, p.138). Organisational boundary decisions based on RBV may lead to more effective coordination of resources, creating the potential for a sustainable competitive advantage. Hence, TCE and RBV come to the same conclusion about the role of heterogeneous resources in structural choice but for different reasons.

_Hypothesis 2: Alliances are more likely to be equity based when alliance partners provide heterogeneous resources._

# 4 Research methodology

## 4.1 Sample

The research was carried out using a sample of alliances in the German telecommunications industry. According to Section 4 of the German telecommunications law, every company that wants to offer telecommunications services is required to notify the regulatory authority. The register of the German regulatory authority for telecommunications and postal services was used as the data source for this paper. The subjects were all telecommunications companies that owned, under Section 6 of the law, either a licence class 3 (a network licence that allowed a company to build a network infrastructure) or a licence class 4 (a service licence that allowed a company to offer voice telephony to the public). In total, 257 companies were identified that owned a class 3 or a class 4 or both classes of licences. Of the 257 questionnaires mailed, 83 questionnaires were received, representing a 32% response rate. The satisfactory response rate may be attributed to the follow-up by a reminder letter and supplemental phone calls. The guarantee of confidentiality and the offer of a report on the main results of the study could be regarded as further incentives to respond to the questionnaire. Furthermore, the study was supported by two letters of recommendation from the leading telecommunications industry associations.

## 4.2 Survey instrument

The survey instrument contained questions about general alliance behaviour as well as questions about the management of the company’s most important alliance. Preliminary versions of the questionnaire were reviewed by four business researchers and nine practitioners from the telecommunications industry to ensure face validity. Three variables that had been used before in empirical studies in the USA were translated into German and reviewed by two German-speaking researchers.

## 4.3 Measures

### 4.3.1 Dependent variable: governance structure

The dependent variable is the governance structure of the alliance. The distinction between equity and non-equity alliances is commonly used in the international alliance literature (Gulati, 1995; Kale et al., 2000). In line with this practice, we categorise joint venture and parent equity holdings as equity alliances. Partnerships simply based on contractual agreements are defined as non-equity alliances. A value of 1 indicates an equity alliance, and a value of 0 indicates a non-equity alliance.
4.3.2 Independent variables

4.3.2.1 Resources in the telecommunications industry

The relevant literature on telecommunications was analysed in order to identify potential strategic resources. Besides land and buildings, the following resources were identified on the network level:

- local loop- and backbone-infrastructure (Kashlak and Joshi, 1994; Pupillo and Conte, 1998; Dengler, 2000; Gorman and Malecki, 2000);
- operation of switching-centres and IN-platforms (Dengler, 2000; Kennet and Uri, 2001);
- know-how about planning, construction and operation of telecommunications networks (Bard and Bejjani, 1991; Andersson and Molleryd, 1997; Dengler, 2000);
- rights of way (Cohen, 2001; Hare, 2001) and
- licences (Dengler, 2000; see also Cartelier, 2003).

For the level of sales and service, the following resources were identified:

- distribution networks (Frazier and Sheth, 1994; Andersson and Molleryd, 1997; Dengler, 2000, p.97; Gorman and Malecki, 2000);
- billing systems (Dengler, 2000, p.97; Milroy and Feng, 2001; see also Ralston, 2003);
- customer care, i.e., order processing, management of customer inquiries and reclamations (Raphael and Pascale, 1994; see also Ralston, 2003) and
- brand name (Rao and Monroe, 1989; Dengler, 2000, p.97).

This compilation of resources in the telecommunications sector was discussed with experts with regard to relevance, completeness and comprehensibility. The result of the literature analysis and the interviews with experts is a register of 12 resources at the alliance level. The reliability of the ‘resources’ scale, including the 12 resources that a firm itself transferred to the alliance, shows a Cronbach’s alpha of 0.822. For the 12 resources that the alliance partner brought into the alliance, the Cronbach’s alpha was 0.687. The minimum value of 0.7 for good scales (Nunnally, 1978) is thus met by the first set of resources (the firm’s) and is slightly, but negligibly, below the cut-off in the case of the partner resources.

