

# COOPERATION FOR EFFICIENCY IN BUSINESS AGREEMENTS TO TRANSFER TECHNOLOGY: A CASE STUDY

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**Abstract:** This paper emphasizes the element of cooperation as instrumental in the efficiency of business agreements to transfer technology. It utilizes the economic analysis of law as a tool, since agreements of this kind are normally protracted over time and confidence between the parties is fundamental to maintaining relationships. The procedural method used was monographic, while the research technique was bibliographic, and by case study. By way of outcome, cooperation was seen as instrumental in making business agreements to transfer technology in a more efficient way, by being able to reduce the likelihood of litigation relating to these agreements, and as an instrument for stability, promoting the retention of these agreements over a longer period.

**Keywords:** Cooperation, Business Agreements, Technology Transfer, Economic Analysis of Law.

## 1. INTRODUCTION

In Brazil, the gradually narrowing gap between town and gown presupposes an established environment favouring greater understanding, comprehension, and true partnership, in order to reduce differences and adjust expectations.

In technology transfer operations, however, factors such as commercial feasibility analysis and a lack of prior business information (an outcome of the disparity

in information about the technology) present negotiating barriers to an agreement of this nature.

The conduct of those proposing to negotiate reverts to convincing the interested party as to the potential and expected profitability of the technology. The latter, in turn, will not be able fully to verify every factor relating to the transaction, to evaluate the real marketing potential of the asset, at the time the technology transfer agreement is signed.

In addition, disparate visions of the purpose of the research and technology to be developed may be assumed to exist between university researchers and companies, which may generate opportunism between the parties, potentially making the parties more wary and partnership development more difficult, and more costly.

For technology to be transferred, the respective know-how must be divulged to the other party, which makes trust between the parties an essential element, with avoidance of defensive and evasive attitudes that could negatively influence contracting, and the financial results from contracting.

Beyond theoretical considerations, this paper presents a case study based on the analysis of a model technology transfer agreement between a Paraná state university and a private company in the metallurgical industry; it also presents the results of interviews conducted by researchers with the signatories to a contractual model of the type analysed.

The issue addressed in this research involves identifying the main technical and informational bottlenecks, negative effects that can be overcome through drafting clauses into the technology transfer agreement. The intention is to reveal the main motivations and constraints that stimulate cooperation between the parties, with the signature of an agreement as an auxiliary agent. Additional analysis of the content of the model agreement studied and its potential to generate litigation will be presented, along with an assessment of existing clauses that facilitate cooperative behaviour, and the importance of a cooperative environment.

The study is divided into seven parts. The first is this introduction. The second provides an overview of the subject matter, as well as a brief review of the guiding literature on the new institutional economics, and on cooperation. The third presents some specific characteristics of the technology transfer agreement. The following section then discusses cooperation and non-compliance in the model analysed. In the fifth part, the methodological procedure behind the case study will be shown, in a model technology transfer agreement signed between a university based in Paraná State and a company specializing in bio-gas engine production. In the sixth chapter, the results and discussions will be presented, with the epilogue finally arriving at the paper's conclusions.

The rationale for undertaking this study lies in the possibility of revealing components that may facilitate future cooperation between the parties and contribute to improved proximity between academia and industry, through cooperative attitudes that promote development, supported by the wording of agreements.

## 2. COOPERATION AND NEW INSTITUTIONAL ECONOMICS

An agreement that involves negotiation relationships of a business nature can be seen through the instrumental prism of business wills being adjusted to enable interests to be reconciled, with a view to jointly maximizing the individual objectives intended by the parties: in other words, cooperation. Equally, it may be taken as a form of corporate governance, chosen because it is considered more efficient than the other possibilities that present themselves to the entrepreneur: in other words, a governance structure.

From the cooperation perspective, for parties to trust each other they must necessarily cooperate, while envisioning relationships continuing and contractual relationships consequently being preserved for the future.

On the other hand, the likelihood of conflicts existing that deter the completion of business, or entail an increase in transaction costs, stimulates reflection on the limitations of legal interventions in private business relationships, especially when considering the already existing agreements and negotiating freedom which, as a rule, characterize the business negotiation environment.

From the thinking developed by Coase (1960), the most efficient solution economically would be for the parties to cooperate with each other in seeking a solution that provides the greatest potential to reduce transaction costs, taken as costs related to the exchange or commercial processes.

There are imperfections affecting negotiation, however, even when the parties are disposed to cooperate. One of these lies in the impossibility of writing agreements that best govern every condition relating to the agreement, to fully contemplate the individual interests of each party: the more the agreement extends over time, the greater the unviability of establishing a complete contract.

The law may be thought of as an alternative to universal private solutions. The way the law deals with applying statutes and enforcing agreements will influence the ways the market acts (COOTER and ULEN, 2010). By the law focussing on establishing a secure contractual environment, commercial exchanges will tend towards efficiency, with positive results, even beyond the signatory parties.

