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Published in:

International Journal of Business Science and Applied Management

Publication status and date:

Published: 02/11/2018

Document Version

Publisher's PDF, also known as Version of record

Citation for the published version (APA):

Koster, F., & Bloem, D. (2018). “Have a little faith”: A vignette study of inter-organizational cooperation and innovation performance. *International Journal of Business Science and Applied Management*, 13(1), 25-41.
<http://hdl.handle.net/1765/111617>

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“Have a little faith”

A vignette study of inter-organizational cooperation and innovation performance

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Abstract

This study contributes to our knowledge about the relationship between inter-organizational cooperation and innovation performance. While research shows that ties between organizations can be a precondition for innovation, less is known about how to govern these inter-organizational relations. Theoretically, relations between organizations can be based on prices (the market), authority (hierarchies), or trust (communities). A central debate in the literature concerns the question whether these mechanisms are substitutes or complements. If they are substitutes, only one of them should suffice, if they are complements, it is possible to have combinations of these mechanisms. A vignette study was conducted to answer this question. The results show that trust is the main mechanism in inter-organizational relations aimed at innovation performance. Furthermore, the results provide evidence that price, authority, and trust are complementary mechanisms.

Keywords: innovation, inter-organizational relations, collaborative community, vignette study

1. INTRODUCTION

Several authors have argued that with the proliferation of the knowledge economy there has been a shift from innovation as a competitive advantage (Crossan & Apaydin, 2010) towards innovation as a cooperative advantage (Dyer & Singh, 1998; Contractor & Lorange, 2002; Koster, 2016). Hence, innovation not only strengthens the individual organization but it can also contribute to the performance of organizations joining forces. This implies that in their quest for innovation, organizations also rely on their ties with other organizations and share knowledge with them, rather than, and in addition to, improving their own stock of knowledge and innovativeness. While research shows that inter-organizational ties can enable the innovation performance of organizations (e.g. Pouwels & Koster, 2017), not much is known with regard to the governance of such inter-organizational relations. This means that research is needed to address the question how inter-organizational relations are structured and managed to facilitate organizational innovation. What is more, little is known about whether the structure and governance of these relations matter for innovation performance. In that regard, two strands of literature can be identified regarding the governance of inter-organizational relations: one underestimating the role of trust and one overestimating it.

Theories underestimating the role of trust often rely on a conceptualization of inter-organizational relations using Williamson's (1975; 1981) markets and hierarchy framework. Within this framework, inter-organizational relations are situated between market relations (guided by the price mechanism) and hierarchical relations based on authority (Adler, 2001; Contractor & Lorange, 2002; Koster, 2016). Economic theories of organizations ignore the role of trust since inter-organizational relations can be governed without it, either through the market or the hierarchy (Williamson, 1981; 1975; Geyskens, Steenkamp, & Kumar, 2006). Cooperation between organizations is seen as a hybrid form of organization mixing these two modes of governance. One of the main criticisms of this framework is that it is based on distrust. The core assumption of the model is that governance structures are necessary to decrease the chance that others parties act opportunistically. This sharply contrasts with other theories arguing that trust is a crucial ingredient of inter-organizational relations, in particular if they are aimed at innovation (Bøllingtoft, Donaldson, Huber, Håkonsson, & Snow, 2011; Snow, Fjeldstad, Lettl, & Miles, 2011). This argument can be found in the strand of literature that goes beyond the dichotomy of markets and hierarchies. In these studies, it is found that trust is a third mode of governance (Powell, 1990; Mayer, Davis, & Schoorman, 1995; Zenger & Hesterly, 1997). The theoretical difficulty with such conceptualizations, however, is that it assumes that trust is automatically present in these relations and that it is not possible to combine these modes of governance, since they are regarded as mutual exclusive options (e.g. Ouchi, 1980). Hence, these three modes of governance are viewed as substitutes: if one is present, the others are not.

More recent theories, however, argue that the three modes of governance can complement each other (Poppo & Zenger, 2002; Gulati & Nickerson, 2008; Ryall & Sampson, 2009; Weber & Mayer, 2011). To a large extent, this discussion started with a provocative article by Alder (2001), in which he discusses the role of trust in the knowledge economy. He argues that in the knowledge economy none of the three governance mechanisms suffices. Instead, the three modes of governance need to be combined and are hence complementary. In other words, it is possible that inter-organizational relations consist of a mixture of market, hierarchy, and trust. As a consequence, there are eight possible modes of governance instead of three. To date, the question how these modes of governance are related to innovation performance has not been tested empirically. Hence, whether prices, authority, and trust are complimentary and whether and how they affect the level of innovation of organizations is largely unknown. As a result, answering this question may lead to theoretical progress. The present study aims to investigate the link between modes of governance and innovation performance by using Adler's (2001) conceptualization as a starting point and investigating it empirically. Using a vignette study (N = 147) (a semi-experimental approach) enabled us to investigate the underlying mechanisms relating the governance of inter-organizational relations and innovation performance.

