

LEARNING AND GOVERNANCE IN INTER-FIRM RELATIONS

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Abstract

This article connects theory of learning with theory of governance, in the context of inter-firm relations. It recognizes fundamental criticism of transaction cost economics (TCE), but preserves elements from that theory. Two kinds of relational risk are identified: hold-up and spillover risk. For the governance of relations, i.e. the control of relational risk, the article presents a set of instruments that includes trust, next to instruments adopted and adapted from TCE. It also includes roles for go-betweens. Some references to empirical evidence are included.

Introduction

This article connects issues of learning and issues of governance, in inter-firm relations. Thereby, it contributes to the integration of competence and governance perspectives, as proposed by Williamson (1999), among others (Nooteboom 1999). The literature on the 'resource-based' or 'competence' view neglects issues of dependence, relational risk and its governance. The literature on governance, particularly in TCE, neglects issues of learning. For a more detailed discussion of how to combine competence and governance perspectives, with references to designs and outcomes of empirical work, see Nooteboom (2004a).

TCE has made important conceptual and theoretical contributions, which have met with considerable, though far from complete, empirical success (Carter 2002). These contributions are well-known and will be summarized only briefly. One important insight is that complete contingent contracting is generally impossible due to uncertainty regarding future events and intentions might affect contract execution. Often, there are unforeseeable incentives and opportunities for opportunism. A central concept is that of specific investments as a cause of dependence, resulting in the problem of 'hold-up'. TCE offers useful instruments for governance, beyond contractual control: integration under a unified hierarchy, the use of 'hostages', redistribution of the ownership of specific investments to eliminate one-sided risk of hold-up, a balance of mutual dependence to ensure mutual threat of retaliation in case of opportunistic behaviour, and reputation effects.

However, there are well-known shortcomings in TCE. First, by its own admission (Williamson 1999), TCE does not pay systematic attention to (radical) innovation and learning. Related to this, while TCE recognizes bounded rationality, it underestimates the problems involved, particularly in the context of learning. TCE is more a theory of comparative statics than of the dynamics of inter-firm relations, in collaboration for innovation. Second, TCE claims that trust, as something that goes beyond calculative self-interest, is not viable in markets. This article will give arguments against that view. Also, especially important in innovation, TCE neglects, as a second form of relational risk, next to hold-up risk, the risk of spillover, defined as the risk that in collaboration competitively sensitive knowledge may spill over, directly or indirectly, to competitors.

This aim of this article is to summarize an extended theory of governance, which takes into account learning and innovation (competence development), processes of trust building, and spillover as well as hold-up risk. From a perspective of learning, new forms of specific investment will be added to the forms proposed by TCE. For this purpose of an extended theory, I claim that we need to cross the boundaries of economics. We need elements of cognitive science to understand the full implications of bounded rationality, and to deal with learning and innovation. We need elements of sociology to understand the sources, limits and processes of trust.

The article proceeds as follows. First it gives a brief summary of the theory of knowledge and learning used, and considers the implications for the theory of the firm. Second, it gives a summary discussion of

the nature and sources of trust, going beyond calculative self-interest, as well as its limits. Third, it discusses spillover risk, and new aspects of hold-up risk. Subsequently, it presents and discusses a toolbox of instruments for the governance of relational risk. At several points, theoretical claims are accompanied by some illustrative, but far from complete, references to empirical tests. Here, there is a bias towards results from research in which I was involved, because those were designed to test the hypotheses discussed in this article.

Knowledge, learning, and theory of the firm

It is a truism to say that information is not the same as knowledge: to become knowledge, information needs to be interpreted in a cognitive framework. To understand knowledge, the question is how this works, and to understand learning, the question is how this framework develops. Here, ‘cognition’ is taken in a wide sense, including perception, interpretation and evaluation, including value judgements, which include emotions next to rational assessment. The perspective employed here is inspired by a certain branch of cognitive science that has variously been labeled as ‘embodied cognition’ (Merleau-Ponty 1942, 1962, Edelman 1987, 1992, Rose 1992, Damasio 1995, Lakoff & Johnson 1999), ‘situated action’ theory (Shanon 1988, 1993, Hendriks-Jansen 1996, Janssen 1997), or ‘activity’ theory’ (Blackler 1995, Kolb 1984, building on the work of Vygotsky 1962 and Piaget 1970, 1974). This stands in contrast with an older ‘computational-representational’ theory (in which Herbert Simon, for example, still operated). Here, there is no space for a full discussion (but see Nooteboom 2000). However, some of the key points are the following:

- a. Cognition is embodied in the sense that it is rooted in bodily processes, such as proprioception and instinctive drives (there is a fruitful link here also with evolutionary psychology). A crucial implication is the rejection of Cartesian dualism, and acceptance of the fact that rationality and emotion are intertwined.
- b. Intelligence is internalized action, i.e. we construct the cognitive categories by which we perceive, interpret, understand and evaluate (with emotions) the world, on the basis of action and interaction in the world. According to this interactionist view, knowledge is inherently social. It is consistent with the ‘symbolic interactionism’ of G.H Mead (1934, 1982).
- c. These categories constitute our ‘absorptive capacity’ (Cohen & Levinthal 1990), i.e. we can only make sense of what we can fit into those mental categories. Since people have constructed their categories along different life courses, there will be greater or lesser ‘cognitive distance’ between them (Nooteboom 1999).
- d. Meaning is context-dependent, i.e. meanings become determinate, or are disambiguated, in specific contexts, *and are shifted by them*. This connects with the situated action perspective of cognition.