In addition to the law substituting or delimitating the expression of the individual will, certain strategies that can stimulate cooperation. Based on empirical experience, Axelrod (2010) concluded, in synopsis, that cooperation can arise from strategies designed by the parties, for their own benefit. The author analyses components that foster cooperation between the parties. Some will be reviewed here.

Reciprocal cooperation will be stable if the future is sufficiently important relative to the present. This is because the stakeholders can each use the implicit threat of retaliation against the other, if the interaction will last long enough to make the threat effective. This conclusion leads to the first prerequisite for promoting cooperation: increasing future expectations (Axelrod, 2010). There are two basic ways to ensure this perspective: through longer lasting or more frequent interactions (Axelrod, 2010).

Prolonged interaction facilitates collaboration standards, while frequent interaction helps promote stable cooperation by excluding other potential proposals exogenous to the relationship. In a negotiation context, another way to make interactions more frequent is to break issues down into smaller segments. This strategy

allows both parties to make many relatively small moves instead of one or two large ones. The stability of cooperation is promoted by breaking up the interaction, by making the gains from betrayal in the present much less important than potential gains in the future through cooperation.

Teaching reciprocity is also a way to stimulate cooperation (Axelrod, 2010). There cannot be what Axelrod calls 'unconditional cooperation' (when one player cooperates, even if the other is exploiting him). A player should thus treat the other in the same way as the other treated him and, for this reason, it is necessary to retain the ability to recognize players from past interaction, to remember the relevant characteristics of these interactions. Without these abilities, a player cannot use any form of reciprocity, and will be unable to stimulate the other to cooperate or not.

There are, therefore, indicators of scenarios that favour cooperative action that, when viable, will act to promote efficiency.

Cooperation is fundamental in the realm of contracts, not only at the time of drafting the agreement, but also with regard to compliance with what has been agreed upon, in order to ensure stability and predictability in contractual performance.

In the event of contractual breach, and as an alternative to taking legal action, new negotiations may seek to resolve the problem, with terms renegotiated by common accord.

Concerning technology transfer agreements and their uncertainties and boundaries, it will be especially pertinent for these to contain clauses that favour the possibility of future renegotiation in the event of unexpected occurrences or other situations that imposed themselves, which stimulate changes in the ordinary course of the agreement.

On the other hand, when the intention is to avoid one party's opportunistic behaviour - and also to serve as an instrument to promote cooperation (COOTER and ULEN, 2010) - contractual clauses that stimulate specific conduct can be created, such as, for example, precisely specifying the content the party transferring the technology is required to transfer to the other contracting party, under penalty of prohibitive fines.

When the penalty or duty to compensate is greater than the value obtained from the breach, the promisor will have more of an incentive to meet the obligation.

Some agreements are subject to more information asymmetry than others. Experience shows that Brazilian regulatory intervention, in some cases, has been an important tool in minimizing this negative impact.

When fine-tuning an agreement, the parties only have their own awareness of the situation, with differing and incomplete information about the subject being contracted. This information asymmetry may be negative, in that it makes contracting more difficult, but, in some situations, it may be the very reason for the business or contract, where one party needs the information held by another, and therefore enters into an agreement for the purpose of informational exchange. This is the case with technology transfer agreements (RIBEIRO and GALESKI JUNIOR, 2009).

Besides seeing agreements as a tool deriving from initial cooperation, which should preferably be accompanied by this cooperative attitude throughout its lifetime, agreements cannot be abstracted from the environment in which they are designed, and for which their effects are projected.

Agreements have a prominent role in the New Institutional Economics, since each governance structure retains a form of agents combined, aimed at minimizing transaction costs; in certain circumstances, the agreement may be a governance structure more compatible with the intended attributes of the transaction, by providing greater systemic efficiency, since its function is to facilitate the exchange of goods or services between these agents.

The agreement should conform to its purpose and its logical, ethical, sociological, economic and socio-political content. As such, its schematic and non-schematic format is considered by law as the legal instrument for creating, transferring, and terminating duties in the economic realm. It also has the characteristic of facilitating the movement of goods and services, directing this flow to those most interested in obtaining them, so that the freedom of choice exists to select the party to be contracted, and the freedom to negotiate the terms, at the time those interested agree together (ARAÚJO, 2007).

Zylbersztajn (2005) highlights incompleteness, costs and duration as aspects related to these agreements.

According to Ribeiro and Galeski Junior (2009), the absence of predictability, as a component in applying interventional principles in the agreement, touches on the essence of contract formation, due to limited rationality, which corresponds with the incompleteness aspect referenced by Zylbersztajn (2005). Contractual incompleteness is associated with behavioural assumptions by the contracting parties, namely limited rationality and opportunism, besides the economic, social, demographic, technological and governmental variables that cause constant uncertainty and can motivate opportunism.

