

Technology Licensing Practices in France[#]

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in *LES Nouvelles*, 25:2, pp. 66-75, 06/2000

This paper draws on a survey conducted among the 450 major French companies. It displays the main statistical results¹ and compares them with previous studies performed by the French Ministry of Industry (SESSI), the French Patent Office (INPI) or academics². As compared to these previous studies, ours is based on quite a small sample, but it relies on very detailed information about contractual practices, while most of the others are based on very vague information on transferred resources, implemented contractual provisions, payment mechanisms³, etc.

Our survey was conducted via a mailed questionnaire sent to the 450 major French firms and the members of LES France (which includes small firms). Out of this initial population of around 500 firms, we got replies from 150 firms. 120 firms decided not to answer our questionnaire⁴, but explained why. The remaining 30 firms sent the questionnaire back. They

[#] This paper draws on research funded by the French Commissariat General du Plan. We thank the many professionals, especially Francis Hagel (Schlumberger & Licensing Executive Society (LES)) and Thierry Sueur (L'Air Liquide & LES), who helped us in our investigations. We also thank the company that provided us with information generally considered highly sensitive and confidential. Carine Staropoli, Carole Chavalier and Julienne Larrey were research assistants on this project. They had the hard task of persuading the firms to reply to the questionnaire.

¹ More detailed statistical results, case studies as well as in-depth interpretations are available in Bessy C. & Brousseau E. [1998], " Technology Licensing Contracts: Features and Diversity ", *International Review of Law and Economics*, 18, p. 451-489.

² Anand B.N., Khanna T., [1996], Intellectual Property Rights and Contract Structure, *Working Paper*, November.

Caves E., Crookel H., Killing P.J. [1983], The Imperfect Market for Technology Licenses, *Oxford Bulletin of Economics and Statistics*, August, 45, 249-67.

Degnan S.A. and Horton C. [1997], A Survey of Licensed Royalties, *LES Nouvelles*, June, pp. 91-96

³ Except for Degnan & Horton [1997] whose survey is based on detailed information on licenses royalties

⁴ These answers are interesting because the 120 companies can be considered as highly representative of large French firms (since they represent 20% of the population). 28,8% did not answer simply because they do not hold patents (mainly in the service sector). 15% do not license and 16,6% consider that licensing is a marginal (and therefore not representative) activity for their company. The other companies did not answer because it was too difficult or too time consuming for them due to the central management of licensing by a foreign parent company (9,1%), to the externalization of licensing activities to a consultant (4,1%), or to a decentralization of licensing activities within the company (1,6%).

The interesting point is that over a sample of 150 large French firms (including the 30 answering firms), 48 % recognize that they either do not have any licensing activities, or that it is only marginal.

Such a result is consistent with what we know about patenting practices. Only 21,4% of manufacturing firms own patents in France and there is a strong "size effect": 83,5% of firms employing more than 2,000 people do

provided us with detailed information on 50 types of contracts that they consider as being the "most representative" of their licensing practices.

Our sample is indeed small. However, we controlled the information we got by checking the diversity of the answering companies⁵ and by comparing the general structure of our sample of contracts with the structure of wider samples of contracts. We did not find any statistically significant divergence between the structure of these various populations of contracts and our sample. We can therefore consider that our sample is not too biased, even if it is small. This is the same when one considers the characteristics of answering firms (size, industry, etc.)⁶.

Our questionnaire is made up of two parts. The first one is dedicated to the gathering of information about the answering firm and the way it manages intellectual assets. In the second part, the firm had to describe the technology licensing agreements that it considers as being the most representative of its activity and practices. Consequently, while our survey is based on only 50 contracts, those "contracts" are considered as representative of a wider population of actual contracts. The questionnaire was designed to gather information about the type of resources transferred, the implemented financial provisions and contractual safeguards, the designed supervision, renegotiations and conflict settlement mechanisms, etc.

The paper is divided into three parts. In the first one, we provide general information about the licensing policy of the surveyed firms. In the second, we display information about the main features of the Technology Licensing Agreements (TLAs) implemented by French Firms. It has to be pointed out that the surveyed arrangements do not cover intra-group transfers and that most of them are between a French firm and a foreign firm. Third, we show the existence of several contractual patterns corresponding to different licensing objectives.

1. French Patenting and Licensing Policies

Our questionnaire enabled us, first, to identify more precisely the way licensing activities are managed by the responding firms; second, how they relate to patenting policies; and third, what the key determinants of those activities are.

1.1. The organization of licensing

In 3/4 firms, a specialized department performs the negotiation of licensing agreements, although it often co-operates with other departments. Most of the time, the Chief Licensing Executive reports directly to the general management of the company. His department can be specialized in Intellectual Property Rights (IPRs) management (25%), but such a department does not exist in every company. The department responsible for licensing can therefore be either a marketing department, or a legal affairs department, or a R&D department, etc. Most of the time, the department responsible for licensing in is also responsible for licensing out.

This is the same for the department responsible for the management of licensing agreements. It can be very different from one company to another. The most frequent case is when the department of legal affairs is in charge of TLA management. The IPR department ranks second.

own patents, while only 14,3 % of small firms (between 20 and 50 employees) own patents. The Industry is also a strong determinant of the willingness to own patents (Source Sessi [1997]).

Our own data suggest however that the willingness to license is much lower than the willingness to patent and that there is probably an under-valuation of their intellectual assets by French firms.

