

Design of Technology Licensing Agreements: New Empirical Evidences[♦]

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Abstract: It has always been argued in the economic literature that in the frame of technology transfer transactions attempts of licensor to mitigate misbehavior of the partners could undermine their ability to learn. We study a recent sample of 237 technology licensing agreements in various industries and across several countries and we show that companies design their collaborative relationships in a way that, from one side, allows them to constraint the temptation of the partners to exploit for private purposes information exchanged in the frame of a transaction, but from another side, does not limit learning possibilities built into relationships. For this purpose we create an integral measure of functional scope of a technology transfer transaction which embodies its learning potential and demonstrate its positive effect on the choice of the specific governance mechanisms by licensor. We do not find any support for the idea that licensing agreements are wider in terms of the rights given to the licensee when parties are engaged in a more complex joint technology development project. However we find a support for the view consisting in a partial substitution of formal governance mechanisms for relational ones. We show that in the presence of prior deals with the same partner licensor inclines to optimize its total contracting costs by sparing on costly implementation of explicit formal mechanisms and to rely instead on implicit relational mechanisms. Summing up, we assert that new empirical evidences revealed in this paper could have implications for the choice of optimal licensing agreement between partners to structure their technology transfer transaction.

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1. INTRODUCTION

Licensing is an essential means for firms to valorize their intellectual assets and innovation capabilities, to access to complementary technologies and assets, and to maintain competitiveness. In enterprises in which business is primarily based on the transfer of information or high technology, IP is the principal asset in the company's portfolio. Technology transfer is usually considered as a base of licensing activity. The various possible logic of technology transfer can range from simple transfers with the aim to get royalties to more complex transfers linked to business partnership. Indeed behind every technology transfer transaction there is a formal legal agreement.

In the existing academic literature technology transfer agreement is usually considered as a single set of formal contractual conditions for effectuating technology transfer transaction, a hybrid form opposed though both to one-shot market contracts and hierarchical structures¹. Thus it is analyzed through the prism of “*average*” contract. A few recent empirical studies by Bessy, Brousseau and Saussier (2002), Brousseau and Coeurderoy (2005), Brousseau, Coeurderoy and Chaserant (2007) make attempts to go further and to construct typologies of the technology licensing agreements, based on characteristics of partners, transactions, etc. Based on transaction costs economics (TCE) logic, these authors demonstrate how characteristics of these formal contracts are defined in order to deter the temptation of licensee to use knowledge and technology transferred by licensor opportunistically. Researchers studying these inter-firm arrangements from a knowledge-based, or resource-based perspective, usually voice that these attempts to mitigate hazards associated with opportunistic behavior of the partners face a fundamental conflict with their desire to learn from each other through a technology transfer transaction. According to works of Sobrero and Roberts (1996), Zajac and Olsen (1993), Ghoshal and Moran (1996), to quote just a few, partners' intention to prevent the risk of technology leakage (i.e. appropriability hazard), when a firm can exercise unauthorized usage of a partner's technology or know-how (Teece, 1986; Oxley, 1997), prevents them from obtaining long-term mutual strategic and learning gains.

¹ Significant portion of prior research on hybrid forms is devoted to the classification of all arrangements as equity and non-equity, where the presence of shared equity is considered as synonymous of hierarchy, and all equity arrangements are supposed to have similar incentives properties – shared ownership and control (Geringer and Hebert, 1989; Gomes-Casseres, 1989; Harrigan, 1988; Hennart, 1991). Campbell and Reuer (2001) offer an exhaustive list of the basic legal issues included in typical alliance contracts, and moreover they argue that similar considerations can be applied to non-equity arrangements, excluding issues related to share-related provisions.

Our purpose in this paper is to demonstrate that there is no real tension between these two dimensions of complex inter-firm technology transfer arrangements – learning and hazard mitigation. We argue that this *false* dichotomy can be easily avoided when we turn more close attention to the production component of transaction costs, which had always remained understated in TCE literature. As analysis of real practices suggests² when companies take into account, apart from the costs of organization of technology transfer transactions, also production costs and strategic considerations in determining the best mechanism for managing their cooperative relations, an efficient outcome can be reached – both in terms of mitigation of appropriation hazards and realization of transactional value potentially built into every transaction. Thus the key role of a design of technology licensing agreements – *to support the cooperative effort, from one side, by constraining at the same time the strategic behavior of the partners*, becomes possible to execute.

This logic brings us to the analysis of functional scope of a technology transfer transaction as embodiment of its learning and cooperative potential and as one of the determinants of the inclusion of specific formal governance mechanisms into technology licensing agreements. In order to reveal causal relations between functional scope and governance structure of the inter-firm arrangements, we focus further on two categories of contract terms which allow us to investigate how firms attempt to resolve various adaptation problems arising after the contract is signed. The *first* category refers to the rights formally transmitted by licensor to a licensee in order to successfully effectuate technology transfer. These rights should always be clearly stipulated in a formal agreement and serve for specifying precisely what is authorized or not. More specifically, these rights can take the form of license regime granted to the licensee, territory dimension, additional rights to sub-license or to sell the license, and so on. *Other* category includes governance mechanisms, and consists in supervision, renegotiation, and conflict resolution provisions, the main purpose of which is to manage *ex post* uncertainty and generate security and adaptability of inter-firm relations necessary to the success of technology transfer transaction.

Our empirical finding of existence of significant positive influence of functional scope on the probability of implementation of sophisticated governance mechanisms by the contracting parties convinces us in the idea that companies design their collaborative relationships in a way that, from one side, allows them to constraint the temptation of the

² The issue of structuring of real licensing practices was intensively discussed with the members of LES-France on various conferences (“*Tendances du licensing 2008*”, 24 October 2008, Lyon; “*L’actualité 2008 du Licensing*”, 9 December 2008, Paris).

partners to exploit for private purposes information exchanged in the frame of a transaction, but from another side, does not limit learning possibilities built into relationships which allow them to perform the substantive task required for the particular technology transfer.

In our paper we also make attempts to specify the factors influencing the bundle of rights which is transferred together with technology and knowledge to the licensee, and, contrary to expectations, we do not find any significant influence of nature of the transaction on the functional scope of the arrangement: technology transfer included in a wider cooperation agreement (cooperative R&D project, alliance, etc.) is no more likely “accompanied” by greater number of rights transmitted to the licensee, than simple technology or other property rights transfer. Moreover this later characteristic of the technology transfer transaction, i.e. whether it is essentially a technology, know-how and other IPRs transfer, or whether it is included in a more complex joint technology development project, where partners are supposed to collaborate more intensively with each other, does not produce any effect on the choice of formal governance mechanisms.

