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

LYARSKAYA NATALIA
EconomiX, University Paris Ouest La Défense Nanterre

[♦] Paper in progress. This version of January 2009.

Abstract: It has always been suggested in the economic literature that design of licensing agreements is aimed at protecting parties from the hazards of opportunism rising all along the technology transfer transaction. Moreover it has been argued that these attempts to mitigate misbehavior of the participants could undermine their ability to learn from each other. In this paper we argue that there is no real tension between these two dimensions of technology transfer agreements – learning and hazard mitigation. 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 which allow them to perform the substantive task required for the particular technology transfer. For this purpose we create an integral measure of functional scope of a technological 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, though, and moreover the later does not induce any effect on the choice of more formal governance mechanisms. 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.

Key words: technology licensing agreements, contractual provisions, governance mechanisms

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

Abstract: It has always been suggested in the economic literature that design of licensing agreements is aimed at protecting parties from the hazards of opportunism rising all along the technology transfer transaction. Moreover it has been argued that these attempts to mitigate misbehavior of the participants could undermine their ability to learn from each other. In this paper we argue that there is no real tension between these two dimensions of technology transfer agreements – learning and hazard mitigation. 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 which allow them to perform the substantive task required for the particular technology transfer. For this purpose we create an integral measure of functional scope of a technological 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, though, and moreover the later does not induce any effect on the choice of more formal governance mechanisms. 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.

Key words: technology licensing agreements, contractual provisions, governance mechanisms

[♦] Paper in progress. This version of January 2009.

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 structures[1]. 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 suggests[2] 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", 24October 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 subtitutional 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 Djik, 1994). Similarly, the rationale for exclusivity provisions was explored mostly by industrial economic literature studying the optimal number of licensee (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. As we saw previously, technological cooperation, including licensing is highly risky. Moreover it is always complex to control once a transfer of know-how, technology and knowledge has been made, how the licensee will behave ex-post either within the frame of the contractual relationships or out of it. To manage ex post behavioral uncertainty, safeguards and governance mechanisms are usually implemented. 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. Thus, payment schemes serve as a solution (though, only partial) to problems of adverse selection, when the potential licensee has difficulties anticipating the value of the transferred technology, and double moral risk, as the success of the transfer depends both on the efforts of the licensor and those of the licensee[3] . Confidentiality and non-competition provisions allow the licensor to protect himself against the risk of the transferred knowledge being disclosed. The uncertainty about the possible uses made of the technology leads the licensor to implement protection provisions, restricting, for instance, geographical area of the technology distribution, and consequently, protecting himself against the licensee's opportunistic behavior. Another contractual clause – grantback provision guarantees the licensor a right over developments carried out by the licensee. To ensure ex post adaptation and enforcement of technology licensing agreements, partners resort also to governance mechanisms, which are based on contractual provisions implementing supervision, renegotiation and dispute resolution mechanisms that aim at enabling ex post enforcement of mutual obligations.

[3] It's worth mentioning, that in the case of TLAs, the focus of researchers is mainly on *ex post* contractual risks arising from licensee's behavior.

Bessy and Brousseau (1998) argue that the more intensive the exchange of tacit knowledge, the more complex and complete the governance structure. Basing on the sample of ten case studies and forty six licensing agreements, on which data were collected through questionnaires, they analyzed the frequency of certain types of contractual clauses, correlation among them, and also managed to point out the existence of five categories of contracts clearly differentiated by their features: from Transactional agreements (as qualified by MacNeil (1974)), through One-Shot Complete Transfer, Relational Commercial and Development agreements to Relational ones. The authors also stipulated that institutional framework plays a major role in the explanation of inter-industry differences in licensing practices.

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 within seven industries, constituted by the INPI's Office of International Technology Transfer. In order to identify the interdependencies between the characteristics of the contracts, they elaborated a typology based on the complexity of the transfer of knowledge 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. Their classification comprises seven classes of licensing agreements, where the first three classes correspond to Transactional contracts, which strictly speaking even do not represent a real transfer of knowledge, but only of user rights, whereas the latter two classes are constituted by more Relational contracts, with other classes occupying intermediary positions. The presentation of the classes ordered according to the main features of resources transferred by the licensor to the licensee allowed authors to note that the increased difficulty of the transfer goes together with the increased complexity of the contractual structure, i.e. contracts become more relational. In spite of this, the relationship between the complexity of the transfer and the governance mechanisms does not prove to be so direct, that is interpreted in the analysis as a dependence on the specific features of institutional framework surrounding the relationship between contracting parties.

