

## WHY DO SOME JOINT R&D PROJECTS FAIL TO BE IMPLEMENTED? A PROPERTY RIGHTS VIEW<sup>1</sup>

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### Abstract

Over the past few years, there has been a significant increase in the relevance attributed to knowledge. This has led to a major shift in the organizational paradigm of R&D&E activities, which have increasingly become important constituents of open systems (CHESBROUGH, 2003; FOSS, 2005). This means that companies no longer compete with each other, but rather, with various complex systems of production based on the interactions between firms, such as networks (THORELLI, 1986; POWELL, 1990), alliances, (STUART, 1998; BAKER; GIBBONS; MURPHY, 2002), joint ventures and others. Despite this, one can reasonably assume that the amount of idealized R&D&E partnership projects exceeds the large number of partnerships found; given that not all of them are actually implemented. Thus, in this study, we seek to understand why some partnerships projects for R&D&E between firms fail to be implemented, restricting the analytical scope of this study exclusively to projects that were ready to be actually implemented, but were not. By addressing this issue from the perspective of the Theory of Property Rights (TPR) of Barzel (1997), we formulate a conceptual hypothesis regarding the motivations that would lead firms to abandon the implementation of some R&D&E partnership projects.

**Key words:** *property rights, partnership, co-specialization*

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## **WHY DO SOME JOINT R&D PROJECTS FAIL TO BE IMPLEMENTED? A PROPERTY RIGHTS VIEW**

### **1. INTRODUCTION**

Over the past few years, there has been a significant increase in the relevance attributed to knowledge, whether by politicians, the press or even by international organizations (FOSS, 2005). Nevertheless, it is in the scientific sphere of management that such relevance acquires an even more pronounced expressiveness (HALAL; TAYLOR, 1998; DRUCKER, 1999), both in the strategic field (GRANT, 1996; BROWN; EISENHARDT, 1998) and in the organizational field (BROWN; DUGUID, 2002). In practical terms, this is verified through a growing importance of human capital, intangible assets and scientific knowledge in the companies (FOSS, 2005).

According to authors such as Nicolai Foss (2005), this trend would have been driven mainly by the rapid growth that was observed especially in the 90s, in relation to investments in information technology and the development of communication systems. This statement becomes evident when considering aspects such as the rapid dissemination of e-commerce and the surge in the number of Internet hosts (FOSS, 2005).

Therefore, it is important to note the changes in the organizational standards of research, development and engineering (R&D&E) as important inducers of this process (KLEIN, 2001; FOSS, 2005), since knowledge is a crucial input inherent in the R&D&E activities.

It is worth noting, therefore, that what was observed in this sense was a considerable structural transformation relating to the organizational processes, the firm “boundaries” and the labor relations, to follow the endless search for knowledge of the companies along with their various sources, whether their suppliers, customers, other firms, or even universities (FOSS, 2005).

This led to a major shift in the organizational paradigm of R&D&E activities, which increasingly stopped integrating closed innovation systems; gradually becoming important constituents of open systems (CHESBROUGH, 2003; FOSS, 2005).

Given this scenario, what can be seen is a major shift in the competitive paradigm of organizations, increasingly configured by the replacement of the competitive pressures among companies by those that occur among the various complex systems of production organization based on the interactions between firms. As an example, we can mention the networks of companies (THORELLI, 1986; POWELL, 1990), alliances, (STUART, 1998; BAKER; GIBBONS; MURPHY, 2002), joint ventures, among other coordination mechanisms that characterize the relationships between the components of an economic system based on the new competitive model.

In this context, it can be inferred that the establishment of partnerships and alliances between firms acquires an essential character to maintain the competitiveness of each one of the companies. This becomes even more significant in the case of R&D&E partnerships, because it is through innovation that companies can differentiate their products, and therefore, they are able to obtain competitive advantage.

This is why the market values these partnerships so much. According to a study conducted in 200 companies and published in Sloan Management Review in 2001, the shares

of global companies experienced an average appreciation of 1% after each announcement of strategic alliance. After all, according to a survey conducted by Booz-Allen & Hamilton in 1997, the profitability of companies with great success in forming alliances outperformed, by 9 percentage points on average, the profitability of other firms.