Contractual incompleteness complicates agreements, and leads to the creation of *ex ante* safeguards in an attempt to deter breach of contract, and *ex-post* safeguards, after contractual breach occurs. The time variable is also another major factor that will influence agreements.

Despite its limitations, the contract has the peculiarity of being a governance structure that, in certain circumstances, can coordinate business more efficiently, by delimiting an idiosyncratic relationship tailored to the contracting parties, enabling them to meet each other's demands (Williamson, 2002).

This bilateral relationship - the contract - transferred into the analytical unit of a 'transaction', in principle contains conflict, mutuality and order, organized and balanced in the agreement for better understanding the demands of each party, interrelating in a satisfactory and better manner than other governance structures, such as market governance, which may contain the influence of diffuse interests, and not effectively serve the agents' interests by an incentive; another option, vertical integration, may not offer a high degree of satisfaction, by making control so high as to leave the contracting parties dissatisfied. The contractual governance structure is thus an intermediate, hybrid situation that includes features that can meet the interests of agents relating together, within an institutional environment, and can provide order in the transaction.

Besides having the purpose of formalizing and clarifying information and restrictions in order to reconcile the parties, the contractual governance structure also formalizes the chronology, and establishes the continuity of established practices.

Tirole (2009) points out, however, that an incomplete agreement and limited cognitive heuristics will trigger inefficiencies, since individuals within the internal organizational framework do not receive incentives to draft the most complete agreement possible deriving from organizational path dependence, from the strategy of remaining within the organization, and from the incentive itself. All these factors provide for inefficient contracts that may generate hostages and rent-seeking behaviour, thus harming the parties involved.

For McDonald et al. (2004), governance structures have changed significantly since the 1960's. Agreements may significantly reduce a series of risks by permitting common requirements to suit the parties and thus create an environment conducive to reducing transaction costs.

### **3. TECHNOLOGY TRANSFER AGREEMENTS**

According to the Normative Acts document of the National Industrial Property Institute (NIPI), technology transfer broadly includes agreements to assign and license trademarks and patents, to supply unpatented technology, technical assistance and technical services, research and franchise agreements, and others, (VIEGAS, 2007). It is a legal negotiation, whose purpose is to transfer certain intangible property (creations, secrets and software) protected by intellectual property institutes, or technical know-how of a substantive and secret nature, not susceptible of monopolistic protection (ASSAFIM, 2005).

It is a "legal transaction whereby one party undertakes to convey certain know-how applicable to a production process, in return for consideration from the other party" and "for there to be effective transfer of technology, the assimilation of know-how by the recipient is required" (CORRÊA, 2005, p. 96).

Because of its purpose, compensation for noncompliance may be ineffective, and even stimulate opportunism by either party, upon improper appropriation of information by a party, thereby permitting profiteering from unlawful use that is disproportionate in comparison to the damage resulting from the breach. Because of its very nature, the information transmitted may be subject to multiple concurrent uses, and additionally risk the asset holder conveying information, based on the promise of a future contract, which may result in non-payment and even the associated improper disclosure of information to competitors: the market edge may be lost through bad negotiating or breach of contract.

In agreements to assign or license patents, the know-how is already explicit in a record that is public knowledge. Except in cases of shortcomings in the documentation (whether intentional or not), the technology will be described therein, and may be reproduced by the stakeholders, provided they have a license for its use. However, in the hypothetical transfer of technology per se ('know-how'), the technology must be described in a way that can be assimilated by the other party. In this situation, opportunism may prevail.

However, faced with the informational asymmetry between the parties, the agent acquiring the technology possibly may not know whether it really possesses all the information necessary to reproduce the technology, or, after contracting and having

invested heavily in that technology, may discover characteristics that remove or diminish the interest in the technology conveyed.

Opportunism is possible, for example, in the case of exploiting the factual irreversibility of the transfer operation: there is the inability to return to the *status quo ante* of the parties after the technology is released (PRADO, 1997): there is no way to return the information to the party that provided it after it has been conveyed, because the buyer has already assimilated the information. This differs from what occurs with tangible assets, where the object is returned and the price and the parties return to the status quo prior to contracting.

For the transfer of technology to occur, there are normally several components to the transaction and, given the characteristics of the technology, such as its rapid obsolescence, agreements must be made promptly. The Brazilian Innovation Law (Law 10973 of 2004), for example, sought to reduce bureaucracy in the transfer of technology between federal universities and businesses/industries, in order to reduce the effort and transaction costs for the parties. However, one difficulty lies in establishing an environment of trust and cooperation between the parties. This difficulty is experienced by researchers both from public and private universities.

The immediate transfer of information is relatively common among researchers, through publication of articles, for example, or participation in conferences, in order to anticipate other research, and as a mechanism for exchanging research findings on the same theme that are of reciprocal interest. There already exists a marked fear in the business field over the transfer of information and the potential loss of market position.

