

Allocation of Decision Rights in Joint Ventures

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Previous studies in organizational economics and international business research have not tested a property rights view on the allocation of decision rights (DR) in joint ventures (JVs). The paper offers a test of the property rights explanation by using data from Hungarian JVs. Our analysis derives the following hypothesis: The more important the JV partner's intangible knowledge assets for the generation of residual surplus, the more residual DR are assigned to him. Copyright © 2009 John Wiley & Sons, Ltd.

1. INTRODUCTION

Previous studies in organizational economics have not tested a property rights view on the allocation of decision rights (DR) in joint ventures (JVs). According to the property rights theory (Grossman and Hart, 1986; Hart and Moore, 1990; Barzel, 1997; Baker *et al.*, 2003, 2006, 2008), the structure of residual DR depends on the distribution of intangible knowledge assets that generate the firm's residual surplus. In JVs, intangible knowledge assets refer to the JV partners' noncontractible capabilities (know-how in R&D, production and procurement management, marketing and advertising, human resource management, organization design, strategy formation) that cannot be easily transferred by contract (Nakamura and Xie, 1998; Nakamura, 2005). The thesis of the paper is: The more important the JV-partner's intangible knowledge assets relative to the other partner for the generation of residual income, the more residual DR should be assigned to him.

Although several theoretical and empirical studies dealing with the allocation of DR exist in organizational economics (Baiman *et al.*, 1995; Lerner and Merges, 1998; Arrunada *et al.*, 2001; Nagar, 2002; Elfenbein and Lerner, 2002; Brickley *et al.*, 2003; Christie *et al.*, 2003; Kaplan and Stromberg, 2003; Windsperger and Jell, 2005; Hu and Hendrikse, 2007), no prior research tests a property rights approach of the allocation of DR in JVs. In addition, many studies in international business research investigate the problem of control in international JVs (Killing, 1983; Schaan, 1988; Geringer and Hebert, 1989; Glaister, 1995; Mjoen and Tallmann, 1997; Chalos and O'Connor, 1998, 2004; Calatone and Zhao, 2000; Groot and Merchant, 2000; Brown *et al.* 2003; Choi and Beamish, 2004; Pangarka and Klein, 2004; Kamminga and van der Meer-Kooistra, 2007; Kahrhunen *et al.*, 2008). However, in this research, control is a very heterogeneous concept and is only partly related to the allocation of DR between the JV partners. It has been modeled by relative degree of ownership and/or a high level of management control and/or a high level of control of specific activities (e.g. Blodgett, 1991a,b; Gray and Yann, 1992; Mjoen and Tallman, 1997). Since most of these studies do

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not explicitly differentiate between ownership and control as distinct theoretical constructs, the research results are difficult to compare and cannot be easily generalized (Kahrhunen *et al.*, 2008). Starting from these theoretical and empirical deficits, we focus in this study on the allocation of DR between JV partners. Our contribution to the literature is to empirically investigate the influence of intangible knowledge assets on the allocation of residual DR in Hungarian JVs.

The paper is organized as follows. Section 2 gives an overview of the relevant literature in organizational economics and international business research. Section 3 presents a property rights approach of the allocation of DR in organizations. Section 4 examines the relationship between knowledge assets and the allocation of residual DR in JVs, and Section 5 tests the hypothesis in the Hungarian market.