However, one can reasonably assume that the amount of idealized R&D&E partnership projects exceeds the large number of partnerships found; given that not all of them are actually implemented. Thus, this study aims to answer the following research problem: *why are some partnership projects for R&D&E between firms not implemented?*

Although there may be numerous factors that would lead companies to abandon the implementation of some projects and partnerships for R&D&E, including economic, financial or political restrictions, or even the lack of skills and difficulties in finding partners; we intend to restrict the analytical scope of this study exclusively to projects that were ready to be actually implemented, but were not.

Therefore, this study will address this issue exclusively based on the Theory of the Firm (COASE, 1937), from the perspective of the Theory of Property Rights (TPR) of Barzel (1997), although other reasons could lead companies not to perform some of the idealized partnerships for R&D&E.

With regard to the restriction of the analytical scope of this study, it is worth noting the fact that this study does not intend to provide explanations regarding R&D&E partnership projects executed between companies and universities, but rather, those that should occur only between firms.

Thus, this study, which is conceptual in nature, is structured into 5 sections, in addition to this introduction. The discussion begins with the introduction of the Theory of Property Rights (TPR) of Barzel (1997), considering that it is based on this theory that we develop the rest of the discussion presented in this paper. In the following section, we present the relationship between the definition of property rights and the incentives of agents to make joint investments, such as those that characterize partnerships between firms for R&D&E.

Nevertheless, as argued in section four, some of the characteristics inherent to the R&D&E processes hinder the definition of property rights, and as a result, they turn the analysis of these incentives into a bargaining problem.

Based on this theoretical discussion, we formulate a conceptual hypothesis regarding the motivations that would lead firms to abandon the implementation of some R&D&E partnership projects, from the perspective of the theories studied. Finally, this study is concluded with some final comments.

## **2. BARZEL'S THEORY OF PROPERTY RIGHTS**

As previously stated, we intend to address the research problem proposed in this study based on the Theory of the Firm (COASE, 1937), from the perspective of the Theory of Property Rights (TPR) of Barzel (1997). For this reason, it is necessary to start the discussion by introducing this theory, as described in this section.

The Theory of Property Rights (TPR) of Barzel (1997) falls within the economic dimension of the analysis of property rights. This conceptual line is based on the argument that transactions involve the exchange of property rights on assets rather than the exchange of goods per se (BARZEL, 1997).

Thus, according to Barzel (1997), the goods would consist of a set of attributes, and therefore, the transactions would involve the exchange of property rights on these attributes.

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In other words, according to Barzel (1997), the transaction of a given commodity or asset consists of the exchange of the set of property rights that compose it.

It is important to point out the fact that this concept acquires fundamental importance for the development of this study, because in this case, although the transaction of a commodity or asset in particular is not the object of analysis, we analyze the R&D&E partnership projects based on the set of attributes involved in these projects, to the detriment of a more generalized view of them.

Going further in this direction, in *The Economic Analysis of Property Rights*, Barzel (1997) develops a deep analysis of such logic by classifying property rights. For this, the author proposes three important distinctions, consisting of concepts of legal property rights, economic property rights and public domain.

Thus, the argument of Barzel (1997) starts from the definition of the term “property rights”. According to the author, the term carries two distinct meanings in the literature and in the Economic Theory. The development of the first of these categories, according to Barzel (1997), occurred from the contributions of Alchian (1965, 1987) and Cheung (1969), and is related to the ability of the economic agents to enjoy their piece of property. The second, much more prevalent and much older, is essentially what the state assigns to the economic agents.

The latter definition, Barzel (1997) designated as the legal property rights. In other words, as argued by Barzel (1997), legal property rights would be related to the ownership of an attribute or an asset, which is guaranteed by the enforcement of the state. For this reason, legal property rights would be closely related to the ability of the states to ensure and protect the ownership of assets or attributes, so that it is necessarily assigned to the agent who made the investment required for its acquisition.

In other words, legal property rights would be ensured through a whole institutional framework, that is, through the formal and informal “game rules” (NORTH, 1990), which certifies that the ownership of the assets and attributes is allocated to the agent that acquired them.

On the other hand, economic property rights, as designated by Barzel (1997), would be related to the other meaning of the term “property rights”; that is, with the notion that property rights relate to the ability of the economic agents, in expected terms, to consume the good or the attribute. That is, unlike the legal property rights, the economic property rights do not relate to the ability of the state to ensure the ownership of the asset, but rather<sup>2</sup>, the ability of the economic agent to verify that the potential rent is held by the holder of the resource (KIM; MAHONEY, 2007).