When agreements extend over time, as in the majority of technology transfer agreements of a business or industrial nature, contractual issues carry greater weight, since the passage of time between contracting and full completion creates additional uncertainties and risks that can discourage exchanges and cooperative actions.

Legal and commercial bureaucracy can also decisively influence negotiations, and setting out clauses relating to the future may lead to questioning the actual usefulness of contracting.

Sometimes the parties are willing to cooperate, but lawyers can complicate contracting, in order to fulfil their duty to protect the client, by requiring clauses of questionable necessity, for example.

Besides the drafting of the agreement, litigation is a factor that increases the cost of transferring technology. The court does not typically possess the technological and marketing information that would be required to resolve the conflict promptly, which increases the risk in any litigation. Thus, even if the party has the right to compensation, for example, it may not necessarily receive it, due to technical shortcomings behind the decision.

The involvement of experts in legal actions is essential, because of the need to produce a technical team to evaluate the technology involved in the claim. This constant presence of experts also greatly increases the cost of proceedings. Small businesses typically cannot compete with larger ones in the technological market and, sometimes, not for lack of technical know-how, but because of a lack of resources to fund the lawsuits that occur over technological competition issues. The fact is

aggravated further when the actions involve international claims. The costs of these claims can hinder the activity of many companies in the technology environment.

Cooperation, especially in relation to the intangible assets associated with know-how, is undoubtedly the best option in terms of efficiency in contracting and in solving possible conflicts.

#### **4. COOPERATION AND NON-COMPLIANCE IN TECHNOLOGY TRANSFER BUSINESS AGREEMENTS**

Often, as seen, the most appropriate solution for a breach of contract situation will not be in the courts, nor in setting damages, by virtue of the impossibility of returning to the *status quo ante* and high litigation costs, coupled with the delay of the Judiciary in resolving conflicts.

These circumstances make cooperation highly appropriate for ensuring the best results. Cooperation in formalizing the contract will enable the drafting of agreements that tend to be more efficient, as will be essential when renegotiating the contractual bases in any hypothetical dispute throughout the agreement period. Renegotiation can replace or modify previously agreed conditions, avoid litigation and reduce costs for both parties.

Such solutions are especially important in technology transfer agreements, since factors can negatively influence the speed and effectiveness of contracting, arising from conduct, rationality limitations, and the intentions of attorneys and businessmen engaged in the negotiation. The parties' predisposition to cooperate permits a more harmonious environment apt to avoiding opportunism in an environment of mutual trust.

As such, the contractual environment cannot be disassociated from the way the transaction is conducted; this may be described as the institutional environment.

The institutions are the rules of the game under which transactions operate, and may be formal or informal in nature (NORTH, 1994). Teaching reciprocity, in Axelrod's thinking (2010), integrates the informal institution environment together with more subjective factors, such as the ethics of a given society. With the legislative apparatus integrating the *formal* institutional environment, creation of a collaborative environment between universities and businesses/industries can be stimulated with a view to increasing trust between the parties and increasing the volume of efficient negotiation between them.

On the other hand, cooperation is stimulated in proportion to the extent that the importance of continuity in transacting future business is promoted. Reciprocal cooperation is stimulated by the fact that parties view future contracting as more beneficial than failing to comply with the present contract. Fear of future retaliation for failure in the present may stimulate a party to cooperate.

One way to make relationships more secure through using the contractual mechanism would be to start by formalizing a general agreement, to address general cooperation issues between the parties from the outset. Later, to the extent that cooperation possibilities have been confirmed, more specific, smaller agreements could be made, to address only issues relating to the new situation. This solution, as

suggested by Axelrod (2010) when he sees decomposition of the subject matter as capable of incentivising cooperation, also appears to solve the problem of one party's lack of motivation, by amply negotiating the contractual terms for each new collaboration. Besides the safety factor, the speed factor would also be solved.

Another way to stimulate cooperation consists in changing the rewards for the parties and making cooperation more advantageous. The savings from not resorting to litigation, and the prospect of early dispute resolution, are indicators that cooperation is the more advantageous alternative.

On the other side, the Brazilian Innovation Act intends universities and companies to come together, and could also promote other facilitators that act as partnership incentives, such as awards, financial resources for ongoing collaboration between researchers and businesses, taxes reductions on company/industry activities that include external research expansion in their objectives, with the establishment of programmes developed in universities, in a clearly cooperative regime.

Reciprocity is an equally important factor in technology transfer agreements. To the extent that cooperation has been successful, the parties will be more likely to cooperate again. However, both parties must act cooperatively, and not just one of them. In this sense, the ability to recognize a partner's past interactions and to remember the positive aspects is also important for further and less costly cooperation in the future, by establishing a truly of stable relationship culture.