4.3.2.2 Dominant resource type

Modelling the variable ‘dominant resource type’ entailed a five-step process. First, the most important resources for the telecommunications industry were identified. Second, the 12 resources used in this analysis were divided into two subgroups, knowledge-based resources and property-based resources. In the next step, the 12 resources were weighted in terms of their market relevance in the telecommunications industry. This was done by multiplying the respective resource endowment with the corresponding market relevance variable, which was determined from the survey using a 5-point Likert scale. The scale ranged between low market relevance and very high market relevance. Calculating an aggregation for both resource types (knowledge-based and property-based) constituted
the fourth step. Because there was an imbalance between the numbers of resources in the two types, the arithmetic means over the two types were calculated as an aggregated figure. This aggregation of all knowledge-based resources and all property-based resources was conducted for all the resources brought into the alliance, resulting in four different means, two means for the focal firm and two means for the partner firm. Further, the means of the focal firm and the partner firm were added together in order to yield a total knowledge-based resource mean and a total property-based resource mean.

In the fifth and last step, a dummy variable was set up which compared the aggregated and summed means of the different resource types. The variable takes a value of 1 if the total mean of knowledge-based resources in the alliance is larger than the total mean of the property-based resources. The value 0 is given if the total mean for property-based resources is larger than that of knowledge-based resources.

### 4.3.2.3 Resource heterogeneity measure

Heterogeneity vectors were calculated in order to measure the heterogeneity in the resource endowment between the alliance partners. The use of a vector as a measure is based on the method employed by Sampson (2004b, pp.500–501) who illustrates capability diversity with a multidimensional vector using patent classes. The original 5-point Likert scale of the resource endowment variables was transformed into one ranging from 0 to 4, as the value 1 on the original scale represents that a firm does not possess this particular resource type at all. The endowment with the 12 resources of one alliance partner is thus defined by a 12-dimensional resource vector. The 12 resources define the rows of the resource vector. Such a vector is set up for each alliance partner.

One characteristic of the angle between the two vectors is that its cosines radian measure ranges between $-1$ and 1. By definition, there cannot be negative components, since resource endowments cannot be smaller than 0; the radian measure ranges between 0 and 1. Figure 1 represents the construction of the resource endowment vectors.

**Figure 1** Construction of the resource endowment vectors

The cosines radian measure of the angle between the two resource vectors is used as measure of resource heterogeneity. What do the different values of the radian measure stand for? Different radian measure values stand for different angles which are spread by the resource vectors. In the case of a two-dimensional vector, a radian measure value of 0 stands for an angle of 90°, the two vectors standing orthogonal to each other. The other extreme of the scale is 1, and here the vectors ‘lay’ on each other so that the angle is 0°. This geometric description leads to the content-wise explanation of the measure used here. If the resource vectors stand orthogonal to each other, the resource endowments of the two alliance partners are completely different. Complete similarity is represented by a
value of 1, and the vectors have the same values (note that this meaning is reversed by recoding the value for ease of interpretation of the results of the logistic regressions discussed later). The radian measure is calculated simply by rearranging the formula for the scalar product of two vectors.

The above-mentioned recoding leads to a reverse meaning of the measures. Complete similarity takes a value of 0 and complete heterogeneity takes a value of 1. The descriptive measures of mean, minimum and maximum will change for this measure compared to the ones which are not recoded. However, there is no change of the influence in the regression models, only a change of the algebraic sign. This switch is merely for ease of interpretation of the measure in the models in accordance with the formulations of the hypotheses. For the sake of simplicity, the radian measure is called the resource heterogeneity vector in the discussion here. This nomenclature is chosen as a ready reminder of the idea that the calculated vectors represent the resource endowment of the firm. Figure 2 sums the above set-up.