⁵ The sample covers mainly large corporations. Half of them make more than 50% of their sales on foreign markets. Pharmaceutical and Chemical firms account for one third of the sample. Transportation equipment manufacturing (20%), Metallurgy, and Metal manufacturing firms (10%) also account for a significant share in the sample. This is consistent with the technical domains that account for the bulk of patenting activity in France. The size of our sample does not enable us to compute sectoral or other detailed statistics, but we cover a wide set of industrial activities (including services, such as engineering services). Moreover, the sample covers large and small firms.

⁶ That said, our study has obviously to be considered as an exploratory study. We are currently in the process of widening the sample, especially by sending the questionnaire to an international set of firms.

The Chief Licensing Executive is responsible for the licensing policy of the whole group in more than half of the cases. He is responsible both for licensing in and licensing out activities in 4/5 cases. He also manages patenting in 50% of the cases.

The department responsible for licensing activities co-operates with the other departments in the following decreasing order (the intensity of co-operation is measured on a 1 to 5 grade scale). Co-operation is quite strong with the R&D department (3.7), the Business marketing department (3.5), the Department of legal affairs (3.2) and the Sales department (3.2)⁷. The financial divisions (2.6) and the manufacturing departments (2.5) seem to be less intensively involved in the management of licensing agreements.

In most of the cases, the management of patenting and licensing activities is only slightly outsourced or subcontracted. Technological watch and patent infringement supervision are the activities related to intellectual asset management that are the most likely to be outsourced to specialized service providers, who can also play a role in the valorization of patent portfolios and in the writing of licensing agreements. Their role is however significant only for small companies. Professional organizations and Public services can also help companies manage their patenting and licensing activities, but they play only a marginal role.

To sum up, most of the time, licensing activities are very centrally managed by a small team of specialists that report directly to the top management, and that ensure most of the negotiations and management of TLAs (though they may be supported by other departments of the company).

1.2. Patenting Policy

One third of the companies register less than 10 patents a year, the second third file between 10 and 50 patents a year and the remaining third register more than 50 patents a year. Half of the companies register their patents in more than 10 countries, but only 1/6 in more than 20 countries (the EU is not considered a single country). Thus, while they are large, many companies in our sample do not anticipate that they could license their technology to third parties. This is because technology licensing is considered a costly and not very profitable activity by many companies. This point is discussed in Bessy & Brousseau [1999].

The major objective of registering patents is to dissuade competitors from imitating the inventions of the company. A more strategic reason follows that first unsurprising objective: French firms register patents to enhance the bargaining power of the company. This is a strategic way of considering patents in that the company can decide to not exploit its technology or to not exclude its competitors from using it. Patents are filed with the objective of benefiting from something in return from competitors, and this "compensation" can be of very different types: money, technology, promises to cooperate (or to be less aggressive), market share, etc.

The other objectives have less importance. It is interesting to point out that the collection of licensing royalties ranks only fifth in the claimed patent registering objectives. This is consistent with previous studies (Levin & al [1987], SESSI [1997]) that also pointed out that the dissuasion from imitation is generally a greater motivation for patenting activities than the desire to collect revenues.

Details are given in table 1:

⁷ It has to be pointed out that the sales department often plays an essential role in licensing-out activities. In several cases, it was considered as the leading department in the negotiation of licensing-out agreements. Generally, this was within the framework of wider agreements to enter new markets.

Table 1: The goals of patenting
(Estimated through a five grade scale and ranked by magnitude)

| | Mean | Standard Deviation |
|--|------|--------------------|
| To dissuade competitors to imitate patentee's inventions | 3,88 | 1,36 |
| To increase patentee's bargaining power vis-a-vis other companies | 3,72 | 1,86 |
| To avoid patent infringement suits by competitors | 2,92 | 1,38 |
| To benefit from an efficient legal anchoring when the company is involved in cooperative projects (e.g. EU projects) | 2,84 | 1,28 |
| To collect revenues either by licensing or selling patent | 2,72 | 1,37 |
| To feed on going licensing relationships | 2,28 | 1,21 |
| To perform technological barter | 2,04 | 1,01 |
| To enable researchers to publish | 1,64 | 0,7 |
| To decrease the willingness of competitors to hire the patentee's employees | 1,31 | 0,7 |
| Other | 1,1 | 0,6 |

1.3. Licensing Policy

The number of licensing agreements is far beyond the number of claimed patents. Only one third of the companies grant more than five licenses a year. This is the same for licensing agreements. This confirms that the willingness to license is, all things equal, quite low in the industry, and that technology transfers are intensive only in a small number of industries.

Only 10% of the companies in the sample have a significant level of cross licensing. For more than half of the companies, cross-licensing concerns less than 5% of their business partners. This share is above 50% for only two companies. This shows that there is a technological hierarchy among companies: some of them "export" technology more than they "import" it.

Another important piece of information is the relatively low willingness to rely on third parties to settle contractual conflicts. When conflicts occur, French firms tend to negotiate transactional agreements (3.9/5). Courts (1.7) and arbitration (1.4) are considered as last resort and bad solutions. It is interesting to note that court conflict settlement is preferred to arbitration and that quite often firms prefer not to solve the conflict rather than bringing the case to the courts (willingness for the "no suit" solution =1,7/5).