According to this perspective, rationality is constrained by absorptive capacity. Information is not ‘out there’ for the taking, at a price, and with a delay, but is contingent on absorptive capacity. Information asymmetry or ‘impactedness’ is not just a matter of lack of access, with limited opportunities for ‘monitoring’, but, more importantly, a matter of lack of understanding. Knowledge cannot be simply transferred. It may or may not be assimilable in absorptive capacity, and if it is, it is reconstituted, in its embedding in a largely tacit cognitive framework. Even memory is not ‘retrieval’ but reconstruction. In expression, meanings are lost, and in absorption meanings are added. For economic agents to transact they need to ‘cross cognitive distance’. Cognitive distance yields both an opportunity and a problem. The opportunity is that contact with others gives us a possibility to escape from the myopia of our personal cognitive construction, by profiting from the different insights of others, based on different experience. A problem, however, is that the greater the cognitive distance, the more difficult it is to cross it, i.e. to understand the actions and expressions of a partner. Thus there is an optimal cognitive distance: large enough for partners to tell each other something new, and small enough for comprehension. More precisely, if novelty value increases and understandability decreases with cognitive distance, and learning outcomes depend on the mathematical product of novelty and understandability, then the performance of learning by interaction is an inverse-U shaped

function of cognitive distance. Absorptive capacity depends on our ability to understand others and on our communicative capacity, i.e. the ability to help others understand what we do or say. Note that there is a difference between crossing cognitive distance and reducing it. This is related to the difference between empathy and identification, recognized in social psychology. Empathy entails the ability to understand someone who thinks differently (and has different norms of behaviour), while identifications entails similarity of thought, i.e. sharing cognitive and normative categories. For an elaboration see Nooteboom (2000).

An important point, for connecting the analysis to TCE, is that absorptive capacity is often specific to a partner, so that the building of mutual understanding may entail an investment that is specific to a relationship. This, then, yields another form of specific investment, in an extension of TCE.

Concerning the empirical evidence for optimal cognitive distance, Wuyts et. al. (2003) recently performed an econometric test of a derived hypothesis, that the probability of alliance formation is an inverse-U shaped function of cognitive distance, in inter-firm alliances in the IT industry. The hypothesis was partially confirmed. Child & Yan (2001) found that the performance of cross-national joint ventures showed an inverse-U shaped relation with cultural distance between the countries involved. Currently, research is being set up that allows for a more direct test of cognitive distance, on the basis of a detailed data base on a range of alliances, in different industries.

Theory of the firm

The notion of cognitive distance has implications for the theory of the firm. Within a firm, cognitive distance has to be sufficiently small, in an organizational cognitive ‘focus’ (Nooteboom 1999), for people to share or align perceptions, interpretations and norms of conduct, in order to achieve a joint purpose. Next to sufficient ‘proximity’ of cognitive categories in the narrow sense of perception and interpretation, an organization needs shared values and norms of conduct as a basis for aligning interests and for conflict resolution. This is related to current issues in new-institutional (principal-agent and transaction cost) analysis of the governance of opportunism. There, it is now recognized that formal ex-ante control (deterrence, material incentives), by contract or hierarchy, is problematic in view of radical uncertainty, and allowance must be made for ex-post adaptation. This problem of governance becomes even more pressing from the present cognitive perspective, in particular the issue of cognitive distance. Ex ante control is problematic because in the process of working together, unforeseeable shifts occur in perceived means and scarcities of resources, *and also in ends*. That is a problem for governance, but an opportunity for learning and innovation. Under these conditions, ex-post governance requires a set of shared assumptions and values of conduct that can be taken for granted, and provide a basis for trust beyond control. Shared categories, in largely tacit ‘assumptions’ and values form the basis of organizational culture (Schein 1985). This notion of an organization as a ‘focusing device’ yields a more fundamental reason for organizations to exist than transaction cost arguments (although those remain relevant).

The sharpness or narrowness of the focus of an organization depends on whether the organization needs to concentrate more on efficient exploitation (utilization of existing resources and competencies, including cognitive competencies) or on exploration (development of new competencies). The former requires a sharper focus, with more unity of perception and interpretation for the sake of efficient coordination, while the latter requires more diversity for the sake of developing Schumpeterian ‘novel combinations’.

Now, organizational focus yields a problem of myopia, by which organizations may fail to see or adequately interpret potential opportunities and threats to its existence. To compensate for that, organizations need outside partners for complementary cognition, or ‘external economy of cognitive scope’ (Nooteboom 1992). Next to familiar, existing arguments for inter-firm collaboration, this yields a cognitive argument (for a survey of goals of alliances, see Nooteboom 1999).

Next, the proposition is that ongoing interaction will yield a reduction of cognitive distance, or, in other words, identification. This increases mutual understanding, but also reduces the scope for learning. This yields the hypothesis that performance of learning is an inverse-U shaped function of the duration of interaction.

An important implication is that under greater uncertainty, in terms of rapid change of technology and markets, the need for outside relationships, as a source of complementary cognition, increases. In other words, under greater uncertainty there will be less integration under a single hierarchy. This is in contrast to the proposition from TCE that under greater uncertainty there will be *more* integration. The argument from TCE is that greater uncertainty yields more limits of governance by contracting and monitoring, increasing transaction costs. I do not deny that argument. However, from a perspective of learning, the need for complementary cognition from an independent, outside source may yield an overriding argument to keep distance and not to integrate.