This paper also contributes to the issue of interplay between formal and relational mechanisms when firms repeatedly interact. Contrary to recent results of Ryall and Sampson (2007) who suggest complementarity between formal and relational contracts, we show that in the presence of prior deals with the same partner licensor inclines to optimize its total contracting costs by sparing on costly implementation of explicit formal mechanisms and to rely instead on implicit relational mechanisms. Thus we prove substitutional effect which trust, reputation-building and relational mechanisms may exert on the design of a formal technology licensing agreement.

New empirical evidences revealed in this paper are based on the setting of 237 technology licensing agreements. Data has been collected from a survey of 160 American, Japanese, and European firms, working in various industries (see Brousseau et al. (2005, 2007)).

The rest of the paper is organized as follows. In section 2 we present literature overview. We then propose theoretical framework for analysis of the design of governance mechanisms, which leads us to forming testable propositions (section 3). Going further to empirical part, we first present our database (section 4), then describe methodological issues relating to construction of dependent and explaining variables (section 5). In section 6 we present analysis of the obtained results, and then conclude.

2. DESIGN OF CONTRACTUAL TERMS AND ITS DETERMINANTS

The analysis of contractual terms lays in the intersection of two disciplines – law and economics. On the law side, an extensive body of literature on contract law teaches us that the reason for including a term in a contract is “hidden” mostly in the subsequent costs of enforcing a contractual term (Shavell, 2003). Notably, if the cost of providing evidence to the courts that a relevant contingency or condition has occurred is sufficiently large, the term will not be worthwhile including.

In contrast, economic literature applies economic reasoning for inclusion of certain provisions in a contract, analyzing their effect on partners’ motivation and incentives for opportunistic behavior. The dominant theories of governance in licenses have been without doubt Transaction Cost Economics (TCE) and Agency Theory, the underlying thesis of which is that it is important to manage the disclosure of the knowledge in a way that enables the partners to reach an agreement while minimizing the risk of appropriation from the licensees (Arrow, 1962). The basic insight behind is that once an idea is disclosed to a potential buyer, the buyer could use the information without paying for it. For instance, agency theory has been relying upon moral hazard and asymmetric information categories to analyze exchanges of knowledge through arm’s length transactions, focusing on the design of both payment schemes (Beegs, 1992; Choi, 2001; Macho-Stadler and al., 1996) and transfer mechanisms (Arora, 1995). In the frame of TCE investigations on payment scheme or on monitoring provisions also exist (Contractor, 1981, Bessy and al. 2004; Brousseau & Coeurderoy, 2005; Aulakh and al., 1998). All these studies show that the more hierarchical governance structures (joint ventures and lump sum fees) are chosen when appropriability hazards are very high, i.e. in the presence of weak IPR and codifiability, and thus, verifiability. At the same time other contractual clauses of licensing agreements are almost unexplored: only two theoretical papers were published about grantback rationale (Choi, 2002; Van Dijk, 1994). Similarly, the rationale for exclusivity provisions was explored mostly by industrial economic literature studying the optimal number of licensees (Kamien, 1992).

However we can refer to the more applied studies of Contractor (1981), and more recently, Arora (1995), Bessy and Brousseau (1998), Bessy, Brousseau and Saussier (2002), Brousseau and Coeurderoy (2005), Brousseau, Coeurderoy and Chaserant (2007), in which theoretical propositions on the choice of separate contractual terms are supported by analysis of real firms’ practices. Let’s try to outline the main outcomes of these studies.

All of these articles are organized as follows. First, authors specify discrete contractual provisions which are usually implemented in licensing contracts (mode of payment, exclusivity clauses, etc.), and try to construct typology of the contracts, distinguishing between the sets of different provisions. Next, basing on analytical framework, strongly supported by the logic of TCE, they find explanations for inclusion (exclusion) of a certain provision in a specific contract, considering as determinants of this partners' choice different features of transactions, characteristics of institutional environment, etc.

For instance, Bessy and Brousseau (1998) try to investigate the totality of the contractual provisions and governance mechanisms applied in the contracts, rather than reduce the structure to certain number of key features of the contract. They show that companies usually implement various safeguards mechanisms in order to manage ex post behavioral uncertainty of the counterparty. Among safeguards they mark out payment schemes, confidentiality and non-competition provisions, protection provisions (exclusivity clauses), provision of minimal performance, grant-back provisions and some others; each of them aims at resolving a specific hazard caused by existence of behavioral uncertainty. To ensure ex post adaptation and enforcement of mutual obligations in technology licensing agreements, partners resort also to governance mechanisms, which are based on contractual provisions implementing supervision, renegotiation and dispute resolution mechanisms. Basing on the sample of ten case studies and forty six licensing agreements, Bessy and Brousseau (1998) show that the more intensive the exchange of tacit knowledge, the more complex and complete the governance structure.

Similar analytic framework was applied in another study of Bessy, Brousseau and Saussier (2002), and its statements were tested on the database of 226 contracts, constituted by the INPI's Office of International Technology Transfer. In order to identify the interdependencies between the characteristics of the contracts, authors elaborated a typology based on the complexity of the transfer of knowledge (from pure Transactional contracts, which strictly speaking even do not represent a real transfer of knowledge, but only of user rights, to more Relational contracts) and verified the hypothesis that the nature of the transfers brought about by the license agreement is co-determined with the type of contractual structure.

Summarizing literature review, we argue that research on the design of contractual mechanisms and on the role of individual contractual provisions in governing inter-firm relations is still emerging. Prior research has tended to focus on the choice between several discrete governance structures for managing technological inter-firm relationship. This in part is explained by underlying TCE logic, where markets, hybrids and hierarchies are considered

as discrete governance alternatives supported by corresponding instruments. In addition, difficulties in obtaining highly confidential information on the specific provision of technology licensing agreements also hindered to a certain degree research on various contractual provisions.

3. THEORETICAL FRAMEWORK

In our study we follow the logic of the most recent paper of Brousseau, Coeurderoy and Chaserant (2007) exploring how technology licensing agreements are designed. In this paper authors assess the influence of transaction attributes, institutional environment and strategic considerations between partners on their choice of governance mechanisms. Consistent with previous studies, governance clauses include three mechanisms – supervision provisions, renegotiation clause, and alternative dispute resolution mechanisms.

Basing on the database of 213 licensing agreements, Brousseau et al. confirm the close link between the intensity of the transfer and the preference of partners for supervision mechanisms. They also show, that by granting a renewal provision, the licensor explicitly provides ex ante a long-term commitment, thus he includes a renegotiation clause in the agreement. The most prominent result obtained in the study is that there is a strong link between the existence of private institutions and the recourse to governance mechanisms, which is in line with MacNeil's (1974) vision. By facilitating the exchange of information among firms and through agreements on behavioral norms, these entities simplify technology transfers and clarify the rules of the game in the business.

Additional contribution of this paper consists in the following: Brousseau et al. confirm that three studied governance mechanisms – supervision, renegotiation, and dispute resolution - are explained by different variables, and moreover, they address independent coordination problems, and hence are chosen independently of each other.