2. THEORETICAL BACKGROUND

2.1. Innovation, inter-organizational cooperation, and the problem of trust

Innovation, defined as "the process of introducing new ideas to the firm, which results in increased firm performance" (Rogers, 1998, p. 2), is often seen as the generation and diffusion of knowledge, which contributes to organizational adaptation and product development (Leonard & Sensiper, 1998; Sveiby, 2001; Powell & Snellman, 2004; Snow, Fjeldstad, Lettl, & Miles, 2011). From the vast body of innovation literature, four distinct types can be derived: (1) product or service innovation; (2) process

innovation; (3) market innovation; and (4) organizational or business-model innovation (Schumpeter, 1934; Boer & Daring, 2001; Pittaway, Robertson, Munir, Deyner, & Neely, 2004; Crossan & Apaydin, 2010; Pouwels & Koster, 2017). In the knowledge economy, generally defined as “production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as to its rapid obsolescence” (Powell & Snellman, 2004, p. 199), the salience of innovation has grown considerably. In the knowledge economy, innovation has become both opportunity and heavy urgency for organizations (Crossan & Apaydin, 2010; Koster, 2016), which they also aim for through cooperation with others (Dyer & Singh, 1998; Contractor & Lorange, 2002; Alexiev, Volberda, & Van den Bosch, 2016).

Resources and organizational assets required for innovation have become increasingly complex and knowledge-intensive, which makes managing and coordinating them increasingly challenging. In this respect, scholars stress the distinction between explicit knowledge and tacit knowledge. Tacit knowledge is implicit, unconscious knowledge embedded in individual, group, and organizational routines (Leonard & Sensiper, 1998; Bontis, 1999; Smith, 2001; Adler, Kwon & Heckscher, 2008; Koster, 2016). While tacit knowledge is important for innovation and therefore for organizational performance, it is difficult to share it within and between organizations. As a result, trust is a crucial part of inter-organizational relations aimed at innovation (Adler, 2001; Koster, 2016). Both (pure) markets and hierarchies are arguably inefficient as knowledge becomes more important and trust may reduce the transaction costs associated with these modes of governance. But whereas some scholars accept trust as an appropriate coordination mechanism, others utterly reject its importance by arguing that “the basic structure of capitalism – its fundamentally competitive and exploitive nature, its instrumental and contractual *Gesellschaft* character – makes any idea of a trust-based community in industry a fantasy” (Adler, 2015, p. 446). By following the notion of embeddedness (Granovetter, 1985), scholars assert that, in capitalist economy, economic actors and their economic relations are not merely instrumental and impersonal. Their behavior and decisions are not solely guided by rational interests, but also by the social institutions in which they are embedded (Dobbin, 2007; Fligstein & Dauter, 2007).

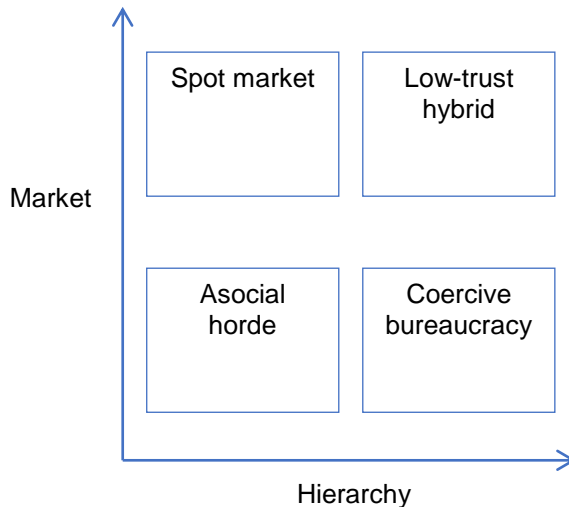
Instead of insisting that markets, hierarchies, or trust are substitutes for the governance of inter-organizational relations, Adler (2001) proposes a framework in which they can be combined and form a continuum of possible outcomes of organizational structuration and coordination. Therefore, the model acknowledges that ideal trust-based community forms are in itself not enough. Instead, market and hierarchy forces continue to be part of economic relations (Bickmore, 2005; Adler et al., 2008; Nowell, 2010; Bøllingtoft et al., 2011; Adler, 2015). As a result, the possible number of governance modes increases.

2.2. Modes of governance

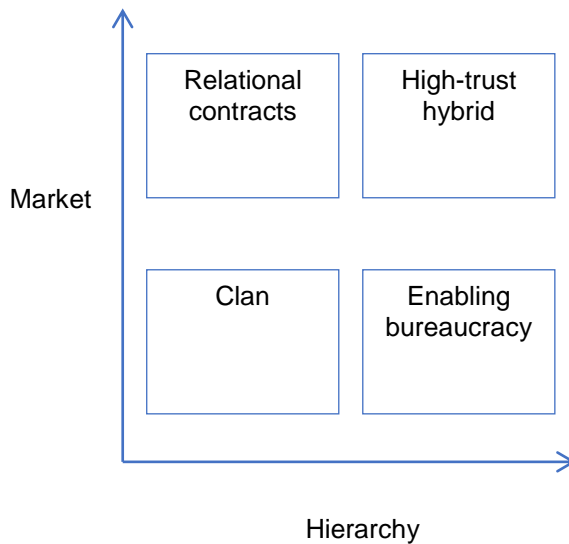
If the three modes of governance can complement each other, the inter-organizational relations can take eight different forms (Adler, 2001). Figure 1 presents these eight modes by distinguishing the modes without trust (the first four modes) and those with trust (the final four) (Koster, 2016).

Figure 1: Eight modes of governance

a. Modes without trust



b. Modes with trust



adopted from (Adler, 2001)

Spot market and relational contracting. In the spot market mode, pure market logic and mechanisms are the only mode of governance underlying the inter-organizational relationship. In this environment trust does not play a role and no extra value through knowledge diffusion is to be expected (Colledge, 2005). In the spot market mode, firms impose sharp market discipline on their suppliers by aggressively demanding lower prices and rapidly moving to cut off suppliers who cannot deliver (Adler, 2001). The relational contract, in contrast, is a market-based contract in which the two parties trust each other through informal relations (Adler, 2001; Baker et al., 2002).