This prediction that under greater uncertainty in terms of technological and market change there is less, not more, integration, was confirmed in an econometric study of alliances in different industries by Colombo (2001), who measured the intensity of change, by industry, by intensity of patent applications. In industries with more change there was less integration. Wuyts et. al. (2003) conducted an econometric test of the hypothesis of an inverted-U shaped relation between innovative performance and the duration of collaboration, in the pharmaceutical industry, and the hypothesis was confirmed.

Trust

Of course there is risk of opportunism, but next to the possibility of opportunism there is also a possibility of trustworthiness, and neither should be neglected. The neglect of possibilities for trust may yield excessive costs of contracting. Under the uncertainties of learning and innovation, control by contracts, and the monitoring required, are especially difficult. A detailed contract and close monitoring might seriously constrain the freedom and open-endedness of action that is crucial especially when collaboration is aimed at innovation. And perhaps worse than that, an expression of distrust, based on the assumption of opportunism, is likely to destroy the basis for building up trust as the relation unfolds. There is much evidence in the (sociological) trust literature that distrust breeds distrust and may even elicit opportunism. Then the assumption of opportunism may become self-fulfilling, with considerable costs of contracting and loss of perspective for a fruitful relationship. And if the conclusion would be that in view of problems of contracting and monitoring we should integrate activities under a hierarchy, we run into the objections to that, in the context of learning, that were discussed before.

Williamson (1993) argued that if trust does not go beyond calculative self-interest, it has little meaning. I agree with that. Therefore, in this article a distinction is made between 'reliance' (in French: 'confiance sur'), which includes calculative self-interest, and trust ('confiance en'), which goes beyond calculative self-interest (Nooteboom 2002). Williamson further argued that if trust does go beyond calculative self-interest, it inevitably leads to blind trust, which cannot survive under competition. With that, I disagree. However, Williamson's argument presented an important challenge to clarify the workings of trust. How can trust go beyond calculative self-interest without becoming blind, in the sense of unconditional?

TCE does not claim that everyone is opportunistic, but that one cannot reliably assess the degree of opportunism, so that the possibility of opportunism should be taken into account. Williamson (1985: 59) argued as follows:

'Inasmuch as a great deal of the relevant information about trustworthiness or its absence that is generated during the course of bilateral trading is essentially private information - in that it cannot be fully communicated to and shared with others (Williamson 1975: 31-37) - knowledge about behavioural uncertainties is very uneven.'

Williamson's view is too pessimistic. As the transaction relation unfolds in time, one can accumulate more or less reliable information about trustworthiness. The sociological literature gives detailed instructions how to infer trustworthiness from observed behaviour (Deutsch 1973). Did the partner act not only according to the letter but also to the spirit of the agreement? Did he give timely warnings about unforeseen changes or problems? Was he open about relevant contingencies, and truthful about his dealings with others that might constitute a threat? Did he defect to more attractive alternatives at

the earliest opportunity? Or to use Hirschman's (1970) notions of 'voice' and 'exit': did he exhibit voice rather than exit? We may also infer degrees of trustworthiness from reputation and from observed characteristics, such as membership of associations and communities (Zucker 1986). So, if the neglect of trust yields high opportunity costs, how could trust be used? What precisely does trust mean? What is its basis? What are its limitations? Here, there is no space to go into all relevant details of the complex notion of trust (for a detailed, systematic treatment, see Nooteboom 2002), and only a few key points are summarized.

First of all a distinction should be made between trust in (or, more generally, the reliance on) competence and trust in intentions. Are partners *able* to follow through on an agreement (competence), and do they *intend* to do so to the best of their ability (intention). Second, trust may be based either on the *rational inference*, or the limitedly rational, and often emotion-laden, *assumption* of trustworthiness, or a combination of the two. The question next is what the sources of reliability and trustworthiness might be. Here, the focus is on intentional reliability, in particular why people might not act opportunistically.

An overview of sources of reliability is given in Table 1. Here, a distinction is made between 'micro' sources that are specific to a relationship, and 'macro', institution-based sources that lie in the social environment of a relationship. The distinction between macro and micro sources is also known as the distinction between 'universalistic' or 'generalised' sources versus 'particularistic' sources, made by Deutsch (1973: 55), and between impersonal and personalised sources made by Shapiro (1987). Trust on the basis of macro sources has also been called 'institution based trust'.

A distinction is also made between self-interested sources and sources that go beyond calculative self-interest. The self-interested sources lie in the realm of TCE, and the others, beyond calculative self-interest, constitute my answer to Williamson. As indicated, I reserve the terms 'trust' and 'trustworthiness' for the sources that go beyond calculative self-interest. The self-interested sources are well known from TCE, and I summarize them as concisely as possible. Here, reliability may be based on control (or 'deterrence'). One may control opportunities for opportunism ('opportunity control'), or material incentives ('incentive control'). Opportunity control may be based on legal coercion ('macro') or on hierarchical 'fiat', within a relationship ('micro'). Material incentives may be based on (bilateral) dependence, hostages, or reputation.

Beyond self-interest and control, trustworthiness may be based on socially inculcated values, norms and habits ('macro'), or on personal empathy or identification, or routinization of conduct, in a specific relationship ('micro').

Table 1 about here

Note, in Table 1, that reputation is included in the (macro) self-interested sources of reliability. Here, one behaves well because bad behaviour would get known in relevant communities, whereby one would forego possibly profitable options for future relationships.