In this regard, it is interesting to note the statement of Barzel (1997) that “according to this definition [of economic property rights], an individual has fewer rights over a commodity that is prone to theft or restrictions on its exchange” (BARZEL, 1997, p.3). That is, since property rights relate to the economic agents’ ability to consume goods, theft or commercial restriction would prevent such consumption, although the state continues to ensure that its property is attributed to the original owner of the asset.

To facilitate the understanding of this logic, as well as the distinction between the two categories of property rights, it is important to present the practical example below. Let us assume that a certain agent acquires a vehicle. In this case, firstly, the agent will make the

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<sup>2</sup> Authors such as Zylbersztajn (2007) and Caleman; Zylbersztajn (2011) tend to assign the enforcement of economic property rights to private mechanisms.

registration of that vehicle with the state. This, in turn, will provide a document guaranteeing him the ownership of the vehicle. This document represents the legal property rights as defined by Barzel (1997). That is, it represents the state's ability to ensure the ownership of the asset, in this case, the vehicle, to whom purchased it.

After registering the vehicle, the buyer can then enjoy its car, using it as a means of transportation. Such use is the concept of Barzel (1997) with regard to the economic property rights.

However, let us suppose that this agent had its vehicle stolen. In this case, the thief would not have acquired the legal property rights over the car, since the state would continue ensuring the ownership of the vehicle to its original owner, that is, the holder of the registration. In other words, the legal property rights would not be changed.

On the other hand, since the original owner of the vehicle can no longer enjoy it, it can be said that the thief would have acquired (or stolen) its economic property rights over the car. That is, since the thief is making use of the vehicle, instead of the original owner, the thief would have acquired the economic property rights and, therefore, the agent who had its car stolen would only have the legal property rights.

This justifies the statement previously presented Barzel (1997), that agents have fewer (economic) rights on goods subject to theft or commercial restrictions; since they would not present the guarantee that the rent or consumption of the commodity would be held by the holder of the resource or asset (KIM; MAHONEY, 2007).

In addition to the distinction of the legal and economic property rights, Barzel (1997) presents an interesting discussion regarding the ability of economic agents to define property rights, especially the economic property rights. In this sense, according to Barzel (1997), the perfect definition of property rights would depend on the provision of full information about all the attributes that make up the property and that are endowed with some value, either by the owner of the asset or others individuals.

However, as the author points out, the access to such information would not be free in the real world, because the high costs of information would result in transaction costs, which in turn, would be associated with the protection and transfer of property rights (BARZEL, 1997, 2005).

As a result, it would not be possible to define property rights in a complete and perfect manner. This is due to the fact that for their value, some of the attributes of assets transacted present high measurement costs (BARZEL, 1982, 1997), that is, significant costs associated with the access to information, whether in relation to the quality of the attributes or in relation to their value. Consequently, the value of the attributes of these assets would not be fully known by their current or potential owners.

According to Barzel (1997), it implies that high measurement costs, in relation to the value of the attributes, would lead agents to maintain the property rights over them poorly defined. That would be equivalent to the positioning of the asset or some of its attributes in public domain (BARZEL, 1997).

In simple terms, assets or attributes will be in public domain when the cost to define the legal or economic property rights is too high in relation to the economic value of the assets or attributes involved (BARZEL, 1997); that is, in contexts where there is an extremely high cost to exclude the use of the asset or the attributes, in relation to its value.

Therefore, one can define that an attribute or asset is in public domain when there is no definition of property rights over it. As a consequence, there would be uncertainty and insecurity with respect to the ability of an agent to capture the economic rent from an asset or

attribute that is in public domain; since its ownership would not be ensured by the state, nor would the economic agents be able to ensure, through private mechanisms, their ability to own it.

For this reason, authors such as Barzel (1997) argue that some attributes of assets would always be in the public domain and, therefore, some transactions would always involve the dissipation of value, if the transaction costs are positive. Thus, it is possible to schematically synthesize the argumentation presented in this section through figure 1, below, where the outer rectangle represents the entire asset.



**Figure 1 – Schematic representation of the definition of property rights over a set of attributes<sup>3</sup>.**  
SOURCE: Based on Barzel (1997); Zylbersztajn (2007) and Caleman; Zylbersztajn (2011).