In the case of non-cooperation, the solution could to unite know-how with resource control, in a way that makes this fusion at the lowest possible cost. However, this solution only applies where one party holds partial or supplemental information related to an asset, while to the other party retains ownership. In this case, either the party with the information purchases the right to the asset, or the asset owner acquires the information, so that the know-how and control over the resource are brought together.

## **5. METHODOLOGY**

As indicated at the beginning of this work, after presenting some theoretical elements relating to technology transfer agreements, the methodology and results obtained at the analysis stage of this case study will be described.

The technique used for obtaining data was documentary research, and interviews.

The documentary research followed the following schedule: (i) reading the criteria established in the clauses; (ii) surveying relevant points to be analysed; (iii) collating the contractual terms and factors that stimulate cooperation.

As filters, the analysis model used (1) the nature of the contract; (2) clarity in defining duties and rights; (3) clauses inducing cooperation; (4) the existence of contractual adjustment mechanisms, or dispute settlement clauses; (5) potential for litigation.

The interviews were conducted in April 2014 using a standard form with open questions, administered to the representatives of the University and the partner company.

The model sought information on (1) contract renewal intentions during the talks leading up to contracting; (2) concern over potential litigation situations during the contract term; (3) technical or attorneys' input in formulating the contract; (4) existence of prior contracting knowledge or experience (if the parties had related to each other before contracting, or this was the first time they had come together); (5) the parties' knowledge (courses, experience, etc.) in relation to cooperation techniques and components; (6) their perspective on repeat negotiations (i.e. new agreements) on the same bases as those contracted; (7) how the administrative and financial management format of the agreement was established, and if the conditions established generated uncertainty or dispute; (8) whether the information required was successfully divulged by the parties, and if other service provision agreements had been made between them to complement the information divulged; (9) whether the parties considered that the resources required from each other to achieve the purpose of the agreement had duly been provided; (10) the existence of any communication on the licensee's part on the possibility of product improvement, which resulted from communication and the division of costs.

## **6. DISCUSSION AND RESULTS**

The contractual model regulates a partnership between Paraná State University and a metal/mechanics company that produces bio-energy technology aimed at purifying biogas.

### **6.1 The nature of the contract.**

This is a Technology Transfer Agreement granting the right to the commercial use/exploitation of product technology, without exclusivity. More precisely, the product technology in the agreement covers the results of intellectual activity within the university, in the form of the method, process, and alternative technology to purify biogas from anaerobic bio-digestion of organic matter of urban, industrial, and rural origins, with a thermal exchange device to preheat the oxidant.

The agreement states that the development phase for the product technology was concluded at the university, and that the industrial production and commercial exploitation will be made by the company. It defines what the development, production and marketing phases are considered to be.

The licensor stated that it is the intellectual property titleholder of the product technology.

Each contracting party expressly identified the person(s) responsible for contractual performance.

The term of the agreement was set at two years, with express provision for a possible extension.

The agreement was accompanied by the signature of a confidentiality agreement, and elected to make registration optional with the administrative authority (the National Industrial Property Institute [NIPI]); under Brazilian law, however, for the agreement to take effect with regard to third parties, registration is required.

### **6.2. Clarity in defining duties and rights**

The agreement emphasizes the parties' duty of professional secrecy concerning the intellectual property, including technical information or industrial or trade secrets relating to the subject of the contract; it was accompanied by a signed confidentiality agreement.

The assignment of the right of use is signed non-exclusively on the licensor's part, with the licensee unable to subcontract companies for marketing without the licensor's consent.

The agreement establishes that the university retains the administrative and financial management of funds derived under the agreement, while the company has the administrative and financial management of funds derived from the production and commercialization of the product technology that is the subject of the agreement. It enables dissemination, for scientific and academic purposes, of scientific information related to the research that gave rise to it, while ensuring that such disclosure does not affect the licensor's trade secrets.

### 6.3. Clauses inducing cooperation

As described earlier, Axelrod (2010) envisions some factors associated with cooperation, of which we highlighted (i) the vision of a future relative to the transaction in which the prospect of future gain exceeds present profitability; (ii) breaking down actions so as to facilitate cooperation; (iii) reward differentials based on an cooperative or uncooperative attitude; (iv) reciprocity; (v) recognition of past interaction; (vi) teaching reciprocity.

The agreement model provides that the parties undertake to provide the information necessary for production viability, for marketing and for control over cash flow, along with commitments to professional secrecy and confidentiality.

It determines that the licensor and licensee shall use their best endeavours to achieve the contractual objectives, as well as provide the required information regarding product technology.

It envisages that the licensee may request technical and scientific consulting support relating to the subject of the agreement from the licensor, through a service provision agreement. This clause opens the possibility of further negotiations between the parties in the interests of the licensee and licensor. For the licensor, it envisages the potential for signing new agreements that will lead to new services provision contracts, to provide technical and scientific consulting support in using the technology developed by the licensor. On the other hand, by determining that, if required, the licensee has the right to obtain the necessary support, given the informational asymmetry between the parties, it provides the licensee the security of being able to rely on the due support. The agreement only provides general sanctions for breach of contract in this case.