1.3.1. Licensing out Policy

Despite the fact that the motivation for patenting is not primarily the gathering of licensing royalties, the principal motivation for licensing is the collection of licensing revenues (3.5/5)⁸. Commercial objectives follow: entering a foreign market (3.0) and selling products that require the use of a specific technology (2.61) are important goals of licensing out policies. Technological goals are next: exchanging technology with a partner (2.65), or benefiting from additional development (2.31) are also ranked as important objectives. Other objectives (such as conflict settlement) are considered as less important⁹. These results are consistent with those of the survey by Degnan & Horton [1997].

⁸ For 3/4 firms, licensing revenues account for less than 1% of the total sales. Licensing revenues account for more than 5% of total sales for only two firms.

⁹ In our sample, two companies (6,6%) have to manage a large number of patent infringement cases (more than 70 each year). For the other firms the average number of cases is 2 per year. Most of these conflicts are settled through transactional agreements (3.1/5). Many transactions lead to licensing agreements (2.6). Courts (2.0) and even arbitration (1.3) are in fact less intensively used to settle conflicts.

Table 2 The Objective of Licensing Out
(Estimated though a five grade scale and ranked by magnitude)

| | Mean | Standard Deviation |
|--|------|--------------------|
| To collect Royalties | 3,54 | 1,14 |
| To enter foreign markets | 3,00 | 1,47 |
| To exchange technology with an industrial or commercial partner | 2,65 | 1,09 |
| To support the selling of products or services that require the use of a specific technology | 2,61 | 1,58 |
| To benefit from specific development as a user | 2,31 | 1,44 |
| To favor the spread of a technical standard | 1,92 | 1,38 |
| To settle patent infringement conflicts | 1,85 | 1,05 |
| To favor outsourcing and spread | 1,3 | 0,9 |
| Other | 1,2 | 0,8 |

Most of the companies (4/5) declare that they transform their licensing conditions during the life cycle of a piece of technology, and more than a third claim that standardization processes strongly influence their licensing out policy (in the sense that in the concerned industries licensing is considered as quasi mandatory).

For 4/5 of the firms, TLAs cover the exchange of know-how. Products follow (3/5). R&D results are exchanged in half of the cases, especially in the chemical and pharmaceutical industries. Only 10% of the companies grant licenses for software.

1.3.2. Licensing in Policy

Two companies do not buy licenses. To access technology is the major determinant of licensing in decisions whether that access is immediate (3.76/5) or just an option (3.1). To engage co-operation is another essential cause of licensing-in agreements (through industrial and commercial partnerships or joint research). The settlement of patent infringement conflicts is sensitive but less important.

Table 3 The Objective of Licensing In
(Estimated though a five grade scale and ranked by magnitude)

| | Mean | Standard Deviation |
|---|------|--------------------|
| To access to a technology to immediately use it | 3,76 | 1,27 |
| To complete commercial or industrial partnership | 3,24 | 1,27 |
| To take an option on a technology to benefit from (future) room for manoeuvre | 3,12 | 1,09 |
| To co-develop a technology with a commercial or industrial partner | 2,96 | 1,34 |
| To settle patents infringement conflicts | 2,2 | 1,35 |

2. Licensing Practices

The questionnaire mainly aimed at collecting information about licensing practices. We asked responding firms to provide us with information concerning their "most representative practices". Consequently, despite the fact that the following statistics were computed over a sample of (only) 46 contracts, they provide information about a wider sample of actual contracts.

Half of the contracts are considered as "representative" because they represent a significant share of licensing revenues, and half of the contracts are considered as "representative" because of the strategic stake they represent. We can therefore consider that we have a good image of the variety of the possible types of TLA. We also have a good balance between licensing in and licensing out agreements. This enables us to consider that the information we got is not too biased by the respondent type. Moreover, since the French firm is either a licensor or a licensee, it is possible to consider that our results are not too strongly biased by

the nationality of the firm involved in the sample. Indeed, most of the time the partner is a foreign partner.

Most of the TLAs in the sample are part of wider agreements. Technological transfer agreements rank first (2.5/5), but commercial agreements (2.2) and industrial or R&D cooperation (2.1) are also frequent. This is another indicator of our ability to grasp very different types of agreements.

Table 4: Implementation of the TLA in a wider Agreement
(Frequency Distribution of answers on a 5 grade scale)

| | No, Never | 2 | 3 | 4 | Always | Total |
|--|-----------|------|------|------|--------|-------|
| Technology Transfer Agreement | 41,3 | 10,9 | 17,4 | 21,7 | 8,7 | 100 |
| Commercial Agreement | 47,8 | 17,4 | 15,2 | 13,0 | 6,5 | 100 |
| Production or R&D Cooperation, Joint-Venture | 52,2 | 15,2 | 4,4 | 17,4 | 10,7 | 100 |

2.1 The transferred resources

Licensing does not simply consist in granting a business partner the right to use a patent. It also requires transferring technology and knowledge. Neither can be reduced to the wording of the patent. They are also embodied in a whole set of supports ó documents, data files, mind sets, organizational routines, etc. ó and this makes it quite difficult to transfer them. This is confirmed by the following table that displays the intensity with which the following resources are exchanged through the TLA in addition to the right to use a patent.