In our paper, we also search for determinants of the partners' choice in favor of these three governance mechanisms (supervision / renegotiation / dispute resolution), though we support it with a different reasoning. As we could see in all previous papers the logic of transaction costs minimization was predominant, it suggests that whether a governance mechanism should be included in a licensing agreement or not has to be defined by the level of opportunism hazard faced by partners. At the same production "side" of transaction costs remained always understated. We argue that observed real patterns of firms' governance structures suggest us that firms also account for other theoretical issues - production costs and strategic considerations - in determining efficient mechanisms of managing their cooperative

relations. Transaction costs are not always primary. This logic brings us to the analysis of functional scope of the agreement as one of the determinants of the inclusion of a specific governance mechanism into technology licensing agreements.

We consider the logic of design of technological licensing agreements to be the following: partners decide to create an alliance in order to satisfy their specific needs (acquiring new technology, market expansion, etc.)³. Therefore, they define the scope of their agreements based on these business needs and their business strategy, meaning that scope reflects the number of rights we transfer to the counterparty. For example, we consider that the choice of the worldwide territory coverage for a license is defined by business goals of a licensor to expand his technology on the maximum possible area, and not by the fact that a licensor is not exposed to contractual hazards from the licensee, and thus he allows him to obtain rights of use on worldwide scope. On the contrary, we consider that the scope of the contract influences the incentives of a licensee to behave opportunistically and, thus, defines to a certain extent the probability of knowledge leakage from transaction. In order to prevent himself from these opportunistic strategies of a licensee, the licensor introduces specific governance mechanisms, which do not impose any restrictions on the scope of the agreement, but which influence licensee's incentives to cheat. This logic brings us to the idea that in order to resolve his main cooperative challenge in the licensing relationships – acquiring new technologies and accessing new markets versus leakage of key knowledge and proprietary assets, the licensor do not restrict the scope of rights he transfer to a licensee; instead he chooses the most appropriate set of governance mechanisms to guarantee these rights are exercised in a due manner.

Following the idea of Brousseau et al. (2007), we assume the particular role of strategic behavior between partners influencing this trade-off between the costs of governance mechanism implementation and the benefits from it. Though we consider these relationships to be expressed not in licensee's strategies to “invent around” the transferred knowledge, and hinder diffusion of the licensed technology. We rather refer to a specific nature of the relationships between partners: if they are involved in a wider agreement, and if they had previous licensing experience with each other. Rationale for the choice of these specific features of strategic “game” can be found in the fact that the probability and the nature of potential losses inflicted on the inventor depend on the specific nature of the technological competition, and on the relative competitive position of the licensee. If partners interact on a

³ For more information on alliances formation motives refer to Oxley et al. (2008).

more solid basis including cooperative R&D project, or alliance and partnership, they *a priori* are more dependent of each other, and moreover, their individual gain is closely bound to the overall success of the project. This dependence undoubtedly influences *ex post* misalignment of partners' behavior and their propensity to shirk, as the latter is associated with significant losses and costs for both parties involved. Moreover, when parties had already licensing experience with each other, they have also more aligned interests and thus, we can argue, that repeated interactions can, through implicit mechanisms, reduce the threat of non-cooperative behavior in knowledge transfer transactions. Parties will therefore rely on more informal governance mechanisms, as the costs of inclusion of formal governance mechanisms in the agreement will be much higher comparatively to the level of risk they are supposed to prevent.

Let's look closer on how contractual provisions are influenced by these types of determinants: the functional scope of transaction, the nature of operation, and prior relationships between agents.

3.1. Three Governance Mechanisms

Technology licensing agreement can not be considered as an *ex ante* complete contract, mostly due to the specific features of the transferred resources, as well as to the great diversity of risks. Consequently, counteracting parties introduce various governance mechanisms to adapt to the new situation, and readjust misalignments when necessary. Following Brousseau et al. (2007), we distinguish between three types of governance clauses: supervision, renegotiation, and dispute resolution.

1. *Supervision mechanism* implies granting of monitoring rights to one of the parties, or to a third independent party, in order to audit the enforcement of formal contractual commitments. Undoubtedly, the introducing of such mechanism is costly. But it worth the effort, as increasing supervision contributes significantly to the increase of costs of opportunism, and thus reduces the incentives to shirk. TCE logic suggests us that supervision is needed when the licensor runs the risk of opportunistic behavior by the licensee, i.e. when there are sunk investments in the relationship and hold up risk occurs (Williamson, 1985).
2. *Renegotiation mechanism* states the extent to which contractual obligations can *ex post*, be redesigned to adjust contractors' behavior either to new environmental conditions, or to changing mutual preferences, or indeed to the accumulation of knowledge (Brousseau et al., 2007). Implementation of this mechanism gives both

partners a certain degree of flexibility and allows avoiding excessively high negotiation costs. Moreover, this contractual clause also provides agents with the incentives of non-opportunistic behavior, as they can adapt to new situations. Another side of the coin, however, is that a renegotiation provision reduces credibility of *ex ante* commitments, and thus increases the likelihood of renegotiation.

3. *Dispute resolution mechanism*, in our context, refers to *alternative* (to the court) dispute resolution instruments. Of course, contracts are enforceable by courts as a final recourse. But due to inefficiency of the legal system, parties, in addition, can appeal to alternative mechanisms (for example, arbitration, or mediation) in order to settle the dispute. These settings control the behavior of counteracting parties through adequate retaliation mechanisms and allow them to manage information and knowledge more efficiently.

As we can see, all these clauses result from simultaneous licensor's decisions made on the following three issues (Brousseau et al., 2007): 1) decision to supervise how the licensee uses the transferred technology; 2) decision to explicitly anticipate the need for *ex post* adaptation; and 3) decision to implement alternative dispute resolution mechanisms.

3.2. Functional Scope of Licensing Agreement

Every license agreement is unique, reflecting the particular needs and expectations of the licensor and licensee. An infinite variety of agreements are possible, limited only by the needs of the parties and by the parameters of the relevant laws and regulations. One of the main sections of a licensing agreement relates to the extent of the rights licensed by a licensor to a licensee. This refers to the functional scope of the right being licensed: whether the license is exclusive, sole or non-exclusive, and the geographic territory for which the license is granted. Some licenses permit the licensee to sub-license some or all of the rights conferred in the license, thus permitting the licensee to go into the business himself of licensing the technology. The rights might also be restricted according to a defined application or product.