The agreement refers to the licensor's offer of innovations that may interest the licensee, the details of which are also conditional on drafting an addendum

It envisages the licensee making the investments necessary for producing and marketing the technology product, and providing financial reports. Since the contracting parties' compensation relies on marketing the goods produced from the technology transferred under the agreement, the prospect of preserving or renewing the agreement stimulates cooperative behaviour, in which the future prospects outweigh

any benefit associated with contractual complications, or termination. By assigning the same commitment level to both contracting parties, the agreement honours the principle of reciprocity.

It establishes control mechanisms for the benefit of the licensor, so that it can monitor trading volumes, which will be reflected in its compensation calculations. The licensor may perform an independent audit at any time, to monitor the licensee's fulfilment of obligations.

It provides that, in the event of any disparity when analysing the commercial reports, an expert technical survey shall be performed, the cost of which shall be divided between the parties. This shared cost prognosis may act as a deterrent to abusive conduct, since the party submitting the reports (the licensee) will know in advance that, in the case of the licensor disagreeing, it will be obliged to share the costs for conducting the investigation, which may stimulate it to act correctly in writing the reports. On the other hand, when considering undertaking technical work, the licensor will also bear the cost incidence in mind, and avoid unjustifiable demands on the party who has the authority to perform audit activities.

The term of the agreement is two years, with extension thereof being possible. In this contractual model, therefore, the idea of inducing cooperation throughout the agreement term is less relevant than future prospects derived from additional provisions, such as those of performing additional work, of interest to both parties, or, looking to the future, new agreements with further potential gains for both. The prospect of contracting in the future is corroborated by the interview responses provided.

The model sets out the communication between the licensee and the licensor concerning possible product improvements, without indicating who will bear the costs required for these adaptations or improvements. In the same clause setting the licensee's obligations, obtaining the licensor's formal authorization is required prior to making modifications or adjustments, again with the costing omitted. Another item in the same clause, however, expressly provides that the licensee shall bear the transport, and board and lodging expenses for the researcher and technical team for technical consultancy work *in situ*, when requested,. The uncertainty about adaptation costs, in a systematic in which other potential costs are specifically allocated is a potential source of dispute. Depending on the business environment, this omission may lead to talks conducted under an authority (such as a judge or arbitrator), or may foster a readjustment between the parties. In the latter, the contracting parties may decide, for example, on allocating additional costs in the best way for both parties, an alternative whose success depends on an existing cooperative environment.

The agreement ensures that any intellectual property rights potentially arising under the agreement shall be shared between the parties, and be subject to an addendum. The guarantee of sharing the fruits of innovation throughout contractual performance tends to stimulate the pursuit of innovation, by promising a share in the profits. The deferral of control over new rights that arise to an addendum again reveals the willingness to accept an incomplete agreement that defers control over related rights to new agreements, the content of which will be prepared at a future point in time, if required.

The agreement is accompanied by a confidentiality agreement signed by the company, for the university's benefit. The signatory undertakes not to disclose the results of the research, nor to use or permit others to use the result of intellectual activity generated by the University without its consent. As regards the penalty for noncompliance, the document refers generically to potential effects of a civil, criminal, and administrative order, which moves away from agreeing on a more efficient option in this area, since provision for stricter sanctions for noncompliance tends to be a more appropriate instrument for deterring undesired conduct. However, as indicated in the interviews conducted, the fully cooperative environment established between the parties was sufficient to keep the company's conduct compliant with the University's best interests.

Even though some contractual clauses referred to confidentiality, a separate non-disclosure agreement was signed. The option of preparing and signing an actual and more specific agreement might lead to the conclusion that both documents were the subject of separate discussions, which would fit the hypothetical dismembering of the subject of negotiations, for ease of understanding, in the way pointed out by Axelrod.

In this same sense, the model analysed envisages that services not expressly described in the agreement may potentially be requested of the licensor, and that these will be the subject of a separate agreement. Opting to separate the latter helps to finalize the terms of the main contract, avoiding it becoming too extensive or costly in trying to control every circumstance that may be associated with the negotiations.

Concerning reward differentials in relation to cooperative or non-cooperative attitudes, it may be concluded that extending the agreement term is confirmed as the compensation for the licensee's full contractual performance.

The interviews highlighted that the agreement examined had only been possible because of the components of recognising the parties' reputation, and teaching reciprocity.

In considering the clauses closest to the instrument of cooperation discussed by Axelrod, the existence of contractual adjustment mechanisms will be analysed.