That is, figure 1 illustrates, quite simply, the fact that the assets would consist of sets of attributes, over which legal and economic property rights would be defined. However, some attributes would remain in the public domain, to the extent that the cost to define the legal and economic property rights would exceed the potential value of such attributes. As a result, from the perspective of the set of attributes, a good or asset would present legal and economic property rights, although a portion of it would remain in the public domain.

### **3. PROPERTY RIGHTS, STRATEGIC RESOURCES AND JOINT INVESTMENTS**

Based on Barzel's (1997) definitions of legal and economic property rights and public domain, an interesting theoretical discussion is raised with regard to the incentives that would lead the economic agents to make investments intended for value creation, especially in the context of cooperation between companies.

In this debate, the contribution of Kim and Mahoney (2007) stands out, in which the concepts underlying TPR are applied to the Resource-Based approach (RBT). With a different focus in comparison to TPR, the RBT advocates that it is the possession of strategic resources by firms that is the main source of competitive advantage; as this approach is characterized by a vision focused on factor market, to the detriment of the product market.

Therefore, Kim and Mahoney (2007) bring back the theoretical contributions of the various authors who advocate in favor of RBT, such as Rumelt (1984), Wernerfelt (1984), Barney (1991) and Peteraf (1993), by resuming the logic that strategic resources, which give rise to the competitive advantages of companies, would be valuable, rare, inimitable and non-substitutable.

Such definition, translated into the language of the TPR, would mean that the competitive advantages of the companies, that is, their ability to outperform competitors with regard to value creation (BARNEY, 1991), would be achieved through the possession of (legal and economic) property rights over the strategic resources (KIM; MAHONEY, 2007).

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<sup>3</sup> Generic representation. For an interesting discussion concerning ratios of legal and economic property rights and public domain, that is, in relation to the areas of the rectangles related to these variables, see Zylbersztajn (2007) and Caleman; Zylbersztajn (2011).

Despite this translation, Kim and Mahoney (2007) support the argument that the RBT implicitly assumes that the property rights that firms hold over strategic resources would be perfectly well defined. That would mean that all the value generated by the company through the ownership of strategic resources would be appropriated by the firm, without any dissipation of rent, since no attribute would remain in the public domain, as defined by Barzel (1997).

However, according to Kim and Mahoney (2007), in the real world, characterized by the presence of positive transaction costs (COASE, 1937), this assumption of the RBT, albeit implicit, would become heroic. This statement is basically a reinterpretation of the logic of Barzel (1997), presented in the previous section, which admits that the existence of transaction costs would prevent the perfect definition of property rights, and as a result, some attributes would always be in the public domain. This means that a portion of the rent generated would be always dissipated.

Now, this idea fits perfectly in the logic of the study conducted by Penrose (1959), precursor of the RBT, who argues that it is the use of resources that would provide the companies the much desired income, and not just their ownership. That is, from the perspective of Barzel's TPR (1997), what Penrose (1959) advocates is that having the legal property rights is not enough for firms to obtain income, but rather, its combination with the definition of the legal property rights<sup>4</sup>. However, what is actually observed is a trend of RBT to analyze the ownership of strategic resources itself, rather than its use; according to the original proposition of Penrose (1959).

Based on this logic, Kim and Mahoney (2007) introduced the concept that the generation (potential rent) and the appropriation of rent (real rent) would constitute two distinct processes, in the contexts where transaction costs are positive. While the generation of value would be properly explained and understood in light of the RBT, the same could not be said in relation to its ownership. This is due to the fact that transaction costs, as previously discussed, would prevent the perfect definition of property rights and as a result, a portion of the rent would be dissipated.

With that in mind, what Kim and Mahoney (2007) propose is that firms need to develop mechanisms to ensure that rents are appropriated by the companies that actually have a hold of the combination of resources that generate them, because otherwise firms would not have incentives to perform the economic activity. This is due to the fact that when the income is not allocated to the firm that owns the strategic resources, to the limit, it would cost more than the benefit obtained, which would not justify its operation.