The nature of the rights being licensed depends on the subject matter, i.e. what is really transferred under the agreement, on business strategy of the parties, on the expected duration of relationships. From the literature, especially, from knowledge-based or resource-based perspectives (Zajac and Olsen, 1993; Sobrero and Robert, 1996; Ghoshal and Moran, 1996), we could see that the extent of rights transferred by the licensor to the licensee is considered already as a safeguard, i.e. "more the licensor is exposed to appropriability hazards

(risk of technology leakage) or hold-up hazards (*ex post* extraction of additional rents) (Oxley, 1999), less rights he will transfer to the licensee”, thus decreasing his potential risk from the transaction. In this paper, basing on TCE, we argue that this dichotomy is false, and show that when designing technology licensing agreements partners are not only pursuing the decrease of transaction costs of the deal, meaning here only the costs of *ex post* contract compliance, but they are focusing on minimizing the sum of transaction *plus* production costs for a given value-created transaction (Williamson, 1985). This framework allows us to distinguish between two types of clauses in licensing agreement – those which provide real transfer of rights from the licensor to the licensee, and those which structure this transfer and provide enforcement for a proper its execution, i.e. governance mechanisms.

The most commonly used rights category are license regime and granted territory. The first one refers to the number of licensees with whom the licensor has the right to enter into agreement. The most preferred option for licensors is, undoubtedly, a non-exclusive provision. By spreading the risks and rewards to several licensees, the licensor does not depend on the success of one licensee. He can maintain a better control over the technology and, by virtue of the fact that several licensees are using and exploiting the technology in several markets and perhaps in a variety of products, give the technology a chance to further evolve and develop. The licensee, on the opposite, prefers an exclusive license, where the rights granted to him even exclude the rights of the licensor to exploit its patent and know-how. In this case, it is important for the licensor to ensure that the negotiated agreement contains appropriate incentives and/or penalties to protect him in the event of poor or non-performance by the licensee. The same logic also refers to the geographic territory. For example, worldwide rights could be granted, or the rights could be limited to specific countries or even specific parts of countries, or zones. What is appropriate will be influenced by what the licensor is able to offer in terms of rights and what the licensee is able to take advantage of in a particular territory or region. But, of course, the greater territory is granted to the licensee, the stronger dependence of the licensor on the performance and appropriate behavior of this particular agent. In order to decrease the probability of potential losses in situation where the licensee behaves opportunistically, the licensor is willing to introduce specific governance mechanisms able to monitor misbehavior of the former.

Other rights can be transmitted to the licensee in the frame of technological licensing agreement. The general idea is still the following: licensing agreements differ significantly in their functional scope, and thus, in level of consequences (contractual risk) a potential misbehavior of the licensee can have on the licensor. For example, a short term license that

does not permit the licensee to modify a design, but only to make it and sell it in the countries of the European Union, is more limited than a perpetual and irrevocable license that permits the licensee to make, use, modify, enhance, copy, reproduce, distribute, display, export, import, and sub-license all of the above rights to others worldwide, as well as the right to use the associated trademark in connection therewith. Such a license comes close to being a sale (assignment) of ownership in the intellectual property and the technology it underlies, making the licensor vulnerable, and increasing his propensity to introduce formal monitoring mechanisms to supervise the enforcement of contractual commitments by the parties. Consequently, all else being equal, the incentive to introduce supervision provision increases with the scope of rights transferred to the licensee. Therefore,

Hypothesis 1A: *The higher the functional scope of the technological transfer transaction, the more likely the implementation of a formal supervision mechanism.*

Regarding renegotiation provision the picture is not as evident as in the previous case. From one side, the greater “freedom” was transferred by the licensor to the licensee in terms of rights, the higher probability that the licensor, based on monitoring activities, will want to verify and when needed, to “fine-tune” the scope of flexibility given to licensee. From another side, taking into consideration the cost-based nature of negotiation process (efforts, time), the licensor may want to include the maximum reasonable number of rights transferred to the licensee at the beginning, when contract is just signed, and do not commit himself to renegotiating process in the future. Thus the effect can be two-sided. However, following the logic of TCE, we incline to believe that renegotiation provision is considered by the licensor mostly as a means to reduce the costs of adaptation which could be much more significant than efforts spent on renegotiation process itself. Thus, we suppose:

Hypothesis 1B: *The higher the functional scope of the technological transfer transaction, the more likely the implementation of a renegotiation mechanism.*

Hypothesis 1C: *The higher the functional scope of the technological transfer transaction, the more likely the implementation of the alternative dispute resolution mechanisms.*

The last hypothesis follows from the imperfection of the legal system, which allows us to argue that the more complex the contract is (here, the greater number of rights it provides to the licensee) the higher probability that courts may resolve dispute inefficiently, especially when contractual breaches are costly, and the outcomes are very difficult to verify by the third

parties. Implementation of alternative mechanisms, on the contrary, can reduce verifiability constraints (for example, appeal to specialized arbitrators), and thus reduce conflict costs.

3.3. Formal governance and relational mechanisms

In our article we also evoke the issue of interplay between formal and relational coordination mechanisms that is widely discussed in economic and managerial literature. Academic research has generally viewed relational governance and formal contracts as substitutes -- the presence of one governance device (relational governance, in particular) obviates the need for the other (Larsen, 1992; Gulati, 1995; Dyer & Singh, 1998; Macauley, 1967). In particular, trust reduces transaction costs by *“replacing contracts with handshakes”* (Adler, *forthcoming*). Thus, Dyer and Singh (1998) argue that informal self-enforcing agreements which rely on trust and reputation “often supplant” the formal controls characteristic of formal contracts. Gulati (1995, p.93) is quite explicit in arguing that contracts and trust function as substitutes: *“... trust avoids contracting costs, lowers the need for monitoring, and facilitates contractual adaptation. Trust counteracts fears of opportunistic behavior and as a result, is likely to limit the transaction costs associated with an exchange.... In other words, trust can substitute for hierarchical contracts in many exchanges...”*

Similarly, Uzzi (1997) argues that the embeddedness of exchanges within social structures economizes on time otherwise spent in costly contract negotiations. Relational governance enables firms to circumvent this costly renegotiation. Finally, Larsen (1992, p.98) argues that formal contracts are rather unimportant in the exchange agreements she examined. Informal social controls push these formal contracts to the background. A common underlying rationale for substitution emerges: if one party trusts the other, there is simply little need for contractually specifying actions. Relational governance lowers transaction costs and facilitates adaptive responses.

Still other scholars suggest an additional reason for substitution: formal contracts may actually undermine the formation of relational governance. Ghoshal and Moran (1996) argue that the use of rational, formal control has a pernicious effect on cooperation. They contend that for those parties being controlled...