In clans and asocial hordes, both market and hierarchy mechanisms are absent. If the inter-organizational relation reflects an asocial horde, the mechanism of trust is also absent. Hence, if the inter-organizational relation reflects an asocial horde, none of the coordination mechanisms is present. In clans (Ouchi, 1980), trust is the main governance mechanism. The clan mode occurs in situations in which both markets and hierarchies fail. Markets fail if opportunism and uncertainty take over, whereas bureaucracies fail when performance evaluation reaches a certain level of ambiguity. In clans, common values and beliefs act as building blocks for trust. Nevertheless, the clan is characterized by high exclusiveness and low tolerance for diversity and thus creates an inhospitable context for innovation (Adler, 2015).

In *enabling and coercive bureaucracies*, market mechanisms are absent. Therefore, we can speak of vertical integration (Baker, Gibbons & Murphey, 2002). Hierarchical structures are in place when the downstream party (the lead firm) owns the asset or becomes the owner by acquisition of the upstream party (Baker et al., 2002). The main purposes of bureaucracies are maximizing efficiency and establishing stability in organizations (Adler & Borys, 1996). Yet, this can happen under different conditions. Under conditions of trust, the bureaucracy enables participants to create and share knowledge, as well as to develop informal relations along the formal structure (Adler & Borys, 1996). In coercive bureaucracies, or capitalist firms (Adler, 2015), hierarchical control destroys informal knowledge diffusion.

The low-trust hybrid and the high-trust hybrid. The low-trust hybrid entails a low-trust combination of market and hierarchical mechanisms. Firms are trying to force improvements upon their supplier base by introducing more complex 'hierarchical contracts' into their market relations. Such hierarchical elements do not only control product specifications, but also the suppliers' internal processes (Adler, 2001). In the low-trust hybrid mode, improvements are forced upon suppliers. In the high-trust hybrid mode (which is also referred to as the "collaborative community"), however, improvements emerge out of trustful conditions (Adler & Heckscher, 2006; Adler et al., 2008). Like in the clan mode, common values and beliefs act as the building blocks for trust as a coordination mechanism. Yet, as noted before, both hierarchical and market mechanisms remain present. Hierarchically structured organizations are efficient in performing routine tasks, yet face difficulties in innovative new tasks which require new knowledge to be generated or used (Adler, 2001). In the competitive context of market structures based on the price mechanism, the generation of new knowledge is often optimized through intellectual property rights, which fundamentally block its diffusion (Adler, 2001). Trust, in contrast, facilitates an enlarged scope of knowledge generation and diffusion, and it significantly reduces transaction costs (Adler, 2001). Within the collaborative community, trust acts as the main coordination mechanism, whereas hierarchical rules maintain stability, and market dynamics assure flexibility (Adler et al., 2008). Therefore, the collaborative community can be defined in the following way: (1) with regard to its structure, it represents an organic division of labor, coordinated through conscious collaboration, and both horizontal and vertical collaborative interdependencies; (2) contribution to and concern for the process; (3) honesty as bases for trust; and (4) value-rationality with values of simultaneously high collectivism and individualism as bases for legitimate authority (Adler et al., 2008).

However, solely using trust as a main argument may not suffice in answering how inter-organizational cooperation can be designed. As Mayer et al. (1995) state, trust is not to be confused with cooperation. If it was sufficient, after all, there should be no expected difference between clans, enabling bureaucracies, relational contracts, and collaborative communities in terms of innovation outcomes. Moreover, this study seeks to investigate the process of inter-organizational cooperation. It does so by synthesizing different dimensions of inter-organizational cooperation into a comprehensive framework, in which market dynamics, the trust dimension, and the hierarchical stability dimension are complemented with components of the collaborative process framework (Ansell & Gash, 2008; Provan & Kenis, 2008) and dimensions of inter-organizational cooperation (Koster, Korte & Van de Goorbergh, 2016). It has to be noted that a one-way, positive relationship between inter-organizational cooperation and organizational innovativeness does not exist. Several risks for participating organizations are involved in the process (Ansell & Gash, 2008; Provan & Kenis, 2008; Pouwels & Koster, 2017). Ansell & Gash (2008) provide a framework for these risks and include preconditions for successful collaborative governance. Accordingly, successful collaboration depends on starting conditions, such as resource and power asymmetries; the institutional design, such as formal rules guiding the collaborative process; facilitative leadership; and the nature of the collaborative process itself.