2. RELEVANT LITERATURE

2.1. Allocation of DR in Organizational Economics

In organizational economics, the question of how to allocate DR was investigated in intra- and inter-organizational settings by applying transaction cost, agency and property rights theory. Lerner and Merges (1998), Arrunada *et al.* (2001), Elfenbein and Lerner, (2002), Brickley *et al.* (2003), Windsperger (2003), Higgins (2006) and Hu and Hendrikse (2007) and Windsperger and Yurdakul (2007), examine the allocation of DR in inter-organizational networks. Based on Aghion and Tirole (1997), Lerner and Merges (1998) analyze 25 DR that can be allocated to either partner in contracts between pharmaceutical firms and biotechnology companies, such as the right to control patent litigation or the right to manufacture the final product. Similarly, Arrunada *et al.* (2001) investigate the allocation of DR in contracts between car manufacturers and their dealers, such as the right to determine the qualifications of the sales force or the right to set prices. Likewise, Elfenbein and Lerner (2002) study the allocation of DR in contracts between internet portal operators and content suppliers. They argue that the allocation of DR depends on the bargaining power of the parties. Brickley *et al.* (2003) investigate the allocation of decision

authority in commercial banks. They argue that local managers of independent small bank have a higher proportion of DR compared with branch managers of large banks because they have more specific local knowledge regarding their customers in rural markets compared with the branch managers of large banks. Windsperger (2003) and Windsperger and Yurdakul (2007) examine the governance structure of franchising networks in Austria and Germany. They show that the allocation of DR between the franchisor and franchisee depends on the contractibility of system-specific and local-market assets. Furthermore, Higgins (2006) argues that the allocation of DR between pharmaceutical and biotechnology firms is sensitive to the bargaining position of both parties. More recently, Hu and Hendrikse (2007) study the allocation of DR in the context of fruit and vegetable contracting in China. Starting from these empirical results, Baker *et al.* (2006, 2008) extend the Grossman/Hart/Moore approach by modeling the allocation of DR across the fixed-firm boundaries. Based on Simon's adaptation view of organizations (Simon, 1951), they developed a model in which decisions are noncontractible but DR are contractible. When decisions are noncontractible, due to intangible knowledge and uncertainty, the *ex ante* allocation of DR determines the efficiency of adaptation. In addition to the inter-organizational studies, several authors investigate the allocation of DR in an intra-organizational context (Baiman *et al.*, 1995; Nagar, 2002; Christie *et al.*, 2003; Abernethy *et al.*, 2004; Vazquez, 2005; Windsperger and Jell, 2005; Harris and Raviv, 2005).

2.2. Allocation of Control in International Business Research

Scholars in international business research have been studying control in international business ventures for decades (e.g. Killing, 1983; Geringer and Hebert, 1989; Groot and Merchant, 2000; Chalos and O'Connor, 2004; Jaussaud and Schaaper, 2006). However, the research as to whether the ownership and/or decision-making can be used as a proxy for control or whether control is a different theoretical construct resulted in contradictory results (Kahrhunen *et al.*, 2008). Starting from Brown *et al.*'s claim to separate ownership and control (Brown *et al.*, 2003)—which

is also compatible with the research results in the corporate governance literature (e.g. Fama and Jensen, 1983; Harris and Ogbonna, 2005), control refers to the question of how to allocate decision-making authority in JVs.

In the following, we review the relevant literature (1) on the relationship between the control and the types of JVs, and (2) on the determinants of the JV's control structure changes over time.

Ad (1):

The following types of JVs can be differentiated according to the control patterns (Killing, 1983, 1988; Beamish, 1985; Schaan, 1988; Glaister, 1995; Yan and Luo, 2001; Zhang and Li, 2001; Kamminga and van der Meer-Kooistra, 2007): Dominant JVs, independent ventures, shared management JVs, and split management JVs. In dominant JVs only one of the partners plays a dominant role in decision-making, in shared management JVs both the partners play an active role in decision-making, in independent JVs the partners' parents do not influence decision-making and the JV general manager has a high level of decision-making autonomy, and in split management JVs, the allocation of decision-making between both the partners depends on the partner's intangible resources and capabilities that generate competitive advantage for the JV. Hence in split management JVs the allocation of decision-making authority is a function of specific knowledge contribution of the partners. The partners tend to exercise dominant control over those activities of the value chain where they have firm-specific advantages due to intangible knowledge assets (Choi and Beamish, 2004). The latter characteristic is the main difference between shared and split management JV. In shared management JVs, decision-making authority over almost all value-creation activities is shared between the partners with less focus on the underlying firm-specific advantages. Therefore, the split management view on structuring DR in JVs is based on the resource-based theory of bargaining power (Lecraw, 1984; Harrigan and Newman, 1990; Blodgetts, 1991a,b; Yan and Gray, 1994; Child *et al.*, 1997; Mjoen and Tallman, 1997). This view is closely related to our property rights view on the allocation of DR in JVs. According to our approach, the allocation of DR depends on the distribution of intangible (noncontractible) knowledge assets between the JV partners.