Concerning routinization, as a basis for the assumption of trustworthiness, Herbert Simon a long time ago showed that routines have survival value due to bounded rationality, in the sense of bounded capacity for reflective thought. Routines allow us to reserve our scarce capacity of 'focal awareness' (Polanyi 1962), in rational, calculative thought, for conditions that are new and demand priority. When things go well for a while in a relationship, one tends to take at least some of it for granted. One may no longer think of opportunities for opportunism open to a partner, or to oneself. On the basis of experience in relations, trustworthiness is assumed until evidence to the contrary emerges. In other words, trust is a 'default'. The possibility of opportunism is relegated to 'subsidiary awareness' (Polanyi 1962).

We have to face Williamson's compelling question how trust can go beyond self-interest without becoming unconditional. Trust does, and generally should, have its limits. Blind, unconditional trust is generally unwise. Even benevolent people need to guard their self-interest, and it is not excessively cynical to assume that resistance to temptations to opportunism or betrayal is limited. Managers may be expected to cheat to the extent that their firm is under pressure of survival in competition. An

illustration is the ENRON affair. When the overriding survival criterion of a firm is short-term (quarterly) profit, and an economic slump erodes it, the firm may feel irresistible pressure to cheat on the figures.

My answer to Williamson's challenge is as follows. Trust goes beyond calculative self-interest on the basis of ethical norms of behaviour (macro) and by building empathy, identification, or routinized behaviour (micro). These sources are limited in self-interest, and identification and routinization are largely unreflective and hence non-calculative. However, trust is unreflective only within certain tolerance levels. In routine behaviour, opportunities for opportunism and some-one else's utilisation of such opportunities are not noticed or paid attention to, until they exceed some tolerance level. This is rational for the same reasons that routine behaviour more in general is rational, as explained by Herbert Simon. It economizes on emotions and cognition, for which we have a limited capacity. Tolerance levels keep trust from becoming unconditional. Tolerance levels are related to inferred or assumed limits of trustworthiness. Yet within these limits trust is real in the sense that trustworthiness is assumed rather than calculated. One does not continually scrutinise behaviour and conditions for opportunities for opportunism, for oneself or one's partner, until they are felt to be excessive. As noted before, trust operates as a default: one assumes trustworthiness, within limits, until evidence of its failure becomes manifest, and then one adjusts the limits of trust. When something out of the ordinary occurs, our awareness shifts from subsidiary to 'focal' and we look critically at what is going on. As Simon (1983) pointed out, we need emotions of danger and excitement to catapult us into focal awareness. Next, we must control emotions to give the partner the benefit of the doubt, allowing for mishaps, rather than immediately assume the worst (opportunism). Thus, routine behaviour is not necessarily blind, or, more accurately, it is not unconditional.

Questions remain, concerning how, according to what cognitive process, more precisely, the limitation of trust 'works'. Here, we can use a theory of 'framing' (Lindenberg 2000, 2003). A frame is an intentional stance that guides behaviour. Actions may be taken in a frame of self-interest or in a frame of benevolence, and these frames constrain each other.¹ At any moment one of the two may be 'salient', guiding conduct, in 'focal awareness', but the other is likely to be 'subsidiary', and they may switch. One may act in a frame of benevolence, but switch to a frame of self-interest, depending on perceived temptations and threats.

In sum, trust, and more generally reliance, is a four-place predicate: the trustor (1) trusts the trustee (2, such as people, organisations), in some respects (3, such as competence, intentions), under some circumstances but not in others (4).

Finally, an important point, to maintain a link with TCE, is that the build-up of trust is largely relation specific, and constitutes another specific investment that may contribute to something like a hold-up risk.

Employing the perspectives of framing and relational signalling, Frédérique Six (2004) studied the dynamics of 'trust and trouble' in organizations. The central question was when trouble causes the breakdown of trust and when, on the contrary, a deepening of it, and when a postponement of judgement, in extending benefit of the doubt. She conducted a detailed, painstaking study of 'trust and trouble events', and the effects of relational signalling, in terms of how and to whom trouble is voiced. This was done in a study of two organizations, to trace the effect of organizational culture on such processes and their outcomes. For other empirical studies of trust processes, in the relationship between leaders and followers, in teams, and in innovation projects, see Nooteboom & Six (2003). In an analytical rather than empirical methodology, Klos (2000) and Klos & Nooteboom (2001) employed agent-based computational modelling to analyse processes of build-up and break-down of trust in interaction between multiple agents. Here, loyalty was modelled as a threshold for defection: defection arises only when its advantage exceeds a certain threshold, which represents resistance to opportunistic temptation. Partners choose each other on the basis of a preference function with two components: expected profitability and trust, which is a function of perceived loyalty, i.e. lack of

¹ On the side of benevolence, or 'solidarity' as he called it, Lindenberg recognised a 'normative frame', where one is guided by norms of conduct. On the side of self-interest, Lindenberg distinguished two frames: a 'hedonic' frame, guided by an urge to gratify the senses, and a 'gain' frame, where one 'guards one's resources' for survival.

defection. Behaviour is adaptive, as follows. One 's own threshold of defection, and the weight attached to perceived loyalty of partners, relative to potential profit, are adapted on the basis of their contribution to past profit. Note that, therefore, the ultimate force that drives trust and trustworthiness is realized profit. This reflects the need for profit to survive under competition. The model served to experiment with parameters, to find when, if at all, trust and trustworthiness increase rather than decrease. Under some conditions it was indeed found to do so.