2.3. Conceptual model and hypotheses

Figure 2: Conceptual model

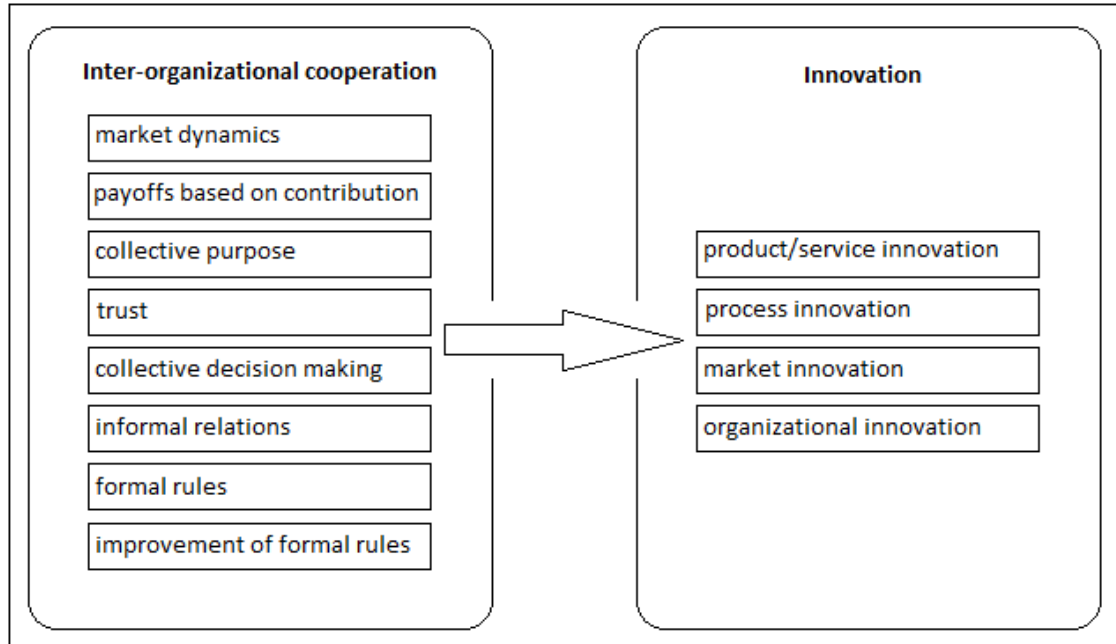


Figure 2 summarizes the expectations based on the theoretical assumptions. To test this conceptual model, the following hypotheses are formulated. First, we state that:

H1: In partnerships including trust, innovation performance is higher than in partnerships without trust.

From this first hypothesis, 4 additional hypotheses can be derived:

H1a: In the clan mode, innovation performance is higher than in the asocial horde mode.

H1b: In the relational contracting mode, innovation performance is higher than in the spot market mode.

H1c: In the enabling bureaucracy mode, innovation performance is higher than in the coercive bureaucracy mode.

H1d: In the high-trust hybrid mode, innovation performance is higher than in the low-trust hybrid mode.

In addition, this study tests the conceptual model as displayed in figure 1, thereby arguing that, from the asocial horde towards the collaborative community, the likelihood of innovation increases. This study argues that from the asocial horde, with no coordination at all, towards coercive organizational modes with hierarchical control, innovation outcomes will improve. Moreover, towards trust coordinated modes and finally towards the high-trust hybrid, innovation outcomes will improve as well. Therefore, the following hypotheses are stated:

H2: The more a partnership approaches the high-trust hybrid mode, the higher the innovation performance.

3. METHODOLOGY: EXPERIMENTAL VIGNETTE DESIGN

3.1. Data collection and respondent characteristics

A vignette study was designed to test the hypotheses. In a vignette study, people are asked to imagine a situation and respond to a number of questions regarding the situation. An online survey was constructed and distributed among the professional network of the researchers. As a result, people in working environments involving decisions regarding innovations of their organization were approached to participate. The data collection covered a time span of 17 days. In total, 52 respondents answered a total of 147 Vignettes. Since the vignettes are the level of analyses in this study, this is also the N used in the analyses. Table 1 displays background information about the respondents and descriptive statistics.

Table 1: Background statistics of the respondents

Age			Education level		
<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>
-25	24	16.3			
26-30	53	36.1	College	21	14.3
31-40	13	8.8	University	105	71.4
41-50	15	10.2	University+	21	14.3
50+	42	28.6			
Economic sector of organization			Organization size		
<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>
			0-15 employees	30	20.4
Public sector	59	40.1	16-30 employees	6	4.1
Private sector	79	53.7	31-45 employees	6	4.1
Mixed sector	9	6.1	46-60 employees	19	12.9
			60+ employees	86	58.5
Duration of employment			Level of decision making authority		
<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>
0-1 years	44	29.9	Never	3	2.0
1-2 years	21	14.3	Barely	36	24.5
2-3 years	11	7.5	Regularly	45	28.6
3-4 years	9	6.1	Often	51	34.7
4+ years	62	42.2	Always/I take them	15	10.2
Experience with situations setting			Livelihood of setting		
<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Representation</i>	<i>Frequency</i>	<i>Percentage</i>
No experience	57	38.8	Unnatural	12	8.9
Little experience	69	46.9	Neutral	72	49.0
Much experience	9	6.1	Natural	51	34.7

N = 52 respondents

The research uses a quantitative experimental vignette design complemented by a traditional survey as described by Atzmüller & Steiner (2010). By randomly changing the experimental conditions it is possible to test theoretical mechanisms. This approach has been successfully applied in organizational settings (for example: Koster & Sanders, 2007; Fleischmann & Koster, 2017). In the present study, the experimental vignette component is designed to measure respondents' subjective prediction of innovation outcomes. In order to secure both the internal and external validity of measurements, the experimental vignette is complemented by a traditional survey component, which measures respondent-specific characteristics. In the case of this research, these measures will function as control variables. The vignette design entails a pool with eight different condition-sets, which are built around the following imaginary situation:

“Imagine a situation in which you are the executive of a company that needs to innovate. To that end, specific skills and knowledge are required. And, not all of these required skills and knowledge are present in your own company. However, other companies do possess them. To get them, you can buy the knowledge and skills from the other company or you cooperate with them by forming an alliance. In what follows, you will read more about the relationship with the other company. You, as the executive in search of skills and knowledge, are asked to review these possibilities.”

After this part, respondents receive a description of one of the eight modes of governance (the exact operationalization is reported in the next section) and were asked to rate on a scale from 1-10 how successful they thought that the specific mode would be in leading to an innovative outcome. To follow previous research showing that innovation can take different forms, we asked them to do this for product/service innovation, process innovation, market innovation, and organizational/business-model innovation. To be sure that they knew what these kind of innovation mean, a short description of each of them was provided. Each respondent rated three modes of governance.