That is, in other words, Kim and Mahoney (2007) argue that the economic agents would only have incentives to invest in the creation of value if the economic property rights are also well defined, as this would be the only way to ensure that the potential rent would be allocated to the holder of the resource that generated it (and thus, the owner of the legal property rights). The main implication is that “the (expected) distribution of economic rents among resource providers ex post has important implications for value-creation activities ex ante” (KIM; MAHONEY, 2007, p.23).

This acquires an even greater significance if we consider the contexts in which companies make joint investments, because in this case the value creation should occur through the combination of strategic resources of both (or more) parties. Thus, if the

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<sup>4</sup> This does not mean that legal property rights are not relevant or that they are less important than the economic property rights, but rather that both categories are necessary to ensure rent.

economic property rights are not well defined, there will be no guarantee that the rents generated ex post will be allocated to the original owner of the resource (ex ante). As a result, the agents would not have incentives to make such joint investments.

In the context of this study, therefore, this implication becomes quite relevant, since partnerships between firms for R&D&E constitute joint investments, and therefore, one can generalize the logic of Kim and Mahoney (2007) by stating that partners would only have incentives to enter into a partnership if they were able to adequately define the economic property rights. However, as will be described below, there are some peculiarities inherent to R&D&E that would lead to an increased complexity of this process.

#### **4. PARTNERSHIPS FOR R&D&E, CREATION AND APPROPRIATION OF VALUE**

As argued in the previous section, the incentives (ex ante) for economic agents to make joint investments, such as in the case of partnerships between firms for R&D&E will be determined by their ability to define property rights (especially the economic property rights); because it is from this definition that companies ensure that the rents generated (ex post) will be allocated to the original owners of the resources required for such (KIM; MAHONEY, 2007).

That is, until this section, what was argued is that the process of value creation, widely debated in the sphere of strategic management, would occur from the grouping or the combination of a set of strategic resources in the context of firms; under the perspective of RBT.

However, as it was observed, the main innovation introduced by Kim and Mahoney (2007) is the idea that in a real world characterized by the presence of positive transaction costs, there would be an important distinction in relation to the processes of generation and appropriation of value. While such scenario would not invalidate the logic of value creation advocated by the RBT, it is in the process of appropriation of value that it requires more attention, since transaction costs would lead to the dissipation of rent and therefore not all the value created would be appropriated by the firm.

Given this important distinction, the process of value creation would no longer be in the central focus of the debate, which would be filled by the logic of appropriation of rents; that is, by the remuneration mechanisms of strategic resources, to ensure that the value created is allocated to the original owners of these resources.

It is in this context that the discussion held by Lippman and Rumelt (2003) becomes relevant, as they have deepened the debate about the remuneration of strategic resources, or in the terms of Kim and Mahoney (2007), the appropriation of the rent generated. Therefore, the authors begin their argument by exposing that in an ideal world, free of transaction costs, the resources would be paid proportionally and identical to their marginal contribution for value creation. That is, in this scenario, the remuneration of the resources (or the price paid for them) would equal their marginal productivity (contribution of the resource) and postulated by the Neoclassical Economic Theory.

However, it is important to note that the assumption underlying neoclassical logic of compensation of resources is that its supply would be perfectly elastic; that is, that there would be no restrictions on the availability of each resource. For this reason, in the case of strategic resources, which lead firms to gain competitive advantages, such assumption is mitigated; because, as already discussed, these resources are valuable, rare, inimitable and



non-substitutable (RUMELT, 1984; WERNERFELT, 1984; BARNEY, 1991; PETERAF, 1993). This means that their supply would tend to be inelastic, unlike that of other resources.

Therefore, Lippman and Rumelt (2003) suggest that the remuneration of strategic resources should be established in a different manner with respect to the other resources. In this regard, the authors argue that it is precisely the lack of strategic resources that requires them to receive an additional payment, in addition to the payment that would be allocated to them if they were not strategic.

Going further in this direction, Lippman and Rumelt (2003) argue that in a relationship between agents in a value chain, is the holder of the scarce resource who should receive such remuneration. However, according to the discussion previously presented, such logic requires that property rights, especially economic property rights, are well defined (KIM; MAHONEY, 2007). It is for this reason that Lippman and Rumelt (2003) argue that the additional remuneration for the strategic resources will occur in a trivial manner in the contexts in which agents are able to determine precisely what these resources are and to whom they belong.