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. This paper provides us new evidences on the contractual governance of licensing agreements; in particular, it assesses 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, aimed at reducing licensee's incentives for opportunistic behavior, renegotiation clause that provides partners with incentives not to shirk (since they can adapt to new situations) and reduces the level of misalignments (since it reduces the costs of adaptation) (Crockerand Masten, 1991), and dispute resolution mechanisms, which directly associated by authors with an alternative dispute resolution.

Basing on the database of 213 licensing agreements, developed together with LESI (Licensing Executive Society International), Brousseau et al. test propositions about the design of governance mechanisms, in particular, how transactional characteristics of technology transfers, institutional framework and strategic hazards arising from technological competition influence the choice of partners in favor of certain governance mechanisms. Going deeper into methodological "cuisine" of the study, we can notice that explanatory variables used as proxies the appropriate provisions of the contracts: for instance, the level of technological uncertainty was defined through the presence/ absence of grant-back and future improvement provisions, while strategic hazards – through implementation of warranties, renewal provisions and minimal performance. This maneuver permitted to have more accurate proxies assessed at the level of transactions.

The results presented in the analyzed article, 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 vision (MacNeil, 1974). 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 3 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.)[4]. 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

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

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 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.

Two later factors which we consider play a role in the licensor's choice of formal governance mechanisms reveal the issue of interplay between formal and relational coordination mechanisms that is widely discussed in economic and managerial literature (see, for example, Pisano, 1989; Oxley, 1997; Gulati and Singh, 1998; Ryall and Sampson, 2003). However there is the breadth and variation in prior findings, both theoretical and empirical, which yields two competing predictions for the relationship between prior (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. Thus, a question arises: do relational mechanisms complement or substitute for formal governance?

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.*

And

> ***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. Nature of Operation and Prior Experience between Partners

The other two factors that we consider as determinants of the choice of appropriate governance mechanism – nature of operation and prior licensing experience - bring us to the analysis of the issue of interplay between formal and relational enforcement mechanisms. Formal contracting addresses the moral hazard problems inherent in inter-firm deals via

explicit terms designed to achieve incentive alignment. Alternatively, when firms (expect to) interact repeatedly, relational mechanisms may achieve similar results without the associated costs. However, as we know from a growing body of theoretical and empirical work, the resulting intuition – that relational mechanisms will be substituted for formal ones – does not generally hold. The extent to which firms substitute relational mechanisms for formal ones in the presence of repeated interaction is an empirical question which we also address in this article.

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 and, thus, substitute for more formal governance.

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 relationships[5].

From another point of view, interfirm collaboration in the frame of TCAs is indeed proved to be a more complex matter in comparison with simple licensing agreements which "accompany" just transfer of rights. Thus, it could be possible that companies include more formal instruments in the contract to provide its real validity. Hence, formal and relational governance mechanisms in this situation would come out as complements reinforcing each others' ability to deter non-cooperative behavior and adopt for more flexible solution between counteracting agents.

Following TCE, we nevertheless assume that existence of a wider agreement between partners can be considered as an exchange of mutual hostages, and thus already, provides necessary incentives for non-opportunistic 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.

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

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

However, regarding the choice of alternative dispute resolution instruments, we can point out clearly, that 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. 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

[5] 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.

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

The second relational variable – prior relationships between counteracting parties, on our opinion, also has an impact on the licensor's choice to include in the contract formal governance mechanisms. However, its influence on supervision and renegotiation provisions could have two-sided effects. From one side, previous contracting favors a more intensive exchange of resources and rights, since the licensor is more confident in the ability and in the reliability of the licensee that leads to implementation of more "protective" governance mechanisms. From another side, the probability of a more "protective" contract can increase with prior deals, as partners learn on each other from the previous transactions, and thus try to foresee all contingencies and put in into the contract. Thus, the first two hypothesis regarding prior relationships between partners can be formulated in the following way:

> ***Hypothesis 3A:*** *The existence of previous experience with the same partners has negative effect on the implementation of formal supervision mechanisms.*

> ***Hypothesis 3B:*** *The existence of previous experience with the same partners has negative effect on the implementation of formal renegotiation mechanisms.*

Following the logic applied to the nature of operations, 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 3C:*** *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 confidential[6]. 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 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. METHODOLOGICAL ISSUES

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, 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

[6] In 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).

contractual hazards related to the specifics of the knowledge (Brousseau and Coeurderoy, 2005).