“... the use of rational control signals that they are neither trusted nor trustworthy to behave appropriately without such controls. ... For the controller, negative feelings arise from what Strickland (1958) described as ‘the dilemma of the supervisor’ viz., the situation

when the use of surveillance, monitoring, and authority led to management's distrust of employees and perceptions of an increased need for more surveillance and control..." (p. 24)

Similarly, Macauley contends that *"not only are contract and contract law not needed in many situations, their use may have, or may be thought to have, undesirable consequences. ... Detailed negotiated contracts can get in the way of creating good exchange relationships between business units"* (Macauley, 1963, p.64). He argues that some firms discourage the use of an elaborate contract because it *"indicates a lack of trust and blunts the demands of friendship, turning a cooperative venture into an antagonistic horse-trade"* (p. 64). Bernheim and Whinston (1998) develop a formal model which similarly concludes that making contracts more explicit may encourage opportunistic behavior surrounding actions that cannot be specified within contracts. Taken together, these scholars view relational governance as a substitute for formal contracts and further suggest that formal contracts, by undermining relational governance, may damage exchange performance.

Indeed, as one could see there is the breadth and variation in prior findings, both theoretical and empirical, which yields two competing predictions for the relationship between prior and deeper (alliance) experience and formal contractual structure. Literature on relational governance suggests that prior relationships can substitute for costly, detailed contracts (Uzzi, 1997; Baker, Gibbons and Murphy, 2002). In contrast, recent empirical evidence suggests that formal contracts are in fact complementary to relational exchange. Poppo and Zenger (2002) find that as relationships between firms deepen, contracts become increasingly customized. Moreover Ryall and Sampson (2007) based on the sample of 42 alliance contracts in the telecommunications equipment and microelectronics industries also suggest that when partners had prior alliance experience, whether with each other or another company, they draft more complete and "protective" (in terms of implemented safeguards) contracts. Thus, a question still arises: do relational mechanisms complement or substitute for formal governance?

In our article we continue this discussion by introducing two factors that we consider have an influence on the choice of appropriate governance mechanism – nature of operation and prior licensing experience.

As for nature of operation we distinguish between two types of relations: a) simple licensing agreements which structure essentially a technology, know-how and/or other Property rights transfer, and b) relations included in a wider cooperation agreement, which can take various forms - cooperative R&D project, partnership, or strategic alliance. We defined the later as Technological Cooperation Agreements, which represent an agreement

between two firms (societies of capital) characterized by a two-side contribution of goods (capital, technology, or firm-specific assets) for a joint technological project that is directly managed by participating partners (Harrigan, 1986; Parkhe, 1993; Gulati, 1998). This type of agreement is frequently concluded between firms who have intention to go further than simple technology and other IP rights transfer, and decide to collaborate in R&D activities pursuing various objectives: to gain access to different technologies, markets, or to realize economies of scale in R&D, and spread the risk and expense of development.

We argue that this specific type of licenses (included in a wider arrangement) serves more complex functions, rather than simple technology transfer, which implies a change in its contractual structure, i.e. inclusion/exclusion of particular provisions in/from the body of contract. As transacting parties while collaborating expect their relations to be long-run, the effects of learning, trust, reputation and other relational mechanisms may exert their influence on the design of a formal agreement between parties. Moreover, collaboration in the frame of a common project aligns the incentives of both parties, as finally, they pursue the common goal – to succeed in this affair, and thus follow “win-win” strategies. Concurrent alliances (or those which go in parallel with the existing one) may represent the development of trust or the exchange of mutual hostages, both of which deter non-cooperative behavior. It, in turns, decreases the costs of partners’ misbehavior and, given the logic of minimization of transaction costs of a deal, also decreases the probability of implementation of formal monitoring mechanisms.

The underlying idea here is that formal and relational mechanisms act as substitutes, and as partners are already tied with mutual obligations when they interact in the frame of a wider cooperation agreement, they prefer not to include additional formal governance mechanisms to regulate their relationships⁴.

We formulate our hypothesis regarding the role of nature of the operation for the choice of governance mechanisms to manager technology transfer relations, in the following way:

Hypothesis 2A1: The inclusion of partners in a wider cooperation agreement has negative influence on the implementation of formal supervision mechanisms.

⁴ Introduction of particular clauses in the contract implies the foregoing cost-benefit analysis, and we consider, thus, that a contractual provision is introduced in the agreement, if and only if, benefits a licensor can get from this are higher than corresponding costs which he has to bear in order to make this provision valid. In the presence of relational mechanisms risks are significantly reduced for the licensor; this, in turn, decreases the likelihood that the costs of introduction of complex provisions will be justified.

Hypothesis 2B1: *The inclusion of partners in a wider cooperation agreement has negative influence on the implementation of formal renegotiation mechanisms.*

The second relational variable – prior relationships between counteracting parties, on our opinion, has similar correlation with the characteristics of licensing agreements, as the variable - nature of cooperation agreements. As partners learn on each other from the previous transactions and still continue to have deals with each other, it gives a base to suppose significant level of trust reached between them. To renege on a contract means for partners to undermine all reputation created during the whole period of their collaboration. Since the licensor is more confident in the ability and in the reliability of the licensee (and vice versa), we can argue that previous contracting favors a more intensive exchange of resources and rights without even implementation of more “protective” governance mechanisms. Thus, the first two hypothesis regarding prior relationships between partners can be formulated in the following way:

Hypothesis 2A2: *The existence of previous experience with the same partners has negative effect on the implementation of formal supervision mechanisms.*

Hypothesis 2B2: *The existence of previous experience with the same partners has negative effect on the implementation of formal renegotiation mechanisms.*

However, regarding the choice of alternative dispute resolution instruments, with regard to trust and reputational concerns, another kind of reasoning has to be applied. In particular, when parties are involved in a more intense network of relationships with each other, they have shared beliefs, and in case of disputes, are more inclined to agree on a common procedure of dispute settlement and to consider the other party likely to enforce the sentence made by the arbitration tribunal. On the other hand, costs of coordination caused by a wide scope of complex joint activities can be mitigated by resorting to alternative dispute resolution mechanisms, which, in turn, could provide assistance in monitoring of contractual relationship and notably the contractual commitments, which ask for communication, continuity and adaptation.

It is interesting note that an appeal to alternative dispute resolution mechanisms is highly used practice in complex technological cooperation agreements. Thus, Ryall and Sampson (2007), analyzing 52 joint technology development contracts in the telecommunications and microelectronics industries, stressed that the most of the contracts in their sample stipulate arbitration as the sole recourse in the event of disputes. Several contracts explicitly waive firm rights to bring disputes before the courts or other

administrative bodies. These provisions likely reflect the inefficiency of courts in resolving disputes of a highly complex, technical nature. Courts often have difficulty inferring the intentions of the respective parties and, as a result, may produce sub-optimal remedies in comparison to arbitration. Therefore, we admit that:

Hypothesis 2C1: *The greater the inclusion of partners in a wider cooperation agreement, the more likely the implementation of an alternative dispute resolution mechanism.*

Moreover, litigation implies public disclosure of information on the conflict. Though having prior experience with each other and continuing to cooperate, partners most probably would not like to demonstrate publicly their current conflicts of interests, and would prefer to resort to private institutions as a means to deal with the risk of opportunism and/or means to ease joint activities. Following this logic, we suppose the positive impact of the existence of prior licensing agreements between partners on the probability of recourse for the alternative dispute resolution instruments. Thus,

Hypothesis 2C2: *The existence of previous experience with the same partners has positive effect on the implementation of an alternative dispute resolution mechanism.*

4. DATABASE

Our study is based on data from International Survey on Technology Licensing Practices, performed among LESI members. To perform this survey, a detailed questionnaire was developed. This questionnaire was sent to 2685 firms, mainly in Europe, Japan, USA and Canada. 160 questionnaires were completed and sent back, providing us with information on 297 licensing technology agreements considered by the respondents as reflecting their most representative practices. The low response rate can be explained by the character of information on licensing practices which is mostly considered by companies as strictly confidential⁵. It is nevertheless compensated by detailed information that was gathered on each agreement (about 70 variables).