To clarify the understanding of this idea, the authors present the following practical example: suppose that a certain individual rents a property to produce sunflowers. *Ceteris paribus*, it is reasonable to assume that its productivity would be equivalent to that of other producers in the region who use inputs and resources of the same kind. However, suppose that the individual adds to its production an innovation, for example, a differentiated knowledge, which allows an increase in productivity. In this case, it is the individual himself who must be remunerated in excess for this strategic resource.

In contrast, suppose that the innovation has not occurred through the individual's knowledge, but the discovery of some attribute of the land that would allow the productivity to be increased. In this case, it is the landowner who must be remunerated in excess of this strategic resource.

Finally, suppose that the innovation is generated either by a specific knowledge of the farmer regarding this land and by a peculiarity of the land, specifically the production of sunflowers; and as a result, productivity is increased. How each one of the parties should be remunerated? How could we share the surplus?

It is based on this idea that Lippman and Rumelt (2003) argue that the major difficulty to define property rights and thus compensate the owners of the strategic resources in excess, emerges in the contexts where it is difficult to determine what these resources are, how they are related and who are their owners. This would occur, especially in cases where the value creation occurs through the combination of co-specialized assets, such as the example mentioned earlier, where the productivity increase was caused either by a specific knowledge of the farmer regarding the land and by a peculiarity of the land, specific to the production of sunflowers.

This debate acquires fundamental importance in the context of this study because, in general, partnerships between companies for R&D&E involve the combination of tangible assets (facilities, machinery, equipment, etc.) and intangible assets, especially knowledge assets. Therefore, while the definition of property rights on tangible assets would not constitute a significant problem, the same could not be stated in relation to knowledge assets; since innovation would be obtained from a combination of the knowledge that each party possesses. That is, while the identification of the results that were produced by each piece of equipment can be trivial, determining which knowledge in particular generated the rents obtained and at which dimension is not a simple task.

This is due to the fact that they are co-specialized and therefore, they fit perfectly in the statement of Lippman and Rumelt (2003) that the issue of remuneration of strategic resources becomes relevant in contexts where value creation occurs through the combination of co-specialized resources.

This idea can be better understood if we go back to the contribution of Alchian and Demsetz (1972, p.780), that while analyzing the joint production, they propose that due to the nature of this activity “[...] it is often difficult to measure the contribution of each member of the team to the final product, and thus difficult to determine how team members should divide the profits generated by their activity.” That is, in the case of joint investments in knowledge assets for R&D&E, it is the very joint nature that would lead to the difficulty in measuring the individual contributions of the parties, and therefore, in delineating the property rights and remunerating the owners of the resources.

It is for this reason that Lippman and Rumelt (2003) propose that in these cases, the division of the surplus should occur through a process of bargaining between the agents, since the property rights are not well defined. As already discussed, it provides to the analysis of partnerships between firms for R&D&E an additional complexity, since on the one hand, companies would only have incentives to make joint investments if they were able to define property rights in order to ensure that the rents generated will be allocated to the original owners of the resources (KIM; MAHONEY, 2007).

On the other hand, given the co-specialized nature of the knowledge assets involved in these partnerships and therefore the difficulty to measure the contribution of each party, there is a complication to define property rights and consequently remunerate the owners of the resources. This transforms the analysis of incentives for R&D&E partnerships, since they no longer rely on a simple process of definition of property rights, and become a bargaining problem related to the delimitation of property rights between the agents.

## **5. THE BARGAINING PROBLEM IN R&D&E PARTNERSHIPS**

As it was observed, the co-specialization of the assets would lead the division of rents generated through the R&D&E partnership to be held through a bargaining process. However, it is important to highlight the fact that this problem does not necessarily constitute an impasse for the companies. On the contrary, in some cases, the division of rent through bargain can be carried out on a quite trivial manner!

However, in the real world, this problem acquires a complex character, since the absence of transaction costs becomes a heroic assumption (COASE, 1937) and as a consequence, the property rights would not be perfectly well defined between the agents. This means that part of the value created would remain in the public domain (BARZEL, 1997). It is for this reason that the agents would engage in a bargaining process intended for the appropriation of this portion and this would not happen efficiently, since by doing so, firms incur costs, which consist of a dissipation of rent; as already discussed.

That is, it is in this context that the bargaining issue would become a problem to be solved by the economic agents. In this sense, the contribution of Hart (1993) becomes relevant, who argues that one of the agents would excel in relation to the others, and would therefore be responsible for the definition of property rights.