Relational risk

There are two kinds of relational risk: risks of dependence ('hold-up') and risk of loss of knowledge ('spillover'). The risk of 'hold-up' is well-known, from TCE, and is summarized as briefly as possible. Hold-up risk arises especially from costs of switching from the present partner to another. Such costs arise, in particular, from investments that are specific to the relationship, and have to be made anew in another relationship. Such investments have to be made up-front, and once they are made one is 'locked in'. Classic forms of specific investments, provided by TCE, are location specific assets, assets in the form of dedicated machines or tools, human asset specificity in training, assets for excess volume of production that could not be sold elsewhere, and brand name assets. To these classic forms, this article has added, in the above analysis, specific investment in the building of mutual absorptive capacity (for crossing cognitive distance), and specific investment in the building of relation-specific trust.

Spillover risk is probably less known, and is now discussed in some detail. The mutual exchange of information, to achieve understanding and to utilize complementary cognitive competencies, from cognitive distance, creates a risk of 'spill-over' to competitors of 'core competence', which can jeopardize competitive position. Of course, the whole point of utilising complementary sources of knowledge is to create and utilise knowledge flows between partners. This may even occur between competitors, to jointly produce new technology, to set technological standards in order to conquer markets, or to jointly provide more comprehensive packages of goods or services to customers. Nevertheless one wants to prevent spillover that goes beyond that purpose. Between competitors, one needs to consider the trade-off between risks and benefits of knowledge flows. In other relations, one needs to assess the risk that sensitive knowledge spills over indirectly, via partners to competitors. That risk depends on whether those partners have relations with one's competitors. Thus, spillover risk depends on network structure and one's position in it. One may need to be careful in establishing linkages with competitors of partners one already has strong linkages with. That might cause those partners to restrict information exchange, for fear of spillover.

There is a danger of being too protective of knowledge, of attaching too much weight to appropriability, while neglecting the dynamic of new knowledge creation in a network of firms, and the development of communicative and absorptive capacity. Of course this does not imply that appropriability no longer plays any role at all, but we should consider when spillover constitutes a real problem. Spillover risk is not always a problem, even if partners have contacts with competitors. The risk depends on the degree to which the knowledge involved is tacit. Obviously, tacit knowledge 'spills' less easily than documented knowledge. This does not mean that it cannot spill over at all. If it is embodied in individual people or teams these may be poached. If knowledge is embodied in the structure and culture of a division of a firm, that division may be taken over. However, then the question is how quickly and effectively that culture can be integrated in the acquiring firm, i.e. how cognitive distance can be sufficiently reduced to yield efficient collaboration. Other reasons why spillover risk may be small are the following. The receiver of information may not have the absorptive capacity to make sense of it, and to employ it for effective competition. Cognitive distance may be too large and difficult to cross. Finally, the speed of knowledge change may be so high that by the time it has reached a competitor and he is able to effectively absorb and implement it, it will have changed.

Governance

An enormous literature has been produced on the governance of inter-firm relations. A systematic discussion of that literature is beyond the scope of this paper. I will make use of my own previous and

current work (Nooteboom 1999, 2004b), which gives such a discussion, and develops a method and a set of instruments for the analysis, design and governance of inter-organizational relations. Those instruments are derived from the sources of reliability, given in Table 1, and they are summarized in Table 2.

Table 2 about here

One solution of course is to prevent risks from arising, by not engaging in specific investments that give rise to the risk of hold-up, and not giving information that may constitute a threat of spillover. This is called 'evasion'. If, on the other hand, one does accept specific investments and information exchange, one may control risk according to the precepts of TCE, such as integration under a 'hierarchy', or by obligational contracting, by means of formal, legal contracts. Hierarchy can limit both hold-up and spillover risk. In obligational contracting, one may limit spillover risk by demanding exclusiveness: in the specific area of collaboration, the partner is not allowed to have contacts with one's competitors.

If opportunities for opportunism cannot be eliminated, one can aim to reduce inclinations to utilize such opportunities, by reducing the incentives to do so, in relational contracting. For this one may use symmetric mutual dependence, shared ownership of specific assets, hostages and reputation mechanisms. This article adds governance beyond self-interest, on the basis of trust. Here one reduces inclinations to utilize opportunities for opportunism on the basis of some degree of loyalty, which may be based on ethics, kinship, empathy, identification, routinization, or friendship.

Risks of hold-up and spillover depend on one's position in a network of relations, and one may therefore control those risks by selecting an appropriate position in such a network, or designing the network around one's position. This strategy does not seem to fit in any of the existing forms of governance (integration, obligational and relational contracting). Perhaps it constitutes a fourth form of governance, which we might call 'positional governance'. Network structure and position have received much attention in sociology (Granovetter 1973, Coleman 1988, Burt 1992), which cannot be discussed here at any length (for an extended discussion, combining competence and governance perspectives, see Nooteboom 2004b).

Finally, one can also make good use of intermediaries, third parties or go-betweens. This is elaborated in a later section.

The instruments of governance all have their limitations. The advantages are clear from the existing literature or from the above analysis. Here, I focus on the disadvantages.

In the context of learning by interaction, evasion entails that one does not yield sensitive knowledge and does not engage in specific investments for the set-up of knowledge exchange. Especially from the perspective of learning, such avoidance of dependence can be highly detrimental. Dependence is especially inevitable in the creation and utilization of complementary competencies, in learning and innovation. Thus, rather than avoiding dependence, the challenge is to maximize the returns and minimize the risks of dependence.