Ad (2):

Although many empirical studies have examined the determinants of the JV control structure, few studies have focused on the question of how a JV control structure evolves over time (Inkpen, 1995; Inkpen and Beamish, 1997; Inkpen, 2000, 2002; Zhang and Li, 2001; Currall and Inkpen, 2003; Inkpen and Currall, 1998, 2004; Kamminga and Van der Meer-Kooistra, 2007). These authors explain control-design changes over time by applying resource-based and organizational learning perspectives. According to this dynamic view of JV control, the main determinants of control structure changes are trust and collaborative learning. A JV control structure will change as the partners' relative knowledge position and hence bargaining power changes with inter-organizational learning. In addition, a change in the relative knowledge position may trigger a change in trust between the JV partners. When inter-partner learning is asymmetrical, the bargaining power of one partner increases, resulting in an asymmetric distribution of decision-making authority and, consequently, in reduced trust and a lower propensity of inter-organizational learning. On the other hand, when inter-partner learning is symmetric, the bargaining power is more equal, resulting in a more symmetric distribution of decision-making authority and hence in an increase in trust between the partners and a higher propensity of inter-organizational learning over time. Inkpen and Currall conclude that 'the learning process provides the mechanism for the linkage between trust and JV control' (Inkpen and Currall, 2004, 593). Therefore, trust as the informal control device influences the allocation of decision-making authority as the formal control structure of the JV (Gulati and Sytch, 2008).

To summarize the relevant results on control in international business research, we can say, first, that control depends on the distribution of knowledge assets between JV partners and, second, that control design changes depend on the changes of the relative knowledge contributions through collaborative learning that is initiated and enhanced by trust between the JV partners. When we compare these results with our property rights view, we can state that the property rights approach is largely compatible with the bargaining power perspective of control

in international business research. Especially, the differentiation between more and less contractible knowledge assets as determinant of the structure of decision-making authority is closely related to the differentiation between tangible and intangible knowledge assets in the international business literature. For instance, a change in contractibility of knowledge assets through inter-organizational learning may explain changes in JV control design over time. On the other hand, contrary to most of the studies in international business research, our study uses a homogeneous concept for the operationalization of DR in JVs.

3. A PROPERTY RIGHTS VIEW ON THE STRUCTURE OF DR IN ORGANIZATIONS

Hayek (1935, 1940, 1945) already pointed out that the centralization of decision-making in organizations is only efficient if the central planner has the knowledge that is specific in time and place. March and Simon (1958) presented a similar view on the design of organization. Owing to the CEO's limited information processing capabilities, organizations must delegate decision-making power. Based on the property rights theory, Jensen and Meckling (1992) argued that organizational efficiency requires that those with the responsibility for decisions also have the knowledge valuable to those decisions. Co-location of DR with knowledge can be achieved by transferring the knowledge to the person who has the decision right or by transferring the DR to the person with the knowledge. This means that knowledge transfer costs determine the allocation of DR in organizations. DR tend to remain in the CEO's office when the costs of transferring knowledge to the central office is low, and DR tend to be delegated to lower levels of the hierarchy when the firm primarily produces knowledge that is costly to transfer to the CEO (Malone, 1997). The question to ask is which factors influence the knowledge transfer costs. According to the property rights approach, the structure of residual DR depends on the distribution of intangible (noncontractible) assets. The person who has intangible knowledge assets that generate the residual surplus should have the residual DR to maximize the residual income