According to Hart (1993), such role would be played by the party that would most influence the success of the project, in financial terms, and as a result, said party would

possess what he calls “residual decision rights”, that is, the ability to impose the solution desired.

However, although the contribution of Hart (1993) can not be neglected, we should also mention the fact that his original concept occurred in the context of a society where the manufacturing activities were the main focus of economic debate. This means that the theoretical approach developed by Hart (1993) fits perfectly in the contexts where joint investments involve tangible assets, such as equipment and machinery.

However, as previously discussed, in recent years, the direction of the debate has changed, as the manufacturing economy has given increasing room to the knowledge economy. This means that, the central focus of the analyses have been increasingly based on intangible assets, which characterize the nature of knowledge, rather than tangible assets, contemplated by the logic of Hart (1993).

This does not mean that the theory of Hart (1993) can not be applied in this context; but rather that these processes increasingly stop falling into this logic, to the extent that the higher the intangibility of the assets, the more difficult will it be to determine the party that holds the residual decision rights. For this reason, it will be harder to solve the bargaining problem!

This analysis is quite interesting in the context of partnerships between firms for R&D&E, because, as already discussed; the co-specialization of the assets involved in these partnerships and their intangibility would hamper the definition of property rights. As a result, the division of the rent generated would occur through a bargaining process, which might or might not be an obstacle to the firms, as argued in this section.

Given this discussion, in the following section, we will develop a conceptual hypothesis regarding the motivations that lead firms not to implement the idealized partnerships for R&D&E, based on the theory of the firm and, in particular, from the perspective of Barzel’s TPR (1997).

## **6. FINAL CONSIDERATIONS: A HYPOTHESIS TO BE TESTED**

As argued in this study, it is precisely the definition of the legal and economic property rights that would ensure that the rents obtained through joint activities of value creation were allocated to the original holders of the strategic resources. That means that by delineating the property rights, each one of the business partners for R&D&E would ensure the “fair” remuneration related to the strategic assets which contributed to the value creation.

This study also showed the logic that it is the ability to define property rights on the rent generated (*ex post*) what would determine, *ex ante*, the incentives that firms have to make joint investments, such as those that characterize R&D&E partnerships, object of study in this paper.

However, as previously discussed, the presence of co-specialized assets, especially intangible and knowledge assets, would hinder the definition of property rights, turning this process into a bargaining game. The complexity of the game, however, could be more or less intense, which in turn would determine the incentives for making joint investments. That is, the more complex the bargaining issue, the more difficult will be the definition of property rights between the partner companies, and therefore, the lower will be the incentive (*ex ante*) to engage in a partnership.

As argued, the bargaining problem would not constitute an impasse for the organizations if the property rights are well defined (COASE, 1960) or if it is possible to

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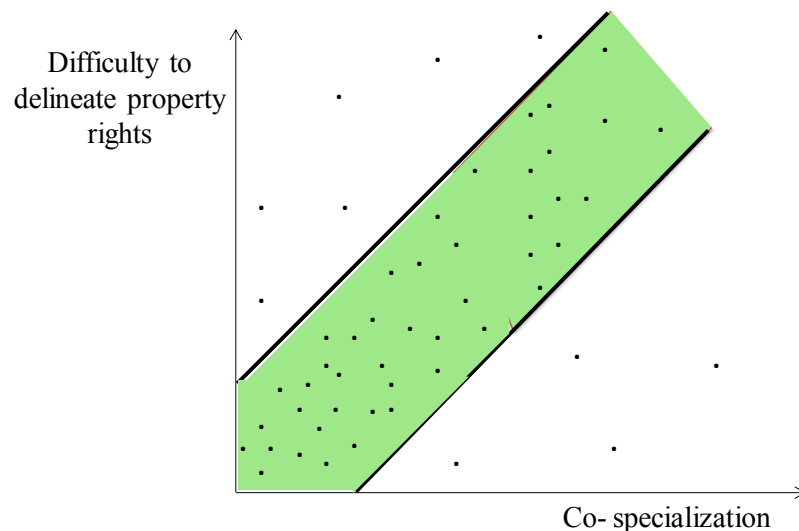
determine the party that holds the residual decision rights (HART, 1993). However, as already discussed, in the real world, where there are positive transaction costs (COASE, 1937), the property rights will not be well defined, and therefore, part of the rent would always be in the public domain (BARZEL, 1997).