3.2. Measures

The dependent variable is termed *innovation performance*. This is measured using a scale variable containing the answer to four questions in the vignette experiment, namely how likely respondents thought it was that a certain mode of governance would lead to *service/product innovation*, *process innovation*, *market innovation*, and *organizational/business-model innovation*. A reliability analysis shows that there is very little variance between the four items (Cronbach’s Alpha = 0.855). Moreover, a principal component of the four items shows that all four items belong to the same dimension. Therefore, the the four answers are added and divided by four to measure the variable innovation performance. Hence, the variable ranges from 1-10, where the value 1 represents ‘very unsuccessful innovation outcome’, and the value 10 represents ‘very successful innovation outcome’.

Vignette conditions: modes of governance. The conditions measuring the eight modes of governance were constructed in two steps. First, the underlying dimensions were operationalized. These dimensions reflect market dynamics, pay-off division based on contributions, collective purpose, trust, collective decision-making, informal relations aimed at innovation, formal rules, and continuous improvement of formal rules. Table 2 provides the exact wording of the vignettes.

Table 2: Representations of variable scores in vignettes

Variable	Variable score	Representation
<i>Market dynamics</i>	0 = low	There is just one supplier in the market. Therefore, your organization has to buy the required knowledge and skills only from another organization.
	1 = high	There are more suppliers in the market. Therefore, your organization can choose with which supplier to engage in a partnership.
<i>Payoff division based on contributions</i>	0 = low	The payoffs generated by the innovation as a result of the partnership all go to the leading organization.
	1 = high	The payoffs generated by the innovation as a result of the partnership are fairly divided, based on contributions in the process.
<i>Collective purpose</i>	0 = low	The other organization does not care about the success of the innovation. There is no collective purpose in the partnership.
	1 = high	For both you and the partner organization, innovation is the main aim of the partnership.
<i>Trust</i>	0 = low	You do not know the people of the other organization, and therefore you do not know if you can trust these people.
	1 = high	You know the people of the other organization, and therefore you know that you can trust these people.
<i>Collective decision making</i>	0 = low	In the partnership, all decisions are made by the leading organization.

	1 = high	In the partnership, all decisions are collectively made by the organizations involved in the collaboration.
<i>Informal relations aimed for innovation</i>	0 = low	In the partnership, there are no informal relations existing between the people of your organization and the people of the other organization.
	1 = high	Next to the formal rules, the relationship is characterized by highly informal relations, which aim for innovation.
<i>Formal rules</i>	0 = low	There are no formal rules in the partnership. The relationship is thus not guided by any.
	1 = high	The partnership is guided by formal rules. Both your organization and the partner organization adhere to these rules.
<i>Continuous improvement of formal rules</i>	0 = low	The formal rules of the partnership, if any, are not adjusted as a result of intermediate outcomes in the collaboration.
	1 = high	While the formal rules of the partnership are guiding, they are easily adjusted as a result of intermediate outcomes in the partnership.

The dimensions are then used to construct the eight modes of governance (spot market, relational contract, asocial horde, clan, coercive bureaucracy, enabling bureaucracy, low-trust hybrid, and high-trust hybrid). How they are constructed is shown in table 3.

Table 3: Operationalization of the inter-organizational modes

Condition-set	<i>Asocial horde</i>	<i>Spot market</i>	<i>Coercive bureaucracy</i>	<i>Low-trust hybrid</i>	<i>Clan</i>	<i>Relational contracting</i>	<i>Enabling bureaucracy</i>	<i>High-trust hybrid</i>
Variable								
<i>Market dynamics</i>	0	1	0	1	0	1	0	1
<i>Payoff division</i>	0	0	0	0	1	1	0	1
<i>Collective purpose</i>	0	0	0	0	1	1	0	1
<i>Trust</i>	0	0	0	0	1	1	1	1
<i>Collective decision making</i>	0	0	0	1	1	1	1	1
<i>Informal relations</i>	0	0	0	0	1	1	1	1
<i>Formal rules</i>	0	0	1	1	0	0	1	1
<i>Improvement formal rules</i>	0	0	0	0	0	0	1	1

Control variables. The analyses are controlled for two characteristics of the respondent's workplace, namely the size of one's organization (*organization size*) and respondents' level of decision authority within his or her organization (*decision authority*). It is expected that organization size positively affects innovation outcomes (Damanpour, 1992). The variable *organization size* ranges from 1-5, in which the value one represents 0-15 employees, and the value 5 represents 60+ employees on a scale of +15 employees per step. As for decision authority, it is expected that the measured effects will be stronger for respondents with higher levels of decision authority. *Decision authority* ranges from 1-5, in which the value 0 represents no decision authority and the value 5 represents full authority/I take the decisions.

Furthermore, the analyses are controlled for two variables reflecting the respondent's attitude towards the vignette study, namely *experience* and *evaluation*. *Experience* measures the extent to which the vignettes represent experiences that respondents have in their own workplace. Respondents are asked how much experience they have with comparable settings in real life. This variable ranges from 0-2, where the value 0 represents no experience and the value 2 represents much experience. *Evaluation* measures the liveliness of the vignette as perceived by the respondent. Respondents were asked how natural they think the condition-sets provided are. This variable ranges from 0-2, where the value 0 represents not natural, and the value 2 represents natural.