#### 6.4 Contractual adjustment mechanisms or dispute settlement clauses

In the event of disputes arising as to the ownership of rights negotiated, the agreement stipulates that strategies will be decided by mutual agreement.

The agreement identifies that the trading prices, taken as the basis for setting the licensor's compensation, may hypothetically be subject to changes based on the market value of the assets, and opens the possibility of prices being adjusted during the contract term. The next clause quantifies the estimated value for these assets.

Given the impossibility of perfectly drafting agreements, considering that the effects of agreements drafted from the model studied tend to extend over time, and considering that the assets produced will be subject to sale on the market and the prices set may vary in accordance with supply and demand in relation to the assets, prior contractual definition through a price renegotiation clause is extremely appropriate, permitting the parties to know *ex-ante* that the prices (which will impact the licensor's

compensation) are merely suggestive, in that they will be defined by the market at the time of being made available, or commercialized.

There is provision for the jurisdiction of the local courts of the University campus, and no arbitration clause.

## 6.5 Potential for litigation

Analysis of the model confirmed that the business characteristics involved in technology transfer favour a particularly clear definition of the parameters of parties' rights under the agreement. Moreover, the contractual provision to transfer university-developed know-how (called product technology), to be marketed commercially, causes the situation already commented on in this study to arise - that the transfer of technology developed will entail access to know-how that cannot be removed from the licensee at the end of the agreement. The latter can only be restricted from continuing to produce and sell the asset pursuant to the existing signed agreement and the risk of sanctions being applied.

The agreement establishes a hypothetical termination by operation of law upon agreement between the parties, with sixty days' advance notice sufficing; it also envisages termination for breach of contract, provided the other party has been given the opportunity to correct or justify this. The licensee's bankruptcy, reorganization, or liquidation are also causes for termination.

In contrast, the agreement ensures that the licensee may terminate the agreement without any formality or requirement in the event that the product or patent contracted is technically or economically unviable.

The licensor already has the security of the right to receive royalties, based on the monthly average of products marketed, if the licensee fails to comply with obligations assumed by stopping commercial exploitation of the technology.

It may be observed that the agreement usually refers to *product technology* when defining its scope, but uses the phrase '*technological package*' in one of its clauses. As the model only defines '*product technology*', the existence of another expression generates a potential source of dispute between the parties, if either has an interest in pursuing another interpretation, in the sense of the two phrases having different meanings and producing different expectations.

The agreement establishes a condition of non-exclusivity in the technology transfer, which enables the university to operate with other partners in exploiting the same product technology. Note that there is no contractual provision regarding exclusivity on the part of the company, which could lead to the conclusion that it can freely contract to obtain other product technologies to produce and market other products, even in the same product technology branch as that contracted. This conclusion may be considered a potential source of litigation.

Among aspects at greatest risk of litigation between the parties arising under the agreement, clauses stand out which provide for the university to manage funds administratively and financially, and the company to manage those arising from the production and marketing of product technology. This clause allocates competence for administrative and financial fund management (generally) arising under the contract, from the technology transfer therefore, to the university, while allocating the administrative and financial competence over resources from producing and marketing

the product technology to the company. At the same time, the parties' compensation is set at percentages on the sale of goods produced that are based on the technology transferred. As the university has general competency for resource management under the agreement, it would be possible to conclude that this would encompass resources the management of which is reserved to the company, since these also arise under the agreement. However, the interview conducted revealed that, until the actual contractual performance stage (where the equipment was in the process of being marketed) the parties did not consider there was any error in the text since, in their understanding regarding the division of management, the researcher said there was no incongruity in the given clause, since the university was managing its part, with the entrepreneur taking care of the other area and business activities.

## 6.6 Analysis of the interview results

From the questions asked, the interview made some additional information possible, which the researchers deemed helpful in preparing the conclusions of this work.

Besides those components already anticipated in the previous sections, it may be gleaned from the interviews that in relation to cooperation assumptions, reputation was the factor that brought the company and the university together. This was due to two factors. The first was the pre-existing relationship network between the entrepreneur and University professors. This network was strengthened by coming together through activities coordinated by the municipality's business association. Within the association environment, both businesses and researchers share issues and needs. Researchers have the opportunity to discuss local business expectations and needs with other researchers from related fields. From coming together, it becomes possible to sign technology development agreements jointly. The second most strategic factor is that it consequentially attracts partners and dissemination of university activities at fairs, seminars and events to publicize research and innovation developments, which provide a link between town and gown.

The contractual model analysed was the fruit of these two actions.

The reciprocity factor is essential for each party, particularly since the leading researcher had difficulty finding any other company interested in marketing its product, and the entrepreneur did not even work in gas purification, with its activity restricted to producing and marketing products related to engine resistance arising from wear and tear caused by the hydrogen sulphide existing in bio-gas. The filter developed by the university came to solve the problem relating to fuel purification.