Table 5: Intensity with which Resources are exchanged through the TLA
(Weighed Mean and Frequency Distribution of answers on a 5 grade scale)

| | Mean | No, Never | 2 | 3 | 4 | Always | Total |
|---|------|-----------|------|------|------|--------|-------|
| Test and Development Data | 3,3 | 21,7 | 4,4 | 13,0 | 30,4 | 30,4 | 100 |
| Consultant Services | 2,9 | 23,9 | 13,0 | 26,1 | 28,3 | 8,7 | 100 |
| Plans. Red books. Manuals | 2,7 | 32,6 | 21,7 | 8,7 | 21,7 | 15,2 | 100 |
| Prototypes. Equipment | 2,7 | 32,6 | 10,9 | 19,6 | 21,7 | 15,2 | 100 |
| Commercial Data | 2,4 | 39,1 | 23,9 | 13,0 | 15,2 | 8,7 | 100 |
| Training | 2,7 | 30,4 | 6,5 | 32,6 | 19,6 | 10,9 | 100 |
| Personnel Delegation | 2,4 | 43,5 | 10,9 | 23,9 | 8,7 | 13,0 | 100 |
| Support vis-a-vis Public Services (Funding, Certification, Regulation, etc.) | 2,1 | 50,0 | 15,2 | 13,0 | 19,2 | 2,2 | 100 |

It is important to point out the fact that the transfer of technology implies the transfer of a wide set of heterogeneous resources. This suggests that it is costly to license a technology and dangerous because it is obviously difficult to secure all these transfers. Along this line, it is interesting to note that providing the licensee with consultancy services is preferred to training his employees. Indeed, most of the time training implies the presence of the licensee's employee in the licensor's facilities and they can learn more than the licensor wants to reveal.

In some agreements, transfers are reciprocal because there are reciprocity requirements. This is a good way to secure agreements. When reciprocity is required, it is most of the time through the providing of goods or services by the licensee. Cross licensing ranks only third.

Table 6: Reciprocity Requirements
(Weighed Mean and Frequency Distribution of answers on a 5 grade scale)

| | Mean | No, Never | 2 | 3 | 4 | Always | Total |
|---------------------------------------|------|-----------|------|------|-----|--------|-------|
| Cross Licensing | 1,7 | 65,2 | 13,0 | 13,0 | 2,2 | 2,2 | 100 |
| Sales of Goods to the Licensor | 2,1 | 54,3 | 13,0 | 13,0 | 2,2 | 6,5 | 100 |
| Providing of Services to the Licensor | 1,9 | 56,5 | 19,6 | 10,9 | 8,7 | 4,3 | 100 |

2.2 Payment Mechanisms

Licenses generate revenues in 91,4% of the cases. This is in line with the claimed main objective of licensing activities: earning licensing revenues. In the other cases, the licensor is remunerated in nature either because there is cross licensing or because he is provided in goods or services by the licensee. The absence of licensing revenue can also be linked to a co-operative relationship in which the licensee provides the licensor with technical development or, even, an alliance.

Lump sump payments alone are scarce (9.5% of the cases in which payments are implemented)). This is because it is quite difficult for the licensee to evaluate the value of a technology for him, and therefore to accept to pay ex-ante a fix priced to access it. This is why royalty payments are generally implemented in TLAs even if this can be a problem for the licensor (90.5%). First, it obliges him to bear the technical and commercial risk of the licensee. Second, it increases the cheating possibilities of the licensee. That is why a good way to reduce the risk born by the licensor is to implement a two part remuneration scheme based both on a lump sump payment paid at the beginning of the license and annual royalties. This applies in 50% of the cases. In these cases, risks are shared between the licensee and the licensor.

When royalties payment are implemented, the basis of assessment is either the sales (61.4%) or the number of items sold (38.6%) and the royalty rate is customized in 70% of the cases. This last figure shows, however, that many licensing agreements implement a standardized rate of royalties.

Since our detailed results are consistent with those of Degnan & Horton [1997], it is not useful to display them here because Degan and Horton's study of royalties is more comprehensive.

Table 7: Payment Mechanism
(Frequency over the whole sample)

| | % | % |
|--|------|------|
| <i>Contracts Implementing Payments</i> | 91.4 | |
| Lump Sum Payment | | 8.7 |
| Two Part Tariff | | 45.7 |
| Royalties | | 37.0 |
| Customized Royalty Rate | 58.7 | |

2.3 Contractual Safeguards

Exclusivity and Use Restriction provisions are a good way to reduce both parties' risks.

In more than 3/4 cases, exclusivity provisions are implemented. One contract out of two includes a clause that states that the technology should not be granted to the licensee's competitors, and exclusive license are granted in one case in two. Exclusivity increases licensor risks because his revenues are dependent on the behavior of the licensee. That is why exclusiveness is generally granted only for a specific territory, to spread risks over several "exclusive" licensees¹⁰.

More than 4/5 contracts implement use restrictions. Geographical restrictions are the most frequent. This type of restriction enables the licensor to avoid competition from its licensees, and to grant exclusive territories. Use restrictions on specific fields of application are also frequent. Most of the contracts implement a combination of the basic restriction domains.

Most favored licensee clauses are a good protection for licensees. To implement this clause is also a good way for the licensor to simplify negotiation. Indeed, this type of clause incites the

¹⁰ To the opposite, excessiveness is probably a way to incite licensee to accept licensing agreements implementing restrictions and constraints.

licensee to rely on other licensees to negotiate better licensing conditions. Due to the risks for the licensor, it is, however, implemented in only 17,4% of the contracts.