3.3. Research design and analysis

Because respondents were asked to rate three modes of governance, a standard OLS regression does not suffice as the assumption of independence of the measures may be violated. In order to take into account that there is an individual and a vignette component that may explain innovation

performance, a multilevel analysis is used to test each main and sub hypothesis (Snijders & Bosker, 1999). In the multilevel model, the individual respondent represents level 2. The independent variables represent level 1. In order to distinguish between individual respondents when measuring effects on the vignette level, each respondent is given a unique respondent ID. In this way, the multilevel analysis design allows to take personal characteristics into account when analyzing effects on the vignette level. In each test, the analysis is set up in three stages. In the first stage, the independent variable will be tested in an empty model (0). The results (model-fit and intercept) of the empty model act as a reference for the results of the following two stages. In the second model (1), control variables are added at level 1. In the third stage (model 2), the independent variable, which is a cooperation scale derived from the vignette conditions, is added at level 1. Within the analysis of the independent variable at level 1, the condition-set that represents the least cooperation will function as the reference category.

4. RESULTS

In this section, the results of the multilevel analyses are displayed. The results of the multilevel analysis between partnerships with trust and partnerships without trust are presented in table 4. In model 0 (the model that does not include any control variables), the mean score of the dependent variable *innovation performance* is 5.89. The control variables *organization size*, *decision authority*, *experience*, and *evaluation* are added in model 1. With respect to model 0, adding the control variables produces a significant improvement of the model fit (the deviance of 46.684 is significant under $p < 0.001$). Moreover, as expected, the personal variable *decision authority* has a positive effect in both model 1 ($b = 0.40$; $p < 0.05$) and model 2 ($b = 0.41$; $p < 0.05$). This moderate effect indicates that people who have more decision-making authority are somewhat more focused on innovation.

Table 4: Multilevel analysis of innovativeness; trust versus no-trust overall

Model	(0)		(1)		(2)	
	b	(s.e.)	b	(s.e.)	b	(s.e.)
Individual (level 2)						
<i>Characteristics</i>						
Organization size			0.10	(0.11)	0.19	(0.09)
Decision authority			0.40 *	(0.17)	0.41 *	(0.15)
<i>Vignette controls</i>						
Personal experience			0.32	(0.28)	0.22	(0.24)
Vignette evaluation			0.26	(0.27)	0.35	(0.24)
Vignette (level 1)						
<i>Partnership conditions</i>						
No trust (reference)					---	---
Trust					2.03 ***	(0.26)
Intercept	5.89 ***	(0.45)	3.64	(0.96)	2.09 *	(0.88)
			*			
			*			
			*			
Model fit						
-2*log likelihood	594.021		547.337		499.072	
Deviance			46.684 ***		48.265 ***	
Variance level 2	3.18	(0.45)	3.29	(0.41)	2.14	(0.32)
Variance level 1	0.14	(0.29)	0.00	(0.00)	0.16	(0.22)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

$N = 52$ respondents; 147 vignettes.

4.1. Hypothesis 1

To test hypothesis 1, the dummy variable *trust versus distrust* is added in model 2. Adding this variable produces a significant improvement of the model fit (Deviance = 48.265; $p < 0.001$). Furthermore, the governance modes that do include the trust dimension are expected to lead to *innovation performance* ($b = 2.03$; $p < 0.001$) compared to those representing distrust between the organizations. This means that hypothesis 1 is supported.

Hypothesis 1a-d
Table 5: Multilevel analysis of innovativeness; trust versus no-trust per governance mode

Model	(3a)		(3b)		(3c)		(3d)	
	b	(s.e.)	b	(s.e.)	b	(s.e.)	b	(s.e.)
Individual (level 2)								
<i>Characteristics</i>								
Organization size	0.07	(0.17)	0.31	(0.21)	0.05	(0.15)	0.39	(0.21)
Decision authority	0.65 *	(0.28)	0.25	(0.31)	0.24	(0.29)	0.43	(0.35)
<i>Vignette controls</i>								
Personal experience	0.04	(0.48)	-0.08	(0.43)	0.69	(0.40)	0.26	(0.68)
Vignette evaluation	0.05	(0.43)	0.91	(0.46)	0.19	(0.44)	0.54	(0.68)
Vignette (level 1)								
<i>Partnership conditions</i>								
Asocial horde (reference)	---	---						
Clan	3.35 *	(0.12)						
Coercive bureaucracy (reference)			---	---				
Enabling bureaucracy			1.01	(0.53)				
Spot market (reference)					-----	---		
Relational contracting					2.28 ***	(0.51)		
Low-trust hybrid (reference)							-----	---
High-trust hybrid							2.48 ***	(0.53)
Intercept	0.94	(1.57)	2.43	(1.87)	2.80	(1.58)	0.87	(1.79)
Model fit								
-2*log likelihood	110.259 ^(a)		125.729 ^(a)		124.320 ^(a)		107.969 ^(a)	
Deviance	446.078***		421.608***		423.017***		439.641***	
Variance level 2	1.98	(0.31)	2.37	(0.62)	1.98	(0.51)	1.64	(0.81)
Variance level 1	0.17	(0.22)	0.00	(0.00)	0.00	(0.00)	0.66	(0.81)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

$N = 52$ respondents; 147 vignettes

^(a) Compared to model 1

To test hypotheses 1a through 1d, each of the trust versions of the governance mode is contrasted with the distrust version. This means that the *asocial horde* is contrasted with the *clan*, the *spot market*

with *relational contracting*, *coercive bureaucracy* with *enabling bureaucracy*, and *low-trust-hybrid* with *high-trust hybrid*. The results of these analyses are presented in table 5.