(Rajan and Zingales, 2000). These rights refer to the use of local knowledge as, 'sticky information (von Hippel, 1994) that cannot be easily communicated and specified in contracts due to too high-transaction costs'. In addition, specific or nonresidual rights are explicitly stipulated in contracts (Demsetz, 1998). For instance, specific user rights over a computer may be rights to use it to run a particular program in a particular manner in a particular time period for some specific purpose' (Foss and Foss, 1998). Therefore, they refer to the use of general or explicit knowledge (as tangible knowledge assets) of the parties that can be more easily written down and specified in contracts. Consequently, given the distribution of intangible knowledge assets, the maximum resource value obtains if the DR are assigned to those who are best able to use these assets (Wruck and Jensen, 1994; Aghion and Tirole, 1997; Malone, 1997). The relationship between knowledge assets and DR can be stated by the following property rights proposition:

The more important a person's intangible knowledge assets for the generation of the residual income relative to another person, the more residual decision rights should be assigned to that person.

4. KNOWLEDGE ASSETS AND DR IN JVS

According to the property rights approach, the structure of residual DR between the JV partners depends on the distribution of intangible (noncontractible) assets. Which knowledge assets are generated and used in JVs, and how are the DR allocated between JV partners? We analyze a JV company with two JV partners (P1, P2). Firms that create a JV face the problem of maximizing the returns to intangible knowledge assets of the JV company when they are dependent on both partners' investments in these assets. For instance, in international JVs the intangible knowledge assets of partner 1 includes knowledge and skills in product development, procurement, production and branding, and the intangible knowledge assets of partner 2 refer to the local-market knowledge, cultural and institutional know-how and human resource capabilities. DR refer to strategic and operational decisions, such as strategy formation, organization design, product, price, marketing,

advertising, procurement and production, finance and investment, human resource management, and controlling system. According to Jensen and Meckling (1992), two ways for allocating DR exist: Either knowledge must be transferred to those with the right to make decisions or DR must be transferred to those who have the knowledge. Thus DR are allocated to P1 when the costs of transferring knowledge from P1 to P2 are relatively higher compared with the costs of transferring knowledge from P2 to P1. This is the case when P1's knowledge assets are very intangible and P2's knowledge assets are less intangible and hence more contractible. In this case, P1 has a stronger bargaining power, due to his intangible knowledge assets that generate the residual surplus, and he can easily acquire the knowledge assets from P2, due to its high degree of contractibility. On the other hand, more residual DR have to be allocated to P2 when his knowledge assets are more intangible and consequently the knowledge transfer costs are very high.

Consequently, following the property rights theory, residual DR have to be allocated according to the distribution of intangible knowledge assets between the JV partners. Hence an efficient decision structure of the JV company implies co-location of knowledge assets and DR (Brickley *et al.*, 1995; Hitt and Brynjolfsson, 1997).

The following example illustrates this property rights view. We differentiate between two cases (see Figure 1):

Case A: P1 has a large fraction of intangible knowledge assets (for instance, technological and brand name know-how) and the know-how of P2 (for instance local-market knowledge and human resource capabilities) is less intangible and hence more contractible. Owing to P1's dominant know-how position he should get a large fraction of residual DR to maximize the JV's residual income stream.

Case B: P2 has a large fraction of intangible knowledge assets (for instance, local-market knowledge and cultural know-how) that generate a high residual surplus and the P1's assets are less intangible. In this case, the residual DR must be assigned according to P1 and P2's know-how position. Therefore, compared with case A, P2 has a stronger bargaining power and hence more residual DR are transferred to P2.