The questionnaire for the Survey was divided into two parts. The first focused on a general presentation of the respondent firm and its organization, licensing goals, and industrial and institutional environment. In the second part, respondents had to provide information on the characteristics of licensing agreements they consider “best represent their

⁵In comparison with previous studies this sample is relatively large and diverse (for instance, Davies (1977) investigates 26 cases; Davies (1992) - 204 cases; Macho-Stadler et al. (1996) - 240 cases; Aulakh, Cavusgil and Sarkar (1997) - 110 cases; Chi and Roehl (1997) - 93 cases; Bessy and Brousseau (1998) - 46 cases).

activity.” Afterwards, information on licensing conditions, payment formulas, safeguards, and governance structure was collected.

For the purpose of our analysis we created the sample of 237 agreements, discarding the responses with missing values.

5. RESEARCH DESIGN

5.1. Explained variables

To model various types of governance mechanisms implemented in the contract, we are based on the corresponding contract provisions which were described by the respondents (based on Brousseau et al., 2007):

- **Supervision**

We created a “supervision” variable (SPRV), which takes a value of 0 when the contract either implements the inspection of books alone, or when the contract does not implement any inspection rights. A value of 1 is assigned if audit rights are granted on at least one of the following aspects of the licensee: its products, its industrial installations, and its R&D capacities. This differentiation between the contracts that do not implement a supervision mechanism or that implement the supervision of books alone, with those that implement supervision on other items is explained by the fact that inspection of books is by itself a virtually cost-free activity, though other types of supervision - inspection of products, facilities and R&D programs is costly. Moreover, the supervision of books is linked to the potential hazards on payments, rather than to contractual hazards related to the specifics of the knowledge (Brousseau and Coeurderoy, 2005).

- **Renegotiation**

We created the “renegotiation” variable as a dummy variable (RENEG) equal to 1 if the contract implements a renegotiation provision (which can range from the royalty rate or the geographical extension of the license, to the whole contract), and otherwise equal to 0.

- **Alternative Dispute Resolution (ADR)**

In order to ensure conflict resolution, agreements may implement various mechanisms. If nothing is specified in the contract, in order to resolve contractual disputes partners recur to courts as the ultimate resort. Alternatively, contractually specifying the

recourse to an alternative dispute resolution mechanism — such as arbitrage or mediation — excludes a final appeal to courts.

We created the variable “conflict resolution device” (**RESOLT**) that assumes a value of 0 if the contract does not implement a formal mechanism for dispute resolution, and a value of 1 if an alternative instrument is settled.

Distribution of these variables is the following:

Values	SPRV		RENEG		RESOLT	
	Freq.	%	Freq.	%	Freq.	%
0 (No)	133	56,1%	134	56,5%	75	31,6%
1 (Yes)	104	43,9%	103	43,5%	162	68,4%
Total	237	100,0%	237	100,0%	237	100,0%

This table shows quite similar distributions for supervision and renegotiation provisions (only ab. 43% of contracts in the sample implement them), though significant differences in comparison to alternative dispute resolution mechanisms (around 2/3 of agreements introduce these mechanisms in order to reduce costs of potential conflicts).

5.2. Explanatory variables

We introduced contractual clauses into the set of explanatory variables that we consider good proxies for the characteristics of the functional scope of licensing agreement and strategic behavior of the parties.

5.2.1. Variables of interest

Variables of interest include three proxies – functional scope of the transaction, nature of operation (whether TLA is a part of more complex contractual arrangement), and presence of previous licensing experience between partners.

- **Functional Scope**

We distinguish the following rights transferred in the frame of licensing agreement (grant clauses of a licensing agreement):

1. *Granted territory*

In the Survey several options were specified for the type of territory granted to the licensee: worldwide license, licensee’s country, or licensee’s continent or economic zone (EU, for example). Moreover, they could be different for Production and Sales activities transferred to the licensee. Descriptive statistics tell us that there is significant correlation between Production and Sales “functions” in terms of granted territory (Pearson Index =

0,79). Thus we model this proxy (LICWW) in the following way: 1 – if worldwide territory was granted both for Production and Sales, and 0 – otherwise:

LICWW	Worldwide license (for both Production and Sales)	
	Freq.	%
0 (No)	115	48,5%
1 (Yes)	122	51,5%
Total	237	100,0%

2. License regime

Though we can distinguish between 4 different levels of license regime, cited below in the order of increase of their “openness”: non-exclusive license, co-exclusive license (exclusivity is granted to a small number of firms), sole license (licensor keeps the right to exploit its patent and know-how), and exclusive license (licensor retains no right to exploit), in our study we specify only 2 levels of regime: Exclusive license *versus* all other regime types.

Similar to the previous variable regarding granted territory, we could observe significant correlation between two functions – Sales and Production (Pearson Index = 0,89). Thus, we deal with it in the similar way: we give value 1 to the variable (LICEXC) – if exclusive regime was granted both for Production and Sales, and 0 – otherwise:

LICEXC	Exclusive license (for both Production and Sales)	
	Freq.	%
0 (No)	159	67,1%
1 (Yes)	78	32,9%
Total	237	100,0%

Comparing the tables, we can conclude that though more than 50% of the analyzed licenses grant worldwide territory for both types of activities (Production and Sales) to a licensee, entire exclusivity is given only in 1/3 of cases. One can assume that decreasing his potential contractual risk from partner’s misbehavior the licensor will compromise between these two licensing conditions: worldwide license coupled with a non-exclusive regime, and on the contrary, exclusive license valid on a limited territory. However, statistics do not reveal neither negative, nor positive significant correlation between these two variables –granted territory and license regime.

3. Specific uses restrictions

If the licensee is not subject to specific uses restrictions than we add 1 to the scope of rights granted to the licensee, otherwise if at least one type of restrictions is implied in the contract (application restrictions, marketing restrictions, and other usage restrictions), we add 0 to the corresponding scope of rights (USNRESTR).