To test hypothesis 1a, a dummy variable contrasting *the asocial horde* with *the clan* is added in model 2a. To start with, this produces a significant improvement of the model fit (Deviance = 446.078; $p < 0.001$). Compared to the asocial horde, the clan mode of governance is more likely to lead to *innovation performance* ($b = 3.35$; $p < 0.05$). This outcome supports hypothesis 1a.

To test hypothesis 1b, a dummy variable comparing *spot market* with *relational contracting* is added to the model. This produces a significant improvement of the model fit (Deviance = 423.017; $p < 0.001$). Furthermore, compared to the spot market, the relational contracting mode of governance is estimated to be more likely to lead to *innovation performance* ($b = 2.28$; $p < 0.001$). Therefore, hypothesis 1b is supported.

To test hypothesis 1c, a dummy variable comparing *coercive bureaucracy* with *enabling bureaucracy* is added in model 2c. This also produces a significant improvement of the model fit (Deviance = 421.608; $p < 0.001$). The enabling bureaucracy does score higher on *innovation performance* ($b = 1.01$; $p < 0.07$) than the coercive bureaucracy. However, this difference is only significant at the 10 percent level, meaning that hypothesis 1c is rejected.

To test hypothesis 1d, a dummy variable is added to compare the *low-trust hybrid* with the *high-trust hybrid*. This also produces a significant improvement of the model fit (Deviance = 439.641; $p < 0.001$). The high-trust hybrid is estimated to lead to more *innovation performance* than the low-trust hybrid ($b = 2.48$; $p < 0.001$). This finding supports hypothesis 1d.

4.2. Hypothesis 2

To test hypothesis 2, all modes are added to the model. In this model (shown in table 6), asocial horde is the reference category. Adding the modes of governance improves the fit of the model (Deviance = 64.612; $p < 0.001$). Compared to the asocial horde, all modes of governance have a higher score on innovation performance. However, the difference with the spot market is not significant. Furthermore, the difference between the asocial horde mode and the low-trust hybrid is significant at the 10 percent level and the difference with the coercive bureaucracy is significant at the 5 percent level.

Table 6: Multilevel analysis of all partnerships and trustful partnerships

Model	(4)		(5)	
	b	(s.e.)	b	(s.e.)
Individual (level 2)				
<i>Characteristics</i>				
Organization size	0.18	(0.09)	0.27*	(0.09)
Decision authority	0.44 **	(0.15)	0.41*	(0.16)
<i>Vignette control</i>				
Personal experience	0.22	(0.24)	0.07	(0.27)
Vignette evaluation	0.38	(0.23)	0.75*	(0.24)
Vignette (level 1)				
<i>Partnership conditions</i>				
Asocial horde (reference)	--- ---	---		
Coercive bureaucracy	1.93 **	(0.55)		
Spot market	0.73	(0.59)		
Low-trust hybrid	1.28 *	(0.57)		
Clan	3.09 ***	(0.54)	-0.29	(0.40)
Enabling bureaucracy	2.84 ***	(0.56)	-0.55	(0.40)
Relational contracting	3.21 ***	(0.54)	-0.15	(0.42)
High-trust hybrid	3.49 ***	(0.58)	--- ---	---
Intercept	0.86	(0.95)	3.68***	(0.88)
Model fit				

-2*log likelihood	482.725 ^(a)	244.503 ^(a)
Deviance	64.612***	302.834***
Variance level 2	1.98 (0.31)	1.30 (0.34)
Variance level 1	0.17 (0.22)	0.12 (0.31)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

$N = 52$ respondents; 147 vignettes

^(a) Compared to model 1

Furthermore, table 6 shows that the high-trust hybrid mode does have the highest score on innovation performance ($b = 3.49$; $p < 0.001$). The relational contracting mode is the second highest ($b = 3.21$; $p < 0.001$). To investigate whether the difference within the “trust” modes are significantly different, model 5 was added to the regression. In this model, the high-trust hybrid is compared to the other modes that are also based on trust (clan, relational contracting, and the enabling bureaucracy). Adding these modes improves the fit of the model (Deviance = 302.834; $p < 0.001$). While all trust-modes have a lower score on innovation performance compared to the high-trust hybrid, these differences are not statistically significant. Therefore, hypothesis 2 is rejected.

5. CONCLUSION AND DISCUSSION

5.1. Scientific implications

This study aims at opening the black box of inter-organizational relations and innovation by investigating whether the mode of governance of these relations matters for innovation performance. By doing that it contributes to the literature on governance modes and in particular discussions about the role of trust in inter-organizational relations. According to economic theories of organizations (the markets versus hierarchies position) trust does not matter, while others argue that trust is the main ingredient of such relations. Based on the vignette study that we conducted, the following conclusions can be drawn. First, trust is indeed a crucial part of inter-organizational relations aimed at innovation performance. Comparing the governance modes that would follow from the discussion about markets and hierarchies on the one hand and trust as a third mode of governance, the outcomes of this study clearly show that the market performs worse than the coercive bureaucracy, which in turn leads to less innovation performance than the clan mode of governance. Hence, the governance modes that include trust perform better in terms of innovation than the variants without trust. This conclusion is in line with Adler (2001) and other studies that found that trust considerably enhances the generation and diffusion of tacit knowledge in organizations (Adler & Heckscher, 2006; Kramer, 1999; Dyer & Singh, 1998). Therefore, this paper concludes that trust can indeed be seen as a possible coordination mechanism for organizations in dealing with complex, knowledge-intensive assets. Whereas prior research also focused on the role of trust in inter-organizational relations, the present study uses a semi-experimental design allowing to draw stronger conclusions about the causal direction of trust and innovation than in earlier research. Moreover, a particular contribution of this study to the present knowledge is that it allows comparing the three main modes of governance in terms of innovation performance.