If these alignment conditions are not fulfilled, the following inefficiencies may arise: (a) inefficiencies arise because a large fraction of residual DR is transferred to P2, although P1 has the most important part of intangible knowledge assets that generates a large fraction of the total residual income stream of the JV (see (2) in Figure 1) and (b) inefficiencies arise because a low fraction of residual DR is transferred to P2, although P1 has only a small part of intangible knowledge assets (see (3) in Figure 1). Owing to this misfit between the distribution of intangible knowledge assets and the allocation of DR, the JV's residual surplus cannot be maximized.

Knowledge Assets	Decision Rights	
	Higher fraction of DR of JV-partner 1	Higher fraction of DR of JV-partner 2
CASE A: Joint venture partner 1's know how: high Joint venture partner 2's know how: low	1 FIT	2 MISFIT
CASE B: Joint venture partner 1's know how: low Joint venture partner 2's know how: high	3 MISFIT	4 FIT

Figure 1. Co-location between knowledge assets and decision rights.

In sum, we can derive the following property rights hypothesis: The higher the intangible knowledge assets of partner 1 relative to partner 2, the higher the partner 1's fraction of residual DR.

5. EMPIRICAL ANALYSIS

5.1. Sample and Data Collection

The empirical setting for testing this hypothesis was the Hungarian market. We started our empirical work by first obtaining a list of 530 JV companies from the Hungarian Joint Venture Association in 2004. The directory of the JV association provided the most comprehensive listing of JV companies operating in Hungary. After several preliminary steps in questionnaire development, the final-version of the questionnaire was sent out by mail to the general managers of the JV company in October 2004 and March 2005. The questionnaire, of which variables are presented in the next section, took approximately 15 min to complete on the average. We received 80 completed responses establishing a rate of return of 15%. The general managers as respondents to the survey were the key informants of the JV companies. Since the general managers as top decision makers in the JV company are involved in all organizational decisions, they were judged to be the most suitable respondents (John and Reve, 1982).

We examined the nonresponse bias by investigating whether the results obtained from the analysis were driven by differences between the group of respondents and the group of nonrespondents. An estimation of nonresponse bias was conducted by using the following approach: Nonresponse bias was estimated by comparing early versus late responders (Armstrong and Overton, 1977), where late responders serve as proxies for nonrespondents. No significant differences emerged between the two groups of respondents.

5.2. Measurement

To test our property rights hypotheses, the following variables are included in the regression analysis: Intangible knowledge assets, residual DR, as well as firm size and technological uncertainty as control variables (see Appendix).

5.2.1. Intangible knowledge assets (*KNOW*)

The general managers of the Hungarian JV-companies were asked to rate on a seven-point scale the JV-partner's intangible assets. The questionnaire asked the extent to which JV-partner 1 has a relative knowledge asset advantage compared to partner 2 (P1 is the partner with the higher percentage of equity in the JV). The knowledge assets refer to the following value chain activities: Production and logistics, human resource management (recruiting), local-market services, strategic planning, controlling, R&D, organization design, strategy formation, local-market knowledge, local institutional knowledge. This measure displayed good reliability (Cronbach alpha = 0.94) (Hair *et al.*, 1998).

5.2.2. Residual DR

The indicator of residual DR is a measure of the distribution of decision-making authority between the JV partners. Our DR variable include the following decisions of the JV: Procurement and production decisions, marketing decisions (price, product, promotion and advertising), human resource decisions (recruitment, training, incentives and wages), investment and finance decisions, strategy formation and organization decisions, and decisions concerning the application of accounting and control systems. The indicator of DR addresses the extent to which residual decisions are influenced by partner 1 compared to partner 2. Hence, it is a measure for distribution of the decision-making authority in the JV company that is compatible with Nagar's measure of DR in retail banking (Nagar, 2002). The general managers of the JV companies were asked to rate the JV partner's influence on these decisions on a seven-point scale.