- **Renegotiation**

  We created the "renegotiation" variable as a dummy variable 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" 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	Supervision provision		Renegotiation provision		ADR mechanisms	
	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 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).

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 3 governance mechanisms. Generally speaking, supervision, renegotiation and dispute resolution mechanisms play different roles in governing contractual relations between partners. Taking it as assumption, we further measure complexity of contractual governance as a whole, i.e. level of "protectiveness" of governance mechanisms implemented in technology licensing agreements. We create a variable characterizing "intensity" of formality

of governance mechanisms implemented to control, adjust and regulate parties' behavior, which is distributed as depicted in the table:

Values	GOVERNANCE	
	Freq.	%
1	31	13,1%
2	87	36,7%
3	75	31,6%
4	44	18,6%
Total	237	100,0%

We could see that majority of contracts introduce "medium" level of protectiveness, i.e. in most cases, either one, or two governance mechanisms are implemented into a licensing agreements. Let's look closer which mechanisms are most preferred by partners:

MECHANISMS (when LEVEL_PROTEC = 2)	GOVERNANCE	
	Freq.	%
SPRV	16	18,4%
RENEG	18	20,7%
RESOLT	**53**	**60,9%**
Total	87	100,0%

In the situation where level of protectiveness equals to 2, i.e. only one adaptation mechanism is used, about 60% of the contracts contain ADR mechanisms, and the remaining is divided almost equally between supervision and renegotiation mechanisms.

MECHANISMS (when LEVEL_PROTEC = 3)	GOVERNANCE	
	Freq.	%
SPRV*RENEG	10	13,3%
RENEG*RESOLT	**31**	**41,3%**
RESOLT*SPRV	**34**	**45,3%**
Total	75	100,0%

Though when level of protectiveness is higher, and when 2 governance mechanisms are put in action, we could see that the most "popular" pairs of mechanisms are {Renegotiation + ADR} and {Supervision + ADR}, and moreover recourse to alternative dispute resolution mechanisms alone counts for 87% of all analyzed contracts.

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. Moreover we consider, and this is also supported by various surveys of real practices (), that while deciding which governance mechanisms to put down into the formal document, the licensor and the licensee subordinate them to their business needs and strategies. The later they embody in the functional scope and technology intensity transferred to the licensee. As Oxley argues (Oxley, 2008) the NIE approach usually assumes that the adverse performance of alliance relationship is mostly due to the errors in selecting partners, or governance mechanisms "accompanying" the deal. However, until recently this assumption has not been tested.

Nevertheless we are aware that such a choice (when contractual clauses play the role of both explained and explanatory variables in the model) is potentially exposed to severe endogeneity biases in the right hand side variables[7]. 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.

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 in the following way: 1 – if worldwide territory was granted both for Production and Sales, and 0 – otherwise:

[7] Masten and Saussier, 2000; Chiappori and Salanie, 2003

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 – 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:

Pearson Correlation Coefficients / Prob > |r| under H0: Rho=0	LICWW	LICEXC
LICWW	1	0,19491
		(0,0026)
LICEXC	-	1
	-	

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.

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.

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 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*).

Total measure of functional scope is just a sum of all rights transmitted from licensor to licensee, which values range from 0 (none of rights is given + imposed restrictions) to 8 (all possible rights are transmitted and no specific usage restrictions are imposed):

License regime (Exclusive license *vs* other) for both Production and Sales	1/0
Specific uses restrictions (No / Yes)	1/0
Provision of additional rights:	
Right to assign the license	1/0
Right to sell license	1/0
Right to sub-license	1/0
Right to sub-contract production	1/0
Right for future improvements made by licensor	1/0
Total Granted Rights (Functional Scope)	**8/0**

Distribution of the sample according to functional scope has the following view:

FUNSCOPE	*Frequency*	*Percent*	*Cumulative Frequency*	*Cumulative Percent*
0	8	3,4%	8	3,4%
1	41	***17,3%***	49	20,7%
2	55	***23,2%***	104	43,9%
3	47	***19,8%***	151	***63,7%***
4	39	16,5%	190	***80,2%***
5	17	7,2%	207	87,3%
6	12	5,1%	219	92,4%
7	13	5,5%	232	97,9%
8	5	2,1%	237	100,0%

These figures show us that about 2/3 of all licensing agreements provide less than average scope of rights to the licensee (between 1 to 3). The same idea is supported by the fact that more than 80% of all agreements do not grant more than 5 different rights to the licensee (or 4 rights and no usage restrictions).