4. Additional rights: rights to assign the license, to sell it, to sub-license, and to sub-contract production

There are 2 two possibilities how these rights could be granted: fully provided to a licensee, or only partially with a licensor getting a right of veto. Thus we distinguish between 2 values for our intermediary variables (4 variables): 1, if the right is fully transferred to a licensee, 0 – if no right is transferred, or a licensor possesses a right of veto. To account for these additional rights we employ 4 dummies:

- DTCEDER – right to assign the license;
- DTVEND – rights to sell the license;
- DTSOULI – right to sub-license;
- DTSOUTR – right to sub-contract production.

We concern that these additional rights are not simply comparable, i.e. right to assign or to sell gives much more opportunities to a licensee in comparison to sub-license or, especially, to sub-contract the production. Indeed, we consider that for the purposes of this study, this distinguish on micro- level is not necessary, and will not provide us with significant differences in empirical evidences. Correlation analysis shows that there is no significant correlation between these 4 types of rights.

5. Rights for future improvements

Next bundle of rights refer to the implementation of rights for the licensee to benefit from future improvements made by licensor. We consider that implementation of such a provision has potential consequences for the contractual governance mechanisms. Thus variable (AMEL) equals to 1, when right for future improvements is granted to a licensee, 0 – otherwise. In a role reversal, contracts often include a grantback provision which enables the licensor to benefit from the right to appropriate the developments made by the licensee on the basis of its initial innovation (Brousseau et al., 2007). But we do not include this contractual clause in functional scope of the licensing agreement, as we “consider” it from the licensee’s point of view.

We do not take into consideration here other provisions, for example, “most favored licensee” provision, as: 1) looking at frequencies, we can conclude that only about 20% of agreements implement it, and about 60% of them concern royalty rate, and not for example, extension of geographical territory, regime, or some usage rights; 2) this condition is “*all or nothing*”, i.e. licensee does not have right to choose which privilege conditions he would like to have versus his co-licensees (ref. - *Les Nouvelles*).

Through factor analysis we extracted one vector summarizing these eight dummies characterizing functional scope of technology transfer transaction. We thereby established a continuum of contracts, starting with those that provide a licensee with very limited number of rights and even apply certain usage restrictions, and ending in contracts characterized by multiple transfers of rights. Descriptive statistics of this new variable (FS) are the following:

N	Mean	Std.Dev	Minimum	Maximum
237	5,4449789	1,8568813	1,94	8,86

- ***Nature of operation***

Proxy for this dimension (ARRCOMPLEX) is the answer of the respondents on the question “*Is the technology transfer included in a wider agreement?*” It equals to 0, if the relations between counteracting parties are limited essentially by a simple Property rights transfer, and to 1 – if the agreement is included in a cooperative R&D project, industrial or commercial partnership, or a wider alliance covering R&D, manufacturing and marketing/sales cooperation of partners. Our sample has the following characteristics according to this variable:

ARRCOMPLEX	Nature of operation	
	Freq.	%
0	143	60,3%
1	94	39,7%
Total	237	100,0%

- ***Prior licensing agreement***

Proxy for this dimension (PARANT) is the answer of the respondents on the question “*Did your company manage a prior licensing agreement with this partner?*” It equals to 0, if the relations did not take place, and to 1 – if the partners were already involved in common technology transfer transaction. Our sample has the following characteristics according to this variable:

PARANT	Functional scope	
	Freq.	%
0	176	74,3%
1	61	25,7%
Total	237	100,0%

5.2.2. Control variables

As for control variables, we included in the model those that we consider could also have an influence on the choice of governance structure of contract, and thus, should be taken into account.

To capture transaction specific characteristics we included variable transfer intensity (TRNSFINTENS). Through factor analysis, we extracted one vector summarizing eleven dummies for the transfer of technology. The respondent explained whether the contract covers the transfer of one or more of the following: (1) the right to use IPRs (e.g., a trade secret) other than trademarks, (2) the right to use the licensor's trademark, (3) plans, (4) prototypes or material, (5) technical tests and development data, (6) marketing tests and other commercial data, (7) technical assistance and consulting services, (8) accounting, marketing, and management methods, (9) training, (10) personnel delegation, and (11) other inputs such as products, equipment, or services. We thereby established a continuum of contracts, starting with those that do not organize any transfer of resources (but only the right to use the patent) and ending in contracts characterized by multiple transfers.

Five industry dummies were used to check for such sectoral effects, as the industry structure and level of technological independence: CHEMICALS – chemical industry, EQUIPMANUF – equipment manufacturing, IND_MAT – raw materials processing industry, SERVICES - services, OTHERIND – other industries (EQUIPMANUF as omitted variable).

To capture the influence of institutional environment on the implementation of governance provisions, we further introduced two variables: PRVTINSTIT – which reflects directly the answer of respondents on the question *whether the agreement make any reference to information, regulations, or services provided by private entities in an effort to simplify technology transfers*. It is ordinal variable, equal to 0, if the contract does not make any reference to private institutions, and ranked from 1 to 4 according to the number of services provided by these entities': provision of fair-practice or financial guidelines, provision of information on parties' behavior (e.g. by assessing of licensee's actual sales or produced volumes), or dispute resolution procedures.

IPR_PRO_LICSOR assess the influence of public institutional framework on contractual design. It's generally accepted that the strength of IPRs varies across countries, because of both the design of the law and the organization of institutions in charge of managing the IPR system (Ostergard, 2000). Traditionally in the literature a set of dummies reflecting nationality of parties are used to qualify the IPR regime. For the purpose of our study we reformulated this variable in terms of the level of licensor's public "protection" *vis-à-vis* licensee. According to the literature, IPRs are stronger in the U.S. than in Europe, and stronger in Europe than in Japan. Thus, comparing geographical areas of both partners we created an ordinal variable IPR_PRO_LICSOR equal to -1, if licensee's IPR regime is stronger than licensor's; it equals to 0, when both partners have similar level of public protection, and to 1, when, conversely, licensor's IPR regime is stronger than licensee's.

However, it's obvious that the structure of licensing agreements is not only influenced by the IPR regime. Other dimensions of the legal framework, particularly contract law, also play a role. It is therefore difficult to forecast accurately how the complex web of legal regulations influences the design of contracts, since various components of the law may have contrasting influences. A more detailed study should therefore be carried out in the future, on a provision-by-provision basis. However, a larger sample would be needed to check the distinct roles of the many (legal and nonlegal) explanatory factors of contractual structures.

We also introduced control variable EXT which captures the effect of internationalization of the exchange between partners. It is a dummy variable equal to 1, if the flow of technology transfer passed across several geographical zones, and equal to 0, when transaction is characterized by domestic licensing in a certain area.