5.2.3. Control variables

Firm size (SIZE): We used the annual sales value of the parent firm as proxy of the firm size representing economies of scale of coordination and monitoring (Martin, 1988; Brickley *et al.*, 1991). The larger the size of the parent firm, the larger its coordination and monitoring capacity, the more easily the parent firm can control the JV, and hence the lower the propensity to transfer residual DR to the partner.

Technological uncertainty (UNCERT): We used technological uncertainty as proxy for knowledge spillover costs. Knowledge spillover costs may

arise because the JV partner has access to intangible knowledge of the other partner(s) after the JV was created (Hennart and Zeng, 2005). The higher the technological uncertainty, the more control is exercised by the JV partner to reduce the knowledge spillover risks. We used a single-item scale that assesses the technological change at the market (1 = low, 5 = high).

5.3. Results

Tables 1 and 2 contain descriptive data of the Hungarian JV companies.

To test the hypothesis (H1) we carried out an ordinal regression analysis with the index of DR (1,...,7) as the dependent variable. The explanatory variables refer to the JV partner 1's relative knowledge advantage (KNOW), size of

the parent firm (SIZE) and technological uncertainty (UNCERT). Based on our property rights hypothesis, DR vary positively with the partner 1's know-how advantage (KNOW). Further, DR vary positively with SIZE, due to economics of scale of coordination and monitoring, and technological uncertainty (UNCERT), due to the knowledge spillover risk. We conducted two separate regressions (without and with control variables). Results of the ordinal regressions are provided in Table 3. In both the models, the coefficient of intangible knowledge assets (KNOW) is highly significant and consistent with our property rights hypothesis. The larger partner 1's know-how advantage, the more residual DR are transferred to him. In addition, the coefficients of the control variables (SIZE, UNCERT) have the expected positive sign and are

Table 1. Knowledge Assets in Joint Ventures

	N	Minimum	Maximum	Mean	Standard deviation
JV-PARTNER 1's Proportion of OWNERSHIP	78	0.04	0.99	0.6208	0.22224
Production and logistics know how Human resource	80	1.00	7.00	3.2750	2.20457
Management know how	80	1.00	7.00	2.7750	1.71350
Local services know how	80	1.00	7.00	3.4625	1.98056
Strategic planning know how	80	1.00	7.00	3.7750	2.01246
Controlling know how	80	1.00	7.00	3.8875	2.01886
R&D-know how	79	1.00	7.00	3.8484	2.26506
Organization design know how	79	1.00	7.00	3.4304	1.85834
Strategy formation know how	79	1.00	7.00	3.8861	2.05680
Local market know how	79	1.00	7.00	3.3671	2.23135
Local institutional know how	79	1.00	7.00	3.0000	1.96116

Table 2. Distribution of DR between Joint Venture Partner 1 and 2

	N	Minimum	Maximum	Mean	Standard deviation
Recruiting decision	79	1.00	7.00	3.0886	2.19083
Training decision	79	1.00	7.00	3.1392	2.06766
Decision on cooperation partners	78	1.00	7.00	3.3205	2.09200
Decision on selecting suppliers	79	1.00	7.00	3.4304	2.07354
Decision on incentives and wages	79	1.00	7.00	3.4430	2.09240
Promotion and advertising decision	79	1.00	7.00	3.5190	2.06845
Price decision	79	1.00	7.00	3.5570	2.28005
Decision on JV-organization	80	1.00	7.00	3.6375	2.24027
Marketing decision	79	1.00	7.00	3.6456	2.11247
Production decision	78	1.00	7.00	3.7051	2.18084
Product decision	79	1.00	7.00	3.7722	2.18942
Accounting and controlling decision	80	1.00	7.00	3.8625	2.26556
Decision on selecting lenders	80	1.00	7.00	4.2375	2.33977
Financial decision	80	1.00	7.00	4.2750	2.29460
Strategy formation decision	80	1.00	7.00	4.3500	2.10545
Investment decision	79	1.00	7.00	4.3924	2.21543
Decision right index	79	1.00	7.00	3.69410	1.78139