Grant-back clauses can be implemented in two opposing cases. When combined with payments, it is generally a simple safeguard for the licensor. He wants to dissuade his licensees from inventing around his technology (since the licensee will not benefit from exclusiveness if he innovates). However, when such a clause is implemented in a contract that does not implement payments, it is generally a case in which the licensor relies on the licensee to provide him with additional developments (8,3% of the cases). Grant-back clauses are very frequent in our sample. They generally provide the licensor with free use rights, but in some cases also with property rights. Grant-back clauses are often associated with exclusivity provisions (52% of the cases). This is a good indication that they are important contractual safeguards (see also Caves & al [1983])

Table 8: Contractual Safeguards
(Frequency over the whole sample)

| | % | % |
|---|------|------|
| <i>Exclusivity Clauses</i> | 71.7 | |
| On the Technology | | 54.3 |
| On a Geographical Area | | 54.3 |
| Technology x Geographical Area | | 37.0 |
| <i>Usage Restriction Clauses</i> | 87.0 | |
| Not Reselling the Technology | | 37.0 |
| On a Specific Geographical Area | | 58.7 |
| On a Specific Field of Application | | 50.0 |
| On a Specific Mode of Commercialization | | 13.0 |
| <i>Most Favored Licensee Clause</i> | 17.4 | |
| On Royalty Rates | | 15.2 |
| On Geographical Restrictions | | 2.2 |
| <i>Grant-back Clause</i> | 65.2 | |
| Property Rights on Development | | 13.0 |
| Free Uses Rights | | 47.8 |
| Simple information right | | 4.4 |

As compared to other interfirm selling agreements, it is important to point out that the "exchange" of exclusivity and restrictions between the licensor and the licensee generates mutual interdependence. This interdependence is DUE and explains why risks can be shared (or even borne by the vendor) through the payment mechanism. It also explains why governance and renegotiations mechanisms have to be implemented.

2.4 Governance, Renegotiations and Duration

The vast majority of TLAs are long term agreements that run over more than 7 years. In addition, with the mutual interdependence and the risk sharing aspect of payment mechanisms, that length explains why many contracts implement governance mechanisms to supervise parties, settle conflicts, and renegotiate. It has to be pointed out, however, that there is no significant correlation between the length of the contract and the implementation of a renegotiations provision. In fact, governance and renegotiations mechanisms depend upon the combination of the length of the contract, the degree of interdependence, and the level of risk sharing.

Table 9: Governance. Renegotiations. Duration
(Frequency over the whole sample)

| | % | % |
|--|------|------|
| <i>Governance Mechanism Implementation</i> | 43.4 | |
| Arbitration | | 23.9 |
| Supervision Committee | | 30.4 |
| Co-existence of Two Mechanisms | | 10.9 |
| <i>Renegotiations Provision</i> | 63.0 | |
| On Royalties | | 34.8 |
| On the Object of the TLA | | 15.5 |
| "Hardship" Clause | | 21.7 |
| On the Exclusivity Conditions | | 26.1 |
| <i>Contract Duration</i> | | |
| <7 Years | | 34.8 |
| [7.12] Years | | 28.3 |
| >12 Years | | 17.4 |
| Patent Life | | 19.6 |

To sum up, TLAs tend to generate a strong mutual interdependence between the contracting parties. This is, first, due to the fact that the licensor transmit resources that are hard to secure. Indeed, enforcing IPRs is costly and infringement can be hard to detect. Moreover, some transmitted resources are not efficiently protected by IPRs: test data, knowledge transmitted though training, etc. Second, interdependence is due to the uncertainty faced by licensees. They generally cannot know exactly how they will valorize the technology because, first, they only have partial information about it; and second, they cannot perfectly forecast how successful they will be in implementing it and bringing it to the market. They therefore want to share risks with their licensor (or even be relieved of their risks). Third, since a process of information revelation and knowledge transmission is irreversible, those mutual interdependencies last long and cannot be suppressed by contractual breach.

This is basically why TLAs tend to implement long term commitments; payment mechanisms that enable parties to share risks; mutual safeguards that provide parties with potential means of retaliation; governance and renegotiations procedures to adapt the relationship throughout its life to all the contingencies that can occur (and that were not foreseen at the beginning of the agreement). Other things equal, TLAs tend to be "relational" agreements (Macneil 1994) in the sense that they are set up to design the framework (but not all the details) of a future co-operative process. This is quite different from a "transactional" agreement that tends to settle ex-ante all the details of a selling process. This second type of agreement is implemented when the transaction tends to be short term and simple.

3. TLAs diversity

While it is possible to point out the general characteristics of TLAs as compared to other types of contract (basic sales contract, franchising agreement, etc.), there is a great diversity among TLAs because:

- First, they do not completely cover similar transactions. In some cases, a TLA covers only the transfer of the right to use a well-known and developed technology. In other cases, the TLA is established to support the joint development process of an immature technology. There are many hybrid situations between these two extremes.
- Second, TLAs can be set up in very different industrial and technical environments. In some industries, collective bodies like associations of scientists and engineers, standardization committees, industry unions, (etc.) facilitate the transmission of knowledge among industry members; design rules and institutions to facilitate technology transfers and conflict settlement; favor the transmission of information among individuals and companies by organizing frequent meetings, dense networks of social interactions, formal information broadcasting, etc. All these tend to facilitate the setting up of TLAs because partners can rely on those collective means to decrease the costs of exchanging

information, securing knowledge exchanges, settling potential conflicts. In those environments where these collective resources exist, TLAs can be simplified (i.e. less safeguards, less supervision mechanisms, less endogenous conflict settlement mechanisms, etc. are implemented) because business partners benefit from these collective resources to govern their relationships (for a more detailed analysis see Bessy & Brousseau [1999]).