With regard to the future perspective factor, the parties confirmed their interest in continuing the business relationship. The entrepreneur said that the asset is currently almost ready for commercialization, after a maturation process that began after signature of the contract. The prototype equipment derived from the research conducted by the University showed the need for a series of adjustments that have been performed over almost thirty-four months.

Representing the university, the researcher emphasized interest in continuing the partnership, since the receipt of *royalties* may effectively begin in the coming months.

The initial term of the agreement has already been extended by amendment, and may be renewed up to a period of 15 years, at which time the exclusivity period on the industrial property will be expiring, and the technology will become part of the public domain.

Both parties consider themselves cooperative, and there was never any concern over possible disputes between the contracting parties; this was enhanced by the fact that the entrepreneur had been a student of the master's program at the university, and knew the intricacies of this academic environment.

The reputation factor can also be identified in the fact that the entrepreneur and researcher already enjoyed a strong relationship before the agreement was signed. They affirmed that the parties would have not completed the negotiation that led to the contract if this strong relationship had not been consolidated.

The final wording of the agreement was derived from the rounds of negotiations, a strategy that minimized opportunistic actions through the frequent interaction, and the professionalism both parties displayed.

The basic draft of the agreement was prepared by the researcher, who passed it on to the entrepreneur, who then tailored it to his needs. The entrepreneur said that the model was not specifically analysed by any attorney or other technical staff. As for the final model, this was reviewed by university lawyers, who left the document almost unaffected. According to the researcher, preserving the draft consensually created by the parties was a factor in the success of the contract.

With regard to shared management, the researcher believes there is no inconsistency in the wording of the provisions governing it, since the university manages its side of the management and the entrepreneur handles the other field- and business activities.

Both parties have an interest in repeating the contract, and consider the relationship to have improved significantly, so that the partnership is well cemented. The learning factor is also highlighted, since those interviewed affirm that both sides gained knowledge from the process.

When requested, the researcher promptly met the entrepreneur's requirements, as did the entrepreneur in investing in the technology developed to achieve market conditions. The costs for new investment have been borne by the entrepreneur and the university, with the university repaying the scholarship assistant who is helping to develop the equipment manual.

## **7. CONCLUSION**

Through the Economic Analysis of Agreements, it is possible to identify contractual and institutional solutions aimed at improving business relations and enabling a reduction in transaction costs, thus ensuring greater market efficiency.

The solution usually provided by law for breach of contractual obligations, by way of compensation, does not always prove an effective tool to deter the opportunism that the contracting parties may adopt.

Cooperation between parties is a method to be considered for its efficiency, especially if it will permit the settlement of disputes that may arise during the agreement period in the most appropriate manner for all involved, and also deter attitudes of

opportunism, in the sense that those who cooperate keep in mind the creation of new agreements and maintenance of steady and profitable economic ties.

An entrepreneur will choose to enter into relational agreements when it considers that the costs of this form of governance are more attractive than pursuing partners in the market, or absorbing all steps related to production and marketing by vertical integration.

The Law will have a secondary role, to the extent that the parties themselves will fulfil the obligations applicable to them, since the agreement expresses the parties' wills and is instrumental in harmonizing their interests. In the event of disagreement throughout the contract term, it may provide planned options for conflicts resolution, by providing inductive renegotiation and adjustment clauses in preference to taking legal action.

In the specific case of technology transfer agreements, this paper seeks to demonstrate that the solutions mentioned tend to be highly pertinent because of the peculiarities of these agreements, considering that the subject matter consists of intangible property. For these agreements, compensation will rarely be the most efficient solution, since: 1) one of the parties may lose the market edge, having lost both the technology (the intangible property) and also the value of contracting through erroneous negotiations; 2) returning to the *status quo ante* is impossible, since once the technology has been passed on, it will be absorbed by the other party; 3) the cost of legal actions over these issues is particularly high, mostly because they will depend on technical investigations; 4) the delay in resolving conflicts brought before the Judiciary is incompatible with the rapid evolution of technology, which may render moot any delayed recognition of rights.

The case study corroborated the hypotheses formulated, demonstrating that cooperation, if present at the time of contract formation, and in any crises during fulfilment thereof, avoids litigation and increases the amount of interaction in transferring technology.

In parallel, the case study shows that the elements stimulating cooperation are present in the content of the agreement signed, which is especially relevant for technology transfer agreements. Additionally, some solutions may be highlighted as encouraging cooperation between the parties for effective business agreements to transfer technology, since the prospect of extending the business relationship, the strategies of reciprocity, the environment of good repute of the parties, and the existence of clauses open to contractual adjustments together corroborate contractual efficiency, thereby avoiding litigation.

Finally, the product technology developed by the university was subject to improvements prior to marketing the final equipment, improvements that were implemented consensually. It may be noted, for a better understanding of the limits of the actual conclusion of this study that the parties are in the phase prior to marketing and profit sharing.

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