**Figure 2** Calculation of the radian measure

\[
\text{vector}_r \text{ vector}_p = |\text{vector}_r| |\text{vector}_p| \cos \theta \\
\Leftrightarrow \cos \theta = \frac{\text{vector}_r \text{ vector}_p}{|\text{vector}_r| |\text{vector}_p|} \\
\Rightarrow \text{Recoding: } 1-\cos \theta = 1-\frac{\text{vector}_r \text{ vector}_p}{|\text{vector}_r| |\text{vector}_p|} \\
\text{Heterogeneity} = 1 \text{ AND } \text{Homogeneity} = 0
\]

### 4.3.3 Control variables

In order to account for potential confounds in the theoretical relationships, we included seven important control variables:

#### 4.3.3.1 Number of alliance partners

Alliances of more than two companies show a higher complexity and a higher control effort than dyadic interorganisational relationships (Das and Teng, 2002). Gulati (1995) maintains that in alliances with more than two partners the likelihood of equity-based alliances would be greater, because the risk of dysfunctional behaviour, conflicts and organisational problems would rise with the number of alliance partners. Therefore, the dummy variable ‘number of alliance partners’ was also added to the regression model. Alliances between two firms were coded 0, whereas alliances with a greater number of partners were coded 1.

#### 4.3.3.2 Nationality of alliance partner

The nationality of the alliance partner can influence the choice of the legal structure of interorganisational relationships and their success. The amount and quality of information about foreign companies is less than that of domestic companies. Moreover,
the loss of reputation through opportunistic behaviour is less for foreign companies. Gulati (1995) states that an equity-based governance structure would be more common if the partner firm did not have the same nationality as the focal firm. He gives two reasons for this: first, there exists more detailed information about domestic companies than about foreign companies, which lowers the risk of opportunistic behaviour, and, second, a bad reputation as a consequence of opportunistic behaviour affects a domestic firm more than a foreign firm. The conclusion drawn from this argument is that equity-based alliances would be more common in alliances with foreign partner firms. Therefore, a dummy variable ‘nationality of alliance partner’ was added to the regression model. Following Kale et al. (2000, p.237), we asked if the alliance partner was a company of the same nationality. For the regression analysis, again, a dummy variable was defined: a value of 1 indicates a different nationality and a value of 0 indicates that the company is of the same nationality.

4.3.3.3 Firm age

Furthermore, we controlled for the age of the firm, in years. This variable helps account for other sources of heterogeneity at the parent-firm level. For example, younger firms are apt to lack the experience, slack resources and staff to create more sophisticated alliance agreements, whereas these resources and administrative skills are more apt to be present in firms that are somewhat older (e.g. Niederkofler, 1991).

4.3.3.4 Trust

Trust is often argued to be the glue that keeps the partners in interorganisational relationships together (Bradach and Eccles, 1989; Das and Teng, 1998). Consequently, the relationship of governance choice in interorganisational relationships and trust has been a matter of an ongoing debate, especially in that part of the research literature that is more driven by appropriation concerns. Trust involves the expectation of reduced opportunistic behaviour and thereby relaxes the need for protective governance mechanisms. Thus, the presence of trust seems to make equity-based alliances less likely (Gulati, 1995). Indeed, Gulati (1995) shows empirically that trust measured as prior alliances between firms make equity-based alliances less likely. To measure trust, the scale of Kale et al. (2000, p.237) was used. Trust was measured with five items indicating to what extent mutual trust, respect, personal friendship, personal interaction and reciprocity prevail between the alliance partners. In contrast to the 7-point Likert scale of Kale et al. (2000), we used a 5-point Likert scale in favour of uniformity because this was applied almost throughout the questionnaire. A Cronbach’s alpha of 0.810 was determined for the trust scale.

4.3.3.5 Alliance partner as competitor

Another factor that might influence the choice of the governance structure in strategic alliances is the rivalry between alliance partners. Oxley and Sampson (2004) maintain that when partner firms are direct competitors in end product or strategic resource markets, more ‘protective’ governance structures, such as equity joint ventures, will be chosen. Accordingly, we gathered data on whether a focal firm’s partner operated in the same or in a different industry. Again, a dummy variable was defined for the regression model; it was coded 0 if the partner firm operated in a different industry and 1 if it operated in the same industry.
4.3.3.6 Strategic importance gap

The addition ‘strategic’ in the context of alliances has become increasingly important over time, due to the growing importance of alliances in a highly competitive business environment. Ownership enables a company in a strategic alliance to get control over important resources of a partner firm (Gulati and Singh, 1998). If the perception of the importance of an alliance differs, the aspired governance form will be different for the alliance members. As the one identifying the cooperation as important might want to choose an equity link in order to allow broad access to the resources of the partner, the other partner will prefer a contract form because for it the interest is limited.