As argued in TCE, integration in the firm surrenders the 'high powered incentives' that apply to an independent producer who has his own responsibility for survival, and it may renounce economy of scale in specialized outside production. Less recognized by TCE, integration can be hazardous, in the need to integrate different cultures, related to differences in organizational focus. Integration also reduces flexibility in the configuration of activities, unless firms are easy to break up. Integration improves the control of spillover, but can cause cognitive inbreeding form loss of variety for learning due to lack of cognitive distance.

As indicated in TCE, complete contingent contracting is often impossible due to uncertainty. The set-up costs of contracts and monitoring systems can be significant. As discussed earlier, contracts may form a straightjacket that blocks the utilization of unforeseen opportunities that arise especially in innovation. It is paradoxical to specify in detail all tasks, rights and obligations for something that is new and unpredictable. Furthermore, detailed contracting to prevent opportunism sets a relation off on a basis of mistrust, and may frustrate the building of trust. Patents may not be possible or effective, for

small firms the costs of monitoring infringement are high and the threat of litigation may not be credible, and patent information may reveal too much. For spillover control, a question is to what extent spillover can be monitored. Monitoring is more difficult to the extent that knowledge involved is tacit. Then control may have to take the form of limiting interaction between personnel. When the knowledge one provides gets embodied in products, one can monitor spill-over by taking apart one's competitors' products to see whether it shows up there (Lamming 1993). That would show that in breach of agreement one's partner has allowed spillover to take place. A demand of exclusiveness, to guard against spillover, has the disadvantage that it deprives the partner from a variety of contacts that contributes to his value as a source of complementary cognition.

Management by relational contracting with incentives from self-interest has the advantage that it is cheaper than contracts, is more flexible, and it is in the players' own interest to be seen to comply with agreements. It requires a judicious mix of mutual interest, shared ownership of specific investments and information, hostages and reputation, to achieve a balance of mutual dependence. There is no need for balance in every aspect separately, but for balance in the mix. Thus one-sided ownership of specific assets may be balanced by one-sided hostages going the other way, or by a rigorous reputation mechanism. The main problem of this form of governance is that it is not self-policing. Again there is a need for observation, measurement and monitoring. How does one measure and monitor degree of dependence, spillover, specificity of investments? For example, if a partner claims that his investment in the relation is highly specific, and that he needs compensation for this, can he be believed, or is there a need to demand insight into his books to check that the investment is indeed not used for anyone else? That, in turn, may increase the spillover risk for him. Another major problem is that the balance of interests, to prevent one-sided dependence, is difficult to ensure and maintain. It is sensitive to shifts in competence and external conditions. It is particularly vulnerable to the emergence on the scene of a more attractive partner for one of the players, who will then be tempted to defect and leave others with a gap in performance and worthless specific assets.

Reputation works only if breach of agreements can be observed, and can be credibly communicated to potential future partners of the culprit. If the culprit can move out with unknown destination this may be impossible. Also, the culprit may claim that the accusation is unjust and that there are ulterior motives to harm him.

Relational contracting with loyalty as the basis for trust, in the expectation that partners will not intentionally create damage even if they have the opportunity and the interest to do so, has several advantages. In contrast with obligational contracting it is cheap, flexible and self-policing, i.e. requires limited monitoring, since it is driven by intrinsic rather than extrinsic motivation. In contrast with relational contracting with incentives from self-interest it is less sensitive to contingencies. However, one may wonder how trust can be seen as an instrument of governance, since it cannot be bought and installed like a machine or injected as an ingredient. If trust is not already in place prior to transactions, it can only be developed in time, in an ongoing relationship. Yet, even then it can be seen as an instrument, in two ways. First, one may select one's partners on the basis of characteristics based ex ante trust (Zucker 1986), such as kinship or membership of a community one is familiar with. Second, one may design the relation and plan its progress so as to build up trust in the process. The main problem concerning trust is: how far can it go? As discussed before, it should not be blind or unconditional. See the earlier discussion of the limits of trust. Within such limits, trust can work. Concerning network structure as an instrument, in the design of density and strength of ties, there is a complicated trade-off between competence and governance. A dense network, with many participants and many strong ties between them, supports governance, on the basis of reputation, coalitions to constrain behaviour, monitoring, and trust based on identification. However, it increases risks of spillover, reduces cognitive distance, and may lead to lock-in, which inhibit access to the variety of cognition needed for learning and innovation.

The use of go-betweens, to be discussed in more detail in a following section, has the problem that effective and reliable go-betweens may simply not be available, and then they are difficult and slow to develop.

Now, I turn to some of the empirical evidence. Berger et. al. (1995) tested the effects of a number of conditions and instruments, from TCE, and trust-related variables, beyond TCE, on perceived risks of dependence of suppliers on their customers (the buyers). The test was based on a postal survey among

80 suppliers to Océ van der Grinten, a Dutch producer of copying machines. Perceived dependence was measured in two ways: independently from the perceived dependence of the buyer ('gross dependence'), and the degree to which the supplier perceived himself to be more dependent on the buyer than vice versa ('net dependence'). One explanatory variable from TCE was three types of specificity of investments. The expected positive effect on perceived risk was highly significant, thus confirming part of TCE. Extensiveness of contract, measured according to several indicators, was not found to have a significant effect. This confirms earlier results from Macauley (1963), and confirms the limited usefulness of contracts, discussed above. Trust in loyalty (lack of opportunism) was construed on the basis of six indicators. It had the predicted negative effect on gross perceived dependence, but not on net dependence. This could make sense: net dependence would depend on the balance of loyalty. If partner's loyalty is reciprocated by own good faith, then the effect on net dependence (degree to which supplier is more dependent on buyer than vice versa) is not to be expected: partner's dependence is equally reduced as one's own is. Some network effects were also tested, and some of them were confirmed. In a subsequent study, Nooteboom et. al. (1997) conducted a survey, with oral interviews, of ten companies supplying components and sub-assemblies to producers of electrical/electronic apparatus, with ten customer relations for each of the ten companies. Relational risk was refined into two components: the size of loss that might occur, due to hold-up, and the probability that hold-up would occur. Two dimensions of trust were hypothesized: routinization and institutionalization. By the latter was meant the emergence of common norms to regulate behaviour within a relationship. The trust variables competed for explanation next to other non trust-related explanatory variables. The results showed that trust indeed has a significant effect on perceived probability of incurring a loss due to opportunism, next to the effects of other variables that one would expect from TCE.