- ***Nature of operation***

Proxy for this dimension 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 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 showed significance of their effect on the governance structure of contract (as showed by Brousseau et a., 2007): IPR commitment of the licensor, contract renewal condition, recourse to private institutions. We also took into account industry features, equity relationships and licensor size.

In our model we want to predict the choice of particular contractual governance mechanisms – supervision, renegotiation and dispute resolution. 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.

6. ANALYSIS OF THE RESULTS

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

	SUPERVISION		RENEGOTIATION		ADR	
Variable	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
PRVTINSTIT	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).

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. Econometrical models confirm that the functional scope of the licensing agreements matters significantly.

(to the issue that there are no contradiction between incentives to give more rights and knowledge vs. fear of appropriation hazards, i.e. no dichotomy learning vs. protection).

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.

REFERENCES

1. Arora, A. Licensing tacit knowledge: intellectual property rights and the market for knowhow // Economics of Innovation and New Technology, 1995, 4, 41-59
2. Arrow, 1962
3. Aulakh P.S., Cavusgil, S.T., Sarkar M.B. Compensation in international licensing agreements // Journal of International Business Studies, 1998, 29, 409-419
4. Baker, Gibbons and Murphy, 2002
5. Beggs, A.W. Licensing under asymmetric information // International Journal of Industrial Organization, 1992, 10, 170-191
6. Bessy, C., Brousseau, E., Saussier, S. Payment schemes in technology licensing agreements: A transaction cost approach // Working Paper, FORUM, Université Paris X & ATOM, Université Paris 1, 2004
7. Bessy and Brousseau, 1998
8. Brousseau E., Coeurderoy R. Combining institutional and contractual mechanisms to control transactional hazards related to transfers of technology: an empirical analysis of supervision provisions in technology licensing agreements // International Journal of the Economics of Business, 2005, 11, 3
9. Brousseau E., Coeurderoy R. and Chaserant C. The Governance of Contracts: Empirical Evidence on Technology Licensing Agreements // Journal of Institutional and Theoretical Economic, 2007, 163, 2, 205-235
10. Campbell and Reuer (2001)
11. Chi and Roehl, 1997
12. Chiappori and Salanie, 2003
13. Choi, J.P. Technology transfer with moral hazard // International Journal of Industrial Organization 19, 2001, 249-266
14. Contractor, F.J. International Technology Licensing: Compensation, Costs and Negotiation. Lexington: Lexington Books, 1981
15. Crockerand Masten, 1991
16. Davies, 1977
17. Davies,1992
18. Geringer and Hebert, 1989

19. Ghoshal and Moran, 1996
20. Gomes-Casseres, 1989
21. Gulati R. and Singh H. The Architecture of Cooperation: Managing Cooperation Costs and Appropriation Concerns in Strategic Alliances // Administrative Science Quarterly, 1998, December
22. Harrigan K. Managing for Joint Ventures Success. Lexington, MA: Lexington Books, 1986
23. Hennart, 1991
24. Jorde T. and Teece D. Innovation and Cooperation: Implications for Competition and Antitrust // Journal of Economic Perspectives, 1990, 4, 75-96
25. Kamien, 1992
26. Macho-Stadler, I., Martinez-Giralt, X, Perez-Castrillo, D. J. The role of information in licensing contract design // Research Policy, 1996, 25, 43-57
27. MacNeil, 1974
28. Masten and Saussier, 2000
29. Oxley, 1997
30. Oxley, 1999
31. Oxley et al., 2008
32. Parkhe A. Strategic alliance structuring: A game theoretic and transaction cost examination of interfirm cooperation // Academy of Management Journal, 1993, 36, 794-829
33. Pisano, 1989
34. Poppo and Zenger, 2002
35. Ryall M. and Sampson R. Formal contracts in the presence of relational enforcement mechanisms: evidence from technology development projects // WP, 2007
36. Shavell S. Foundations of Economic Analysis of Law (Chapters 13-16 Economic analysis of Contract Law). Harvard University Press, 2003
37. Sobrero and Roberts, 1996
38. Teece, 1986
39. Uzzi, 1997
40. Van Djik, 1994
41. Williamson, 1985
42. Zajac and Olsen, 1993