Measuring the gap between the strategic importance of the alliance for the focal firm compared to the strategic importance for the partner firm was done by calculating the absolute value of the difference between the two strategic importance variables. The strategic importance for the focal firm and the partner firm were polled via a 5-point Likert scale, which ranged from strongly disagree to strongly agree.

4.3.3.7 Asset specificity

As this paper concentrates on the characteristics of resources, a meaningful completion of the set of control variables is one that reflects one major finding of the past academic discussion. Asset specificity as a true TCE construct and success story is of strong explanatory power in the debate about governance structure choice. Shelanski and Klein (1995), for example, find that boundary choice is mainly influenced by asset specificity. David and Han (2004) show that it is worthwhile to devote more time to the construct of asset specificity and its influence on governance structure choice. Asset specificity finds its way into the analysis in the form of specific investments in personnel and dedicated facilities. The variable is calculated by summing up these two variables. The Cronbach’s alpha of these two is at an acceptable level of 0.593.

5 Results

The dependent variable was dichotomously coded, with equity alliances taking the value of 1 and non-equity alliances 0. Owing to the dependent variable’s binary character, a logistic regression analysis instead of a linear regression model was carried out. For a binary-coded variable, a logistic regression analysis is more appropriate than a two-group discriminant analysis. According to Menard (1995), essential premises for regression models are independent regressors (which mean non-multicollinearity) and more than 50 cases. In order to check for multicollinearity, the method suggested by Menard (1995, p.66) was applied to the models presented here via the use of collinearity measures of a linear regression to gauge if a logistic regression entails a problem of multicollinearity. The critical values (Menard, 1995) for the tolerance values of 0.20 and for the Variance Inflation Factor (VIF) of 5 were undershot for both models. Consequently, the potential problem of multicollinearity can be excluded. We give the descriptive statistics in Table 1.
## Table 1

Descriptive measures and pair-wise correlations

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<tr>
<th></th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
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<th>2</th>
<th>3</th>
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<th>5</th>
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<th>7</th>
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<td>.38</td>
<td>1</td>
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<td>2. Number of partners</td>
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<td>.50</td>
<td>.17</td>
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<td>3. Nationality of partners</td>
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<td>1</td>
<td>.13</td>
<td>.33</td>
<td>.20</td>
<td>-.06</td>
<td>1</td>
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<td>7. Strategic importance gap</td>
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<td>9. Dominant resource type</td>
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Note: * The correlation is at the .05 (two-sided) significance level.
In Table 2, we summarise the results of the logistic regression models. Model 1 shows the effect of the control variables on the governance structure of strategic alliances. The chi-square value indicates that the model in general is significant on the $p = .05$ level of significance. In order to judge the quality of the model, Nagelkerke’s R-square was applied. With a Nagelkerke’s R-square of 0.38, the model fit can be considered as moderately good (Backhaus et al., 2003). The results of model 1 show that the nationality of the alliance partner and asset specificity influence the governance structure choice. Equity-based alliances are more likely when alliances are formed with partners from other countries and specific investments are made. In contrast, trust, the number of alliance partners, firm age, the industry of the partner and a gap in strategic importance do not influence governance structure choice.