Roles of a go-between

The use of a go-between is less known in the literature, and merits a separate discussion. The first role of a go-between is related to competence rather than governance. The go-between helps parties to learn from each other, and to achieve the mutual understanding needed for that. In other words, the go-between may be needed to help partners to cross cognitive distance. To the extent that the knowledge transferred has to replace existing tacit knowledge, there is a problem that existing tacit practice is taken for granted and is difficult to subject to criticism. Then, the tacit knowledge underlying practice may first have to be made explicit (Nooteboom 2000). The go-between may have an important role to play here. Particularly in a small firm, where often a greater proportion of knowledge is tacit, an outsider who comes with a proposal to change existing practice will be dismissed as not making sense and being 'impractical'. Only people who are trusted to be familiar with existing practice and the exigencies of that particular small firm may get the attention of the entrepreneur.

A second role is related to the first one. It is to solve the 'revelation problem'. In the selling of information, there is Arrow's paradox of information: to judge the value of information one must already have it, but then there is nothing left to pay for. One solution is to offer licenses with only a small payment up front, and a subsequent payment in proportion to the proceeds derived from the patent. However, this may not be easy to observe, for the purpose of control. An alternative it to let the go-between assess the value of the information. For this, the third party has to know both sides well enough to reliably inform them on the competence and intentions of each other, without surrendering much information on content.

A third role, connected to the second, is to control spillover, seeing to it that knowledge does not flow beyond where it is intended. This is relevant when one partner would not allow the other to come into the firm and monitor knowledge flow, because he would thereby have access to other sensitive information, creating a risk of reverse spillover, while the third party does not constitute such a risk.

A fourth role derives directly from TCE. Williamson (1985) indicated the possibility of engaging a third party as a go-between (in 'trilateral governance'). That was inspired by considerations of efficiency. It obtains when governance to control transaction costs is needed but the transactions involved are too small or infrequent to justify the often considerable costs of a 'bilateral' governance scheme. Then it is more efficient to make a simpler overall agreement and engage a third party for arbitration or mediation.

A fifth role is to act as a guardian of hostages. Without that, there may be a danger that the hostage keeper does not return the hostage even if the partner sticks to the agreement. The third party has an interest in maintaining symmetric trust and acceptance by both protagonists. He can be trusted more to sacrifice the hostage without hesitation if the giver does not stick to the agreement, and not to keep the hostage longer than agreed. This solution is antique, and was practised in the Middle Ages, in the exchange of hostages between kings (de Laat 1999), with an emperor as the third party.

A sixth, and perhaps the most crucial role, is to act as an intermediary in the building of trust. Trust relations are often entered with partners who are trusted partners of someone you trust (Sydow 1996). If X has competence as well as intentional trust in Y and Y has intentional trust in Z, then X may rationally give intentional trust in Z a chance. X needs to feel that Y is able to judge well and has no intention to lie about his judgment. Intermediation in the first small and ginger steps of cooperation, to ensure that they are successful, can be very important in the building of a trust relation. The intermediary can also perform valuable services in protecting trust when it is still fragile. Things may go wrong in a relation either because of mistakes or because of opportunism, but in practice they are difficult to distinguish because an opportunist will claim mistakes or mishaps as the cause of disappointing results. The intermediary may solve misunderstandings that turn mistakes into perceived indications of opportunism. New relationships may have to start small, with low stakes that are raised as trust builds up. This may be needed especially when contracts are not feasible or desirable. The disadvantage of such a procedure is of course its slowness. In a competitive environment where speed to market is of increasing importance it may be too slow. Then, a go-between may provide help for a more speedy development.

A seventh role, related to the sixth, is to help in the timely and least destructive disentanglement of relations. A dilemma arises in ending a relation. If one wants to end a relation because a more attractive option has emerged, should one announce this attention at an early stage, or should one drop it on the partner at the last moment? In other words should one go for an adversarial or a collaborative mode of divorce (Nooteboom 1999)? With the first, one offers the partner a way out with least damage: he stops making specific investments that would maintain his switching cost, one can help to find a new partner to minimize disruption. However, one also gives the partner time to obstruct one's departure.

Collaborative divorce is viable if the partner can be expected to cut his losses and welcome the help to get out with minimal damage. Here also, to eliminate misunderstanding, and to prevent acrimonious and mutually damaging battles of divorce, a go-between can offer valuable services.

An eighth role is to act as a lookout, a sieve, a channel and an amplifier in reputation mechanisms. As indicated earlier, for a reputation mechanism to work, infringement of agreements must be observable, its report must be credible, and it must reach potential future partners of the culprit. The go-between can help in all respects: to monitor infringement, to sift true reports from gossip, to connect with future potential partners of the culprit and bridge the distances involved.