Table 3. Ordinal Regression Results

Independent variables	MODEL 1	MODEL 2
<i>Decision rights (DR)</i>		
Threshold constants		
	-2.691*** (0.417)	1.332 (1.423)
	-1.519*** (0.301)	2.698* (1.148)
	-0.559** (-0.255)	3.915*** (1.450)
	0.721*** (0.259)	5.384*** (1.508)
	1.378*** (0.29)	6.13*** (1.540)
	2.256*** (0.365)	7.166*** (1.590)
Intangible knowledge assets (KNOW)	1.108*** (0.231)	1.1*** (0.250)
Firm size (SIZE)		0.494** (0.215)
Uncertainty (UNCERT)		0.648*** (0.219)
Model statistics		
	<i>N</i> = 79	<i>N</i> = 73
Model chi-square (<i>p</i> < 0.001)	22.025	30.631
-2 Log likelihood	253.003	233.776
Nagelkerke <i>R</i> Square	0.25	0.351

****p* < 0.01; ***p* < 0.05; **p* < 0.1; values in parentheses are standard errors.

significant. Variance Inflation Factor (VIF) test shows no indication of multicollinearity.

6. DISCUSSION AND IMPLICATIONS

The aim of the paper is to develop and test a property rights view on the allocation of DR in JVs. The data from 80 Hungarian JVs confirm the hypothesis that the JV partner's intangible assets positively influence the tendency toward a higher proportion of residual DR. In addition, our study also makes an important contribution to operationalize control in JVs with the residual DR variable. Consistent with Yan and Gray's view (Yan and Gray, 1994; 2001), we developed a measure for DR consisting of strategic and operational decisions.

Our empirical study has some limitations: First, although the database in the survey sample is diverse, it remains far from a large and statistically random sample. Second, future research has to investigate the relationship between allocation of DR and the performance of JVs. Our property rights proposition suggests a positive relationship

between complementarity of intangible knowledge assets and residual DR, on the one hand, and the performance of the JV company, on the other hand. In addition, based on Inkpen and Currall's framework (Inkpen and Currall, 2004; see also Kamminga and Van der Meer-Kooistra, 2007), future research has to examine the influence of trust (as informal control) on the allocation of DR in JVs.

This study also has managerial implications. The result of this study indicates that the distribution of decision-making authority in JVs must be based on the importance of the JV partners' intangible knowledge assets for the creation of residual surplus. Therefore, this study provides companies with an explanation of a way to structure residual DR in JVs. The structure of residual DR must be aligned with the JV partners' specific knowledge assets. High partner-specific know-how under a low proportion of residual DR may not generate a high residual surplus for the JV company, because the JV partner does not efficiently use his intangible knowledge assets for the creation of the total income stream. Conversely, low partner-specific know-how under a high proportion of residual DR is unlikely to

maximize the residual income stream, because the JV partner has not the capabilities to create a high residual surplus.

APPENDIX: MEASURES OF VARIABLES

Intangible knowledge assets (KNOW) (10 items; Cronbach alpha = 0.94):

JV-partner 1's relative know-how advantage compared with JV-partner 2 concerning the following value chain activities (1–7):

(Production and logistics, human resource management (recruiting), local-market services, strategic planning, controlling, R&D, organization design, strategy formation, local-market knowledge, local institutional knowledge).

Firm size (SIZE): Average sale value of the parent firm of JV-partner 1 (per year).

Technological uncertainty (UNCERT): The JV-manager has to evaluate technological uncertainty on a 5-point scale (1–5):

Extent of technological changes.

DR index (mean): To what extent does JV-partner 1 influence the following decisions compared with JV-partner 2? (1–7).

(Recruiting, training, selection of cooperation partners, selection of suppliers, incentives and wages, promotion and advertising, investment projects, price decisions, organization structure and strategy, marketing, product management, production and procurement, accounting and controlling system, selection of lenders).

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