### Table 2  Results of the logistic regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>−6.07</td>
<td>−6.87</td>
</tr>
<tr>
<td></td>
<td>(3.22)*</td>
<td>(3.82)*</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>−.06</td>
<td>−.10</td>
</tr>
<tr>
<td></td>
<td>(.13)</td>
<td>(.15)</td>
</tr>
<tr>
<td></td>
<td>1.31</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>(.90)</td>
<td>(0.96)</td>
</tr>
<tr>
<td></td>
<td>2.27</td>
<td>2.32</td>
</tr>
<tr>
<td>Nationality of alliance partners</td>
<td>(1.15)*</td>
<td>(1.23)*</td>
</tr>
<tr>
<td></td>
<td>.28</td>
<td>.20</td>
</tr>
<tr>
<td></td>
<td>(.25)</td>
<td>(.28)</td>
</tr>
<tr>
<td></td>
<td>.47</td>
<td>.27</td>
</tr>
<tr>
<td>Partner as competitor</td>
<td>−1.10</td>
<td>−1.43</td>
</tr>
<tr>
<td></td>
<td>(.86)</td>
<td>(.96)</td>
</tr>
<tr>
<td>Strategic importance gap</td>
<td>−.71</td>
<td>.83*</td>
</tr>
<tr>
<td></td>
<td>(.71)</td>
<td>(.83)*</td>
</tr>
<tr>
<td>Specific investment</td>
<td>.59</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>(.24)**</td>
<td>(.26)**</td>
</tr>
<tr>
<td>Direct effects</td>
<td></td>
<td></td>
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<tr>
<td>Dominant resource type</td>
<td>2.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.32)*</td>
<td></td>
</tr>
<tr>
<td>Resource heterogeneity</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.80)</td>
<td></td>
</tr>
<tr>
<td>Nagelkerke’s $R^2$</td>
<td>.38</td>
<td>.46</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>16.62*</td>
<td>20.58*</td>
</tr>
</tbody>
</table>

Notes: $N = 64$ (one-tailed test).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Positive coefficients indicate that an increase of the independent variable increases the probability of an equity alliance (equity alliance = 1) in comparison to a non-equity alliance (non-equity alliance = 0).
Model 2 shows the influence of dominant resource type and resource heterogeneity on the governance structure of strategic alliances. The chi-square value indicates that the model in general is significant at the $p = 0.05$ level. With a Nagelkerke’s R-square of 0.46 the model fit can be considered good (Backhaus et al., 2003). The results support Hypothesis 1, which stated that the likelihood of equity-based alliances would be greater if the alliance is driven by knowledge-based resources. This finding is, thus, consistent with Das and Teng (2000) that knowledge-based resources contributed to alliances would be more likely to be safeguarded by an equity-based governance structure in order to mitigate opportunistic behaviour and unintended transfer of such resources.

Hypothesis 2 was not supported, as the model does not disclose any significant connection between resource heterogeneity and the choice of governance structure in alliances. The results, thus, differ from those of Mitchell et al. (2002) whose findings indicated that the combination of different resources would offer more opportunities for learning and could, thus, lead to an unintended transfer of resources. Mitchell et al. (2002) maintained that equity participation would be positively correlated with resource heterogeneity, and justified this on the basis of the common concern to protect a firm’s own resources. Contrary to this reasoning, our results show that the choice of an equity alliance is not determined by resource heterogeneity but rather by knowledge-based resources. These knowledge-based resources may cause certain interpartner heterogeneities in resources. For example, one partner might bring marketing know-how to the alliance and the other know-how about the operation of the telecommunications network. In order to further illustrate these results, we calculated marginal effects for both hypotheses. The results of these calculations are that a marginal increase of 0.10 for the between 0 and 1 standardised vector measure increases the probability for an alliance to be equity-based by 0.7%. The marginal effect size for the dummy variable dominant resource type is approximately 15.2%. Thus, the probability that an alliance is equity-based increases by more than 15% if the alliance is knowledge-dominated.

6 Discussion and conclusions

This empirical study analyses how the characteristics of firm resources influence the choice of governance structures in strategic alliances. In particular, we examined the relative influences of the resource type (knowledge-based and property-based) and interpartner resource heterogeneity on alliance structure choice in the telecommunications industry.

The distinction between property-based and knowledge-based resources has proved to be appropriate. The results indicate that equity-based alliance structures will be more common when knowledge is the dominant resource type within the alliance. These findings are consistent with Das and Teng’s (2000) argument that partner firms will safeguard their contributed knowledge-based resources by employing equity to curb opportunistic behaviour and unintended transfer of such resources. Moreover, the current study failed to find support for the position of Mitchell et al. (2002) and Sampson (2004a), as we found no evidence that resource heterogeneity influences governance structures in alliances in the telecommunications industry. Based on these empirical findings, we submit that the choice of the governance structure is not determined by resource heterogeneity but rather by knowledge-based resources.
Also, in case alliance partners evaluate the importance of the alliance in a similar manner, it is more likely that an alliance would be equity-based. In other words, alliance partners are more willing to enter into equity-based alliances if the importance for the partner is equal to one’s own priorities. Furthermore, asset specificity reaffirms its major explanatory power in this study, corroborating that when investments lead to a possible lock-in, alliances partners tend to establish an equity-based alliance.