By using data analysis, it is possible to point out the existence of various patterns of TLAs. Data analysis enables us to compare populations of individuals (here contracts) along several dimensions (according to a great number of features) and to point out the characteristics that differentiate them the most. Moreover, it enables us to point out the clustering of individuals (contracts) around some groups of common characteristics, various groups being contrasted by opposing characteristics¹¹,

We use such methodology to point out

- First, the features that contrast TLAs the most
- Second the existence of five classes of TLA.

3.1. The most discriminating features

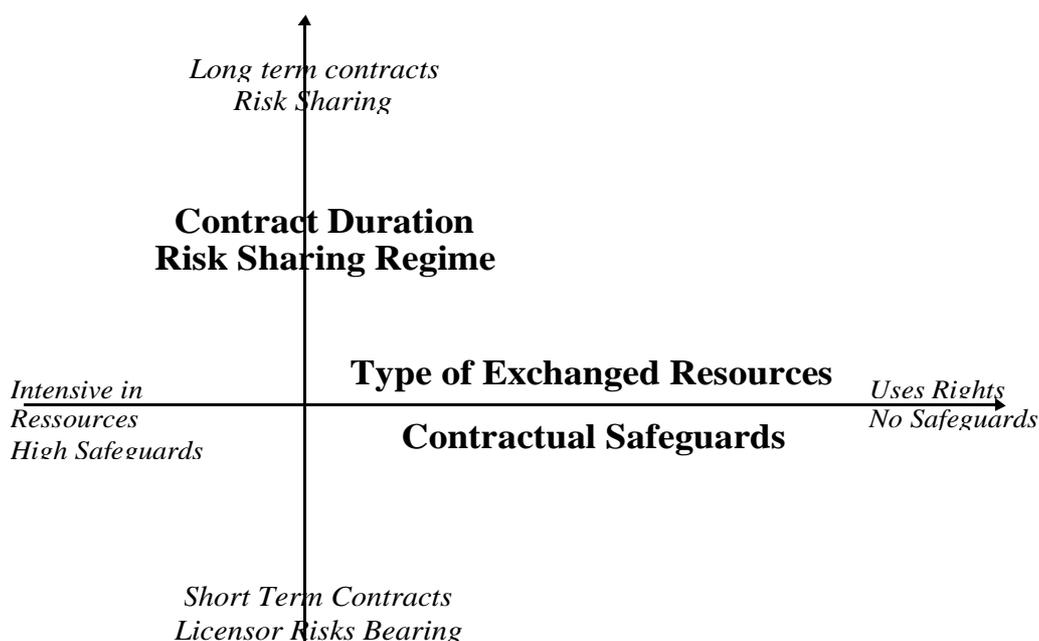
The statistical methodology enables us to point out that, due to the correlation among various contractual features, it is possible to "reduce" the description of our sample of TLAs to a reduced number of (aggregated) features rather than using the whole set of characteristics grasped through our questionnaire. The first two aggregated dimensions explain 30% of variance. We can therefore say that the major lines of discrimination among the various types of contract are:

- First, the level of contractual safeguards, which is strongly linked to the types of resource that are exchanged thanks to the contract. Indeed, one can oppose the contract that covers the exchange of a wide set of resources ó data, red books and manual, prototypes, training or consulting services, etc. ó from the contract that just organizes the transfer of uses rights among the parties. The former exist because knowledge transfer is performed, while the latter are due to the fact that the licensee does not really have to learn anything from the licensor.
- Second, the contract duration and the risk sharing regime (i.e. the payment formulae). Indeed long term contracts generally implement a risk sharing regime (a two part tariff system), while shorter term contracts tend to implement a single system of royalty payments. As will be pointed out later, long term risk sharing agreements are linked to co-development processes and alliances, while short term agreements in which the licensor bears most of the risks are linked to more commercially-oriented agreements, either to share markets (between the licensor and the licensee) or to provide a client (the licensee) with a technology.

Figure 1 sums this up:

¹¹ Multiple correspondence analysis and hierarchical clustering are methodologies that enable us to compare our contracts along several dimensions (Lebart, Morineau & Warwick [1984]). The data were processed with the ADDAD-SAS software. Correspondence analysis is a weighted principal component analysis of a contingency table. We processed several analyses to ensure a robust synthesis of the structural relationships among the variables. The taxonomy is obtained by a clustering method, which is based on the reciprocal neighbor method from the measures tables obtained in the correspondence analysis. The aggregation criterion is the centered moment of order two of a partition. At each step, one minimizes the intra-class variance of the partition built. This supported the division of the sample into five main classes. The resulting taxonomy is analyzed by examining the correlation between each class and the categorical values (table 9). We thank B. Gomel (CEE) for his help and advice in processing the data.

Figure 1: The two most discriminating dimensions



3.2. Five Classes of contracts

The statistical methodology used enables us to measure the distance among two contracts in the above-described space. This makes it possible to point out the clustering of our sample of 48 agreements into five main classes. Figure 2 represents these five classes graphically in the plane designed above. Table 10 describes them along the various dimensions of our questionnaire.