Secondly, the study also shows that the pure trust mode (the clan or community) is not the only trust mode that can contribute to innovation performance. This outcome contributes to the second theoretical discussion found in the literature. The core of this discussion is about the question whether market, hierarchies, and trust are supplements or complements. Whereas some studies argue that relations can only be based on one of these three modes of governance (an either/or situation), recent work suggests that modes of governance can be mixed and strengthen each other (Adler, 2001; Koster, 2016). Nevertheless, this was not tested in relation to innovation performance, to date. The outcomes of this study provide evidence that these governance modes are complements: if trust is part of the relationship, price and authority can also be part of it. Comparing all the modes of governance, the one combining market, hierarchies, and trust (the high-trust hybrid) produced the highest level of innovation performance. This is a valuable addition to the literature since it shows that modes of governance can be (or need to be) complementary. However, since the trust component turns out to be the main driver of innovation performance in inter-organizational, this difference was not found to be statistically significant. Nevertheless, it should be concluded that this type of governance is not completely instable as would be expected based on theories arguing that the governance modes are supplements. In that case, market, hierarchies, and trust would be in conflict with each other and the

high-trust hybrid would perform much worse than was found in this study. This would then mean that the other dimensions have no part in designing partnerships. Yet, we see that when trust interacts with other dimensions of collaboration (Ansell & Gash, 2008; Provan & Kenis, 2008), it might also be that, under conditions of trust, dimensions like informal relations, collective purpose and process contribution are more likely to be in place as well (Adler et al., 2008; Adler & Heckscher, 2006).

Another conclusion drawn from the results is that within the different modes of governance, market dynamics tend to be of higher significance than hierarchical stability. The results show that relational contracting has a higher positive effect on innovation outcomes than the enabling bureaucracy. This suggests two things. First, partnerships based on equal power divisions between participating organizations are more likely to be successful than hierarchically structured partnerships. This is a noteworthy theoretical insight as it shows that mixing governance modes is not self-evident and requires attention from managers that need to balance seemingly contradictory forces to reach cooperative advantages (Hughes & Weiss, 2007; Koster & Van Bree, 2018). Second, this result is in line with the argument that the market mechanism becomes more salient when complexity of assets is higher (Geyskens et al., 2006). Also, this insight is in line with the theoretical argument that market dynamics in partnerships secure flexibility and diversity (Gilson, Sabel & Scott, 2009; Adler, 2001). Again, this study shows that these different modes of governance are intertwined and in unison affect the innovation performance of organizations.

5.2. Limitations and further research

While the present study has several strengths as it distinguishes governance modes and uses a semi-experimental design, it also has some drawbacks that need to be taken into account. The major weakness of the present study lies in the methodology that is applied. Using a vignette study allows to draw strong conclusions about the direction of the outcomes, but at the same time it needs to be acknowledged that the data are about a hypothetical situations. Hence, additional research and data gathering are needed to assess real-life situations.

The study offers the following questions for future research. First, the study relies on theoretical notions found in the literature to operationalize the different governance modes. The operationalization is a first attempt that may be further improved. From the theory it can be derived that trust facilitates informal relations, contributes to the acknowledgement of a collective purpose, and thus enhances knowledge diffusion (Alexiev et al., 2016; Ansell & Gash, 2008; Kramer, 1999). Yet, further research is needed in order to investigate if, and how, these dimensions interact with each other. This also requires to collect data from different sources. Using a questionnaire across a large sample of organizations helps to understand how widespread the use of the three governance modes, as well as their combination, is. By relating this to the innovation performance of organizations, it is possible to get outcomes that can be generalized to economic sectors or even countries. In addition to that, qualitative research is welcomed, in particular with regard to the question how managers try to balance price, authority, and trust. As this research shows there may be tensions in the inter-organizational relation if these governance modes are applied at the same time, while it also shows that if they are applied in unison, this may strengthen the innovation performance of organizations. Nevertheless, this outcome is not self-evident and understanding how managers deal with this requires in-depth information, which can be collected through interviews, focus groups, and observations. Besides that, Pouwels & Koster (2017) show that the kind of innovation can matter in the relationship between inter-organizational cooperation and organizational innovativeness. This study did not find considerable differences between those types, since it did not primarily focus on these mechanisms. Therefore, it is necessary to investigate whether, and if, different mechanisms are in place for different kinds of innovation. Third, more data are needed to draw conclusions about how inter-organizational cooperation influences innovation performance. This study was based on data from 52 respondents and 147 vignettes. Effects and interactions between dimensions might be more visible if they were to be tested with more extensive data.

5.3. Practical implications

Overall, this study has practical implications for organizations engaged in inter-organizational relations aimed at innovation. The most important one being that, in order to be successful, trust needs to be secured in the alliance. This is that basis that every inter-organizational arrangement aiming at innovations should have in place. This also implies that a sole focus on price (the market mechanism) or authority (e.g. controlling the other party), can hinder the relations with other organizations. This conclusion is in line with the insights that the study of Hughes & Weiss (2007) offers. They show that too much focus on the formal side of an alliance increases the chance that the alliance fails. Their suggestion that the management of the relationship with other organizations is crucial for innovation

performance is confirmed in the present study. As suggested above, managers play a key role in generating inter-organizational relations fostering innovation performance.

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