The current study also showed, as in Gulati (1995), that the nationality of the alliance partner influences the governance structure decision. Alliances consisting of partners from different nations are more likely to be equity-based. In contrast to the findings of Gulati (1995), however, the current study did not find support for the proposition that the number of partners would have a bearing on the choice of the governance structures in strategic alliances. Furthermore, firm age and the industry of the alliance partner did not seem to influence the governance structure decision.

Moreover, in contrast to Gulati (1995), trust did not influence the alliance structure choice in the German telecommunications industry. In other words, trust between alliance partners did not increase the likelihood that a non-equity alliance was chosen over an equity alliance. We suggest three reasons to help explain this result. First, the German telecommunications market is a new industrial sector which has been opened for competition since 1998. Ninety per cent of the alliances were established after 1 January 1998. In addition, most telecommunications companies had only little experience with alliances. Considering this, trusting personal relations between managers (as in other industries) might still be an exception in telecommunications companies. Second, the German telecommunications sector is characterised by high environmental dynamism. Between 1998 and 2000, the number of telecommunications companies had constantly risen, but since then a shakeout and numerous liquidations and mergers and acquisitions can be observed in the telecommunications sector. In such an environment, an alliance partner that is trusted today might not be on the market tomorrow. Consequently, alliance partners seek to safeguard their investments through equity-based alliances. Third, trust as well as alliance structure choice develop over time. The current study contains a cross-section analysis. It might be that at the time of our data collection, it was, on the one hand, too early for trusting personal relations between alliance managers and, on the other hand, alliance structure choice might not have been renegotiated at that point in time, because companies lacked experiences and information regarding the partner’s trustworthiness. Also, some of the firms may not have worked together before, so that trust was unlikely to have been a factor in their structuring decision. In summary, the current study provides empirical evidence for the boundary condition of the relationship between trust and alliance structure choice.

There are some limitations in the present study, ones that also point to the areas that call for future research. The measurements of the resources are based on data that reflect perceptions. Even though this procedure is customary in resource-based studies (Chandler and Hanks, 1994), a supplementation or substitution with objective measures would be desirable. Therefore, telecommunications networks could, for instance, be operationalised in terms of the number of switching centres and the kilometres of glass fibre net (or the capacity of the net). Also, as is common in alliance research (Ahuja, 2000; Kale et al., 2000), a one-sided measurement was made, i.e., the alliance was evaluated from the perspective of one alliance member, the focal firm. However, it is not unlikely that specific parameters would have been evaluated differently by the partner firm. In that case, it would be more realistic to analyse the complexities of interpartner
differences in evaluations, differences that are likely to lead to negotiations between the alliance members before the actual governance structure is agreed upon. The current study did not inquire into the dynamics of this pre-formation exercise in the alliances that we studied, but we may assume that the eventual structural choice would be mostly a result of interpartner negotiation. Additionally, in order to identify strategic resources, the RBV suggests focusing on only one industrial sector. It is, therefore, not certain if our results can be straightforwardly generalised to industries other than the German telecommunications sector. Given that the telecommunications sector is characterised by pronounced environmental dynamism, vigorous competition and high growth, it would be desirable that future studies be conducted in other kinds of industries.

In conclusion, the current study presented an empirical application of the resource-based and transaction cost perspective simultaneously in order to explain the management of strategic alliances. It showed that firms manage their alliances with governance structures that consider the nature of the resources they contribute to the alliances. Hopefully, the current study provides some impetus to more empirical investigations in order to lend rigorous support for a more comprehensive resource-based theory of strategic alliances.

References


Alliance structure choice: between resource type and resource heterogeneity


**Note**

1 An earlier version of this paper was presented at the 2007 annual meeting of the Academy of Management, Philadelphia, PA.