The five classes are the following. They are ranked from the most "relational", in which the TLAs implement a complex set of safeguards, payment mechanisms, renegotiations provisions to govern a co-operative process, to the most "transactional" agreements that resemble a simple sales contract.

- "Relational TLAs": These long-term agreements govern the exchanges of many resources along with the right to use a patent. These contracts implement many safeguards, specific negotiation supervision and arbitration structures, and two-part tariffs.

R&D alliances are typical of these relational agreements

- "Development TLAs":¹² This groups agreements through which a licensor gives a licensee the right to develop his technology. They do not implement payments, but a renegotiation structure aimed at discussing the conditions of the exploitation of the result of the R&D process when completed.

Typically, these agreements are set up when a licensor has developed a technology that has to benefit from additional developments that he cannot perform. As compared to the previous category of agreements, the contract focuses on technological development (and does not address industrial or commercial exploitation) because the technology is still at its first stage of development, and both parties cannot really foresee how they will want to exploit it.

- "Relational Commercial TLAs": These short-term agreements are linked to commercial agreements. The licensor transfers to the licensee the right to use a patent and the necessary resources to exploit it. Geographical restrictions and other safeguards are

¹² In fact, these agreements do not perfectly fit the plane displayed in figure 2. This is why they are represented out of it. This is because this plane is just a simplifying projection of the described space of n dimensional space (n variables).

implemented to avoid competition between the licensor and his licensees. In turn, the licensor bears the risks (payments based on royalties).

Commercial agreements in the pharmaceutical industry correspond to these types of agreement. Typically, several distributors are granted the right to manufacture and sell a molecule. Grant-back clauses and severe contractual safeguards are implemented to protect the licensor's intangible assets.

- "One shot complete transfer": These contracts are designed to transfer the right to use a patent for its whole life in exchange for a lump sum payment. The absence of restrictions and royalties avoids any ex-post supervision and renegotiations needs. Consequently, these contracts do not implement governance structures. They typically govern the exchange of a technology that is not a key one for the patentee.

Typically, these contracts are signed when a company owns patents of a technology that can be exploited in markets or technological fields other than those that correspond to its main activities and capabilities. The most efficient way to exploit this intangible is therefore to license it to a third party which is not a direct competitor. That is why strong safeguards are not implemented.

- "Transactional TLAs": These correspond to a simple transfer of the right to use a patent and therefore do not cover the exchange of additional resources. They generally do not implement strong safeguards and do not anticipate ex-post renegotiations. They are relatively short term and tend to implement uniform royalty' payments.

Agreements among manufacturers of consumer' electronic products correspond to this type of "transactional" agreement. Since they are all on the same technological frontier, they do not really need to transfer technology. Since they all have a lot of licensing agreements, since together they represent a relatively small community, they all benefit from means of retaliation in case of opportunistic behavior. Moreover, they are used to settling conflict thanks to various more or less formal organizations involved in the transfer of technology and intellectual assets. Therefore, they can sign quite simplified contracts.