To account for the effects of long-term involvement of partners on governance costs, we introduced a dummy variable RENEWAL. Indeed, the licensee is more motivated to invest when the licensor commits himself in the long run. But, in the long run, uncertainty increases. Thus, the longer the length, the higher the risk of maladaptation is, and, therefore, a need for regulatory governance mechanisms. RENEWAL variable is a dichotomic variable equal to 1 (50% of cases), when contract includes a renewal provision, and equal to 0 otherwise.

To control for differences in negotiation power between partners, we further included variable POWER_EXT into the model. Larger firm is more likely to possess sufficient resources and thus is more able to negotiate provisions advantageous for itself. Moreover it is able to afford greater effort and expertise needed to manage its licensing activities. It is more

likely to benefit from learning effects. We distinguish between two levels: firms employing less than 500 staff and those employing over 500, thus several situations are possible: size of the licensor is bigger than of the licensee (POWER_EXT equals to 2), on the contrary, size of the licensee is bigger than of the licensor (POWER_EXT equals to 0), and both partners are equal (POWER_EXT is 1).

A summary of all endogenous and exogenous variables together with their descriptive statistics is provided in table below:

Characteristic	Denotation	Unit / Type	Mean	MIN	MAX
Main dependent variables:					
Supervision provision	SPRV	Dummy	0,439	0	1
Renegotiation provision	RENEG	Dummy	0,435	0	1
Alternative dispute resolution	ADR	Dummy	0,684	0	1
Variables of interest:					
Functional scope of agreement	FUNSCOPE	Continuous	5,445	1,94	8,86
Nature of agreement	ARRCOMPLEX	Dummy	0,397	0	1
Prior licensing deals	PARANT	Dummy	0,257	0	1
Control variables:					
Transfer intensity	TRNSFINTENS	Continuous	0,65	0	2,41
Industry dummies:					
Chemical industry	CHEMICALS	Dummy	0,49	0	1
Raw materials processing industry	IND_MAT	Dummy	0,1	0	1
Services	SERVICES	Dummy	0,09	0	1
Other industries	OTHERIND	Dummy	0,07	0	1
Equipement manufacturing	EQUIPMANUF	Dummy (ommitted)	0,22	0	1
Reference to private institutions	PRVTINSTIT	Ordinal variable	0,81	0	4
Public institutional framework	IPR_PRO_LICSOR	Ordinal variable	1,18	0	2
Internationalization of the transaction	EXT	Dummy	0,53	0	1
Long-term commitment	RENEWAL	Dummy	0,51	0	1
Bargaining power	POWER_EXT	Ordinal variable	0,82	0	2

In our model we want to predict the choice of particular contractual governance mechanisms – supervision, renegotiation and dispute resolution. Basing on Brousseau et al., we know that various governance mechanisms cannot be explained by the same variables. This supports an idea of independency of the choice of these three governance mechanisms. Generally speaking, supervision, renegotiation and dispute resolution mechanisms should play different roles in governing contractual relations between partners. However, we admit that the licensor decides simultaneously on these provisions, and thus, joint incidence of these

three clauses is highly possible. This fact induces us to use a *multivariate probit model* estimated by simulated maximum likelihood.

Nevertheless we are aware that since in our model contractual clauses play the role of both explained and explanatory variables, it is potentially exposed to severe endogeneity biases in the right hand side variables⁶. For that reason, we systematically checked these possible disturbances (testing a two-step procedure, i.e. running regressions of each contractual variable on other variables), and the results remained unchanged. We can therefore state that, in our sample, our right hand contractual variables are not seriously affected by endogeneity. Contracting parties seem to negotiate each strategic commitment rather autonomously from other contractual commitments.

6. ANALYSIS OF THE RESULTS

General results of our analysis are provided in the table below⁷.

Variable	SUPERVISION		RENEGOTIATION		ADR	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Intercept	0,47333***	0,02904	0,45414***	0,02955	0,60274***	0,02674
FUNSCOPE	0,14384**	0,05574	0,11245*	0,06193	0,16731***	0,03755
PARANT	-0,1596**	0,07514				
ARRCOMPLEX						
CHEMICALS	0,24837**	0,11957				
EXT	0,18456***	0,06289			0,12187**	0,05651
IND_MAT	0,26157**	0,10179				
IPR_PRO_LICSOR	-0,24117**	0,09953			-0,16742**	0,07503
POWER_EXT	0,25258***	0,08484	0,2233***	0,04448	0,19884***	0,06508
PRVINSTIT	0,15942**	0,0789	0,25365**	0,11443	0,19384***	0,03073
RENEWAL			0,19523***	0,04501		
SERVICES	0,25296**	0,10496			0,21415**	0,0876
TRNSFINTENS	0,21286***	0,05339	0,18208**	0,07712	0,12173*	0,06734
N	237					
LOG Likelihood	-248,759					
Wald (Chi-square)	125,18***					

Coefficients are significant at 1%(***), 5%(**), 10%(*).

Our results confirm our main hypothesis, i.e. the close link between complexity of contracts in terms of rights given to the licensee and therefore his high possibility to behave opportunistically, as he has wide rights over transferred technology – and the preference for inclusion different mechanism to govern these relations. More number of rights the licensor gives to the licensee, more he is exposed to appropriation hazards, therefore this type of transaction requires more protective mode of governance. This evidence supports the main outcome of Transaction Costs theory (Williamson, 1985).

⁶ Masten and Saussier, 2000; Chiappori and Salanie, 2003

⁷ Only statistically significant variables are presented in a final model.

However we don't find statistical confirmation of our hypothesis regarding inclusion of the license agreement in a wider cooperation agreement.

As for impact of prior relationships, we could see significant and negative influence of existence of prior experience with the partner to the probability of the inclusion of supervision conditions in the agreement. This makes a ground to argue on the substitutability between formal and relational governance mechanisms.

7. CONCLUSION

Summarizing, this research allows us to obtain a more comprehensive description and comparison of different types of licensing agreements in comparison with previous studies. Firms entering into technology licensing transactions face considerable challenges; partners must be able to transfer complex knowledge and skills with partners. R&D collaboration, however, also raises the risk of leakage or unintended transfer of knowledge and skills between partners. Since firms do not wish to make better competitors of their partners, the ability to safeguard against leakage is critical. Indeed, evidences provided by our econometrical models demonstrate that there is no contradiction between licensors' incentives to give more rights and knowledge to their partner (ability to share and diffuse knowledge) versus their intention to protect their intellectual property and safeguard against leakage.

On the opposite, our result points out also that partners who interacted previously can economize on formal mechanisms thanks to the repetitive character of the relationship and to the fact that the two parties are incited to play a win-win game. They engage therefore in a long-term cooperative relational perspective.

This study can serve as guidance for practitioners in choosing governance structures for technology licensing agreements through a contingency analysis that examines the interaction of production costs, transaction costs, and strategic considerations.

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