Most of these roles are especially important in innovation. Here, exchange of knowledge is crucial, with corresponding risks of spillover, and specific investments needed to set up mutual understanding and cooperation. There are corresponding risks of hold-up, while especially in innovation the competencies and intentions of strangers are difficult to judge. Especially in innovation detailed contracts tend to have the adverse effect of a straightjacket, constraining the variety of actions and initiatives that innovation requires. Third party arbitration then yields a less constraining alternative, in trilateral governance and the development of trust instead of using detailed contracts.

Note that in all roles it is crucial that the go-between command trust in both his competence and his intentions. He should be competent concerning the technologies involved, and concerning the relational skills required. He should be known to be impartial and incorruptible. He should have an interest to act scrupulously, with a view to his reputation as a go-between. There is a range of actors who could possibly play these roles, and not all roles have to be played by a single actor. Possible go-betweens are banks, consultants, interlocking directorates, and local government agencies, such as municipalities or development agencies, or subsidized technology transfer centres.

Contingencies

Problems of relational risk depend on a number of contingencies. More flexible technology, allowing for a variety of forms of application on the basis of a given, generic investment, entails less specificity

of investment, and hence less hold-up risk. More tacit knowledge and faster change of knowledge yield lesser risk of spillover.

The feasibility of individual instruments of governance depends on conditions of markets and institutions. Contracting is not feasible when activities cannot be monitored, depending on the type of knowledge and technology, or when there is no reliable judicial system. Reputation depends on the presence of effective reputation systems. Integration of activities under unified hierarchy depends on anti-trust policy. Trust depends on the values, ethics and norms of conduct embodied in culture. The use of go-betweens depends on their presence, in the form of banks, associations, and other forms of social capital.

Since all the instruments of governance have advantages and disadvantages, an important question is what instruments to use under what circumstances. Often, one can usefully combine several instruments. However, they should not be in conflict, but should complement each other. This is a complex matter, and here only some illustrative examples can be given.

In principle trust and contract are substitutes: more trust allows for less contract, and vice versa. However, they are also complements. Where a contract ends, as it necessarily must, somewhere, trust needs to begin. It is often difficult to make them consistent, since detailed contracts to preclude opportunism may reduce trust, and may in fact stimulate opportunism. However, their combination is not impossible. They may be consistent, for example, when contracts are geared to potential limits of trustworthiness, while not blocking the further development of trust, and when their combination is supported by a commitment to voice rather than exit, and contracts are actually enforced only in exceptional cases. The crafting of a contract may be costly and may itself constitute a relation-specific investment, so that prior trust may be needed to accept the costs and risks involved. Contracts may be detailed not so much for guarding against opportunism, but for preventing misunderstanding or to constitute a support for memory, when activities are technically complex. In other words, they may need to be detailed to support competence trust rather than intentional trust.

An attractive combination, especially in collaboration for innovation, is the gradual build-up of balanced dependence, with incremental specific investments, with minimal contractual safeguards against opportunism, which allows trust to develop. This may be further supported by a reputation mechanism, and support from go-betweens, which are easier to reconcile with trust and innovation than contractual safeguards are.

Conclusion

It is possible to connect theory of learning and competence production with theory of governance, to arrive at an integrated theory of learning and governance. This requires a theory of knowledge and learning. From the theory used in this article, it follows that learning is inherently social. In governance, trust is indispensable. It was argued that contrary to Williamson's views, trust may go beyond self-interest, in ethical behaviour and identification, and it may be based on non-calculative routine behaviour, while being subject to tolerance limits that stop trust from becoming unconditional. Two kinds of relational risk were recognized: hold-up and spillover. Next to the familiar forms of specific investments, recognized by TCE, two new ones were added: investment in mutual absorptive capacity, and investment in the building of relation-specific trust.

For the governance of relations, i.e. the control of relational risk, a set of instruments was offered, which includes trust, network configuration and go-betweens, next to instruments derived from TCE. These instruments were geared especially to problems that arise in learning in interaction between firms. The optimal mix of instruments to be chosen, and the effects on performance, depend on a range of contingencies of institutions, technology and markets. In view of differences in technology and markets, forms of governance and performance will vary between industries. In view of differences in institutions, forms of governance will vary between countries, yielding different performance.

The claims set forth in this article have been subjected to a variety of empirical tests. Only some of them could be indicated. Clearly, there is much more empirical work to be done.

Table 1 Sources of (intentional) reliability

	macro; universalistic	micro; particularistic, relation-specific
self-interest		
opportunity control	contracts, legal enforcement	hierarchy, managerial 'fiat',
incentive control	reputation	dependence: unique partner value, switching costs, hostages
Sources of trustworthiness		
altruism benevolence	values, social norms of proper conduct,, moral obligation, sense of duty, bonds of kinship	empathy, routinization, identification, friendship

source: adapted from Nooteboom (2002).

Table 2 Instruments for control of relational risk

Instrument	Description
Evasion	don't yield sensitive information and don't engage in specific investments,
Integration	unified administrative control, by merger or acquisition,
Obligational contracting	contracts to control hold-up, and patenting to control spillover,
Relational contracting with incentives from self-interest	use of mutual dependence, ownership of assets or information, hostages, reputation mechanisms
Relational contracting with loyalty as a basis for trust	based on values and norms of conduct, personal bonds, routinization
Network structure	one's position in a network
Roles of a go-between	trilateral governance, solving the revelation problem, monitoring, hostage keeping, spillover control, sieve and amplifier of reputation, trust building

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