Figure 2: The Five Classes of Contracts

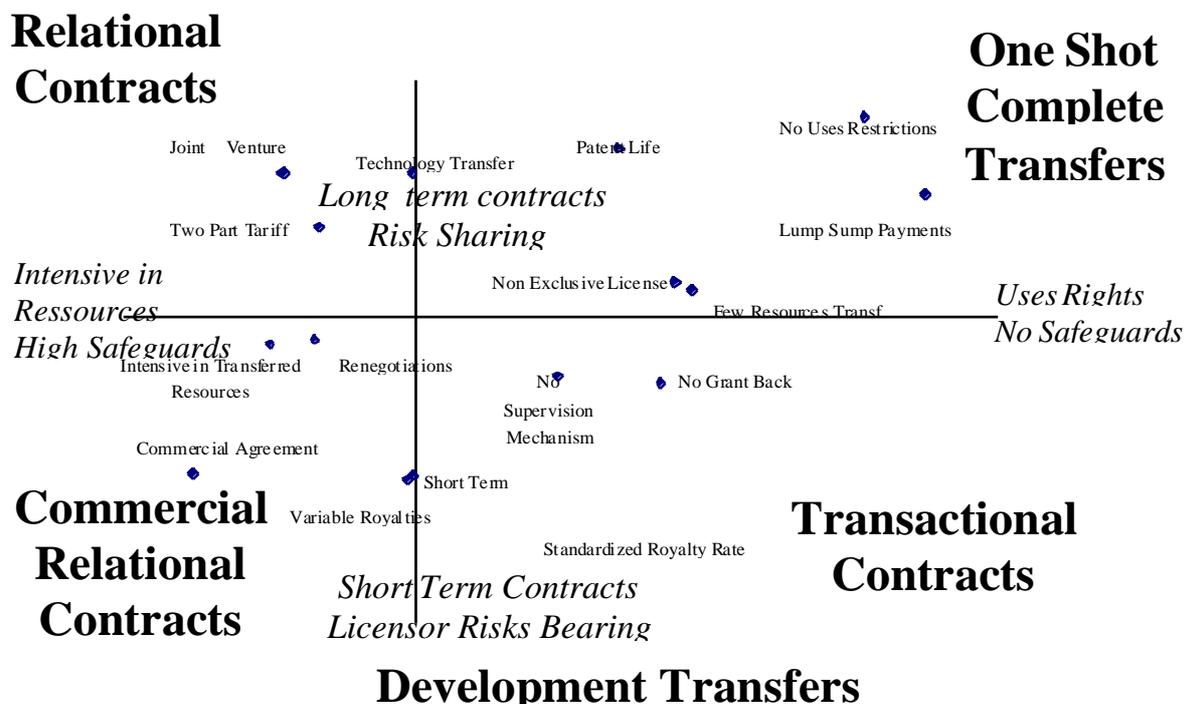


Table 10: The Five Classes of Contracts

| Frequency | Transac- tional TLAs | One Shot Complete Transfer | Relational Commer- cial TLAs | Develo- pment TLAs | Relational TLAs | Sample |
|--|----------------------------|----------------------------------|------------------------------------|--------------------------|--------------------|--------|
| Inclusion in a Wider Agreement | | | | | | |
| Technology Transfer | | | | | | |
| Weak (I3T1) | 36.4 | 50 | 50 | 50.0 | 38.0 | 41.3 |
| Strong (I3T3) | 36.4 | 50 | 16.7 | 25.0 | 28.5 | 30.4 |
| Commercial Agreement | | | | | | |
| Weak (I3A1) | 81.8 | 75.0 | 17.7 | 75.0 | 23.8 | 45.6 |
| Strong (I3A3) | 0 | 0 | 50 | 0 | 38.1 | 23.9 |
| Joint-venture | | | | | | |
| Weak (I3V1) | 54.5 | 50.0 | 66.0 | 75.0 | 42.8 | 52.1 |
| Strong (I3V3) | 27.2 | 25.0 | 0 | 25.0 | 38.1 | 28.2 |
| Transferred Resources | | | | | | |
| Codified Knowledge | | | | | | |
| Weak (I5I1) | 63.6 | 50.0 | 0 | 50.0 | 14.0 | 30.4 |
| Strong (I5I3) | 0 | 0 | 100 | 25.0 | 29.0 | 28.3 |
| Un-codified Knowledge | | | | | | |
| Weak (I5J1) | 54.5 | 50.0 | 0 | 75.0 | 19.0 | 32.6 |
| Strong (I5J3) | 27.2 | 0 | 83.3 | 25.0 | 38.1 | 37.0 |
| Reciprocity | | | | | | |
| Cross Licensing | | | | | | |
| Weak (I6C1) | 90.9 | 100 | 66.7 | 50.0 | 47.6 | 65.2 |
| Strong (I6C3) | 0 | 0 | 0 | 50.0 | 9.5 | 8.7 |
| Goods Purchases | | | | | | |
| Weak (I6P1) | 72.7 | 100 | 50.0 | 75.0 | 33.3 | 54.3 |
| Strong (I6P3) | 27.3 | 0 | 16.7 | 0 | 23.8 | 19.6 |
| Payment Mechanism | | | | | | |
| No Payment (I7I1) | 0 | 0 | 0 | 100 | 0 | 8.7 |
| Lump Sum Payment (I7I2) | 0 | 100 | 0 | 0 | 0 | 8.7 |
| Two Part Tariff (I7I3) | 54.5 | 0 | 16.7 | 0 | 66.7 | 45.7 |
| Royalties (I7I4) | 45.5 | 0 | 83.3 | 0 | 33.3 | 39.9 |
| Customized royalty rate (UF81) | 54.5 | NS | 0 | NS | 100 | 58.7 |
| Governance | | | | | | |
| Supervision. Arbitration. Negotiation Mechanism (I102) | 18.1 | 25.0 | 0 | 75.0 | 66.7 | 43.4 |
| Renegotiation provision (I172) | 27.2 | 25.0 | 66.7 | 100.0 | 81.0 | 63.0 |
| RP on royalties (R172) | 9.1 | 0 | 16.7 | 25.0 | 61.9 | 34.8 |
| Duration | | | | | | |
| <7 years (I161) | 9.0 | 50.0 | 100 | 25.0 | 28.6 | 34.8 |
| [7.8] years (I162) | 18.1 | 0 | 0 | 50.0 | 42.9 | 28.3 |
| >12 years (I163) | 45.5 | 0 | 0 | 25.0 | 9.5 | 17.4 |
| Patent Life (I164) | 27.2 | 50.0 | 0 | 0 | 19.0 | 19.6 |
| Safeguards | | | | | | |
| Exclusivity Clauses (I112) | 54.5 | 50.0 | 83.3 | 75.0 | 81.0 | 71.7 |
| EC on Technology (TEC2) | 27.3 | 25.0 | 83.3 | 75.0 | 61.9 | 54.3 |
| EC on Geog. area(GEO2) | 45.4 | 50.0 | 50.0 | 75.0 | 51.1 | 54.3 |
| Usage restriction (I122) | 72.7 | 50.0 | 100 | 75.0 | 100 | 87.0 |
| Not Reselling Techno (RTE2) | 27.2 | 0 | 16.7 | 50.0 | 52.4 | 37.0 |
| Geographic Area(RGE2) | 27.2 | 25.0 | 83.3 | 50.0 | 76.2 | 58.7 |
| Fields of application.(RDO2) | 36.4 | 0 | 16.7 | 50.0 | 76.2 | 50.0 |
| Most Favored Licensee (I132) | 18.1 | 0 | 0 | 0 | 28.5 | 17.4 |
| Grant-back (I142) | 27.3 | 0 | 66.7 | 100 | 90.5 | 65.2 |