It is for this reason that the determination of the party that holds the residual decision rights becomes so relevant, since it is this agent who would determine the definition of the property rights, and thus, it would relatively easily solve the bargaining problem.

Nevertheless, as previously argued, as partnerships for R&D&E have increasingly involved the combination of intangible and knowledge assets, there has been an increasing difficulty in determining the party that has the most influence on the financial success of project, and as a result, it becomes more complicated to determine the holder of the residual decision rights. This means that the bargaining problem acquires an increasingly pronounced significance as the co-specialized assets involved in the R&D&E partnerships acquire a more intangible character!

Figure 2, shown below, summarizes this idea in a schematic and simplified manner: the more co-specialized are the strategic resources involved in the R&D&E partnership, the more difficult will it be to define the property rights ex ante between the parties.

Thus, the R&D&E partnership projects, represented by the black dots, would indicate the tendency of being distributed along the diagonal represented by the black lines. These, in turn, indicate the fact that the difficulty in the definition of the property rights increases as the projects involve a higher level of co-specialization of resources<sup>5</sup>.



**Figure 2 - Schematic representation of the classification of partnership projects between firms for R&D&E regarding the co-specialization of assets and the difficulty in the definition of property rights.**

SOURCE: The author.

Figure 2 schematically shows the first proposition developed in this study: *the more co-specialized the resources involved in the partnership for R&D&E are, the greater the difficulty in defining the property rights between the agents.*

<sup>5</sup> It is worth mentioning the fact that such representation is schematic and therefore does not necessarily mean that there is a linear relationship between the co-specialization of resources and the difficulty to define property rights.

However, it is important to note that this does not mean that there cannot be exceptions. On the contrary, the fact that some dots were represented out of the green diagonal in Figure 2 is not accidental, but it is intended to express the idea that some projects could involve a large co-specialization of resources, although they do not present considerable difficulties in the definition of the property rights. Similarly, some projects could be characterized by an intense difficulty with regard to the delineation of property rights, although the value creation does not occur through the combination of highly co-specialized resources.

As previously discussed, this is justified by the degree of intangibility of the co-specialized resources involved in these projects, since the greater the intangibility, the harder will it be to measure the contribution of the parties. Thus, the bargaining process will be more complex and so is the definition of the property rights. Similarly, the more tangible are these resources, the easier will it be to determine the party that holds the residual decision rights, and consequently, the solution of the bargaining game. As a result, the lower the difficulty associated with the definition of the property rights.

Thus, we present the second proposition developed based on the arguments presented in this study: *the more intangible are the co-specialized resources involved in the R&D&E partnership, the greater the difficulty in defining the property rights among agents.*

Regardless of the reasons that would lead to the difficulty in defining the property rights between business partners, what is observed is that it could encourage the emergence of contractual issues ex post related to the division of value among companies. It acquires considerable importance, because, as already discussed, “The (expected) distribution of economic rents among resource providers ex post has important implications for value-creation activities ex ante” (KIM; MAHONEY, 2007, p.23). This means that the only possibility of contractual issues related to the appropriation of rents (ex post) would discourage companies to engage in R&D&E partnerships (ex ante).

It is based on this logic that we elaborated the hypothesis presented in this study: *the greater the difficulty in delineating the property rights among the companies involved in the R&D&E partnership, the greater the probability that the project of this partnership is not implemented.*

This would occur because the non-definition of property rights (ex ante) would imply the fact that the value created (ex post) would be in the public domain (BARZEL, 1997). As discussed above, there is an insecurity and uncertainty about the possibility of appropriating rents when they are in the public domain. Therefore, the greater this insecurity, the lower the incentive to invest, ex ante.

This study innovated by proposing that partnerships for R&D&E are envisioned from a different theoretical logic, and which is still under development. However, it was limited to strictly conceptual arguments, that is, both the propositions and the hypothesis developed in this study were based on merely theoretical arguments.

This does not mean that the contribution of the research is not relevant or still, that it can be invalidated. On the contrary, according to Williamson (2000), new theoretical approaches are the result of a process characterized by the interaction between the theoretical argumentation and empirical evidence. And this is why future studies should seek the empirical investigation of the propositions and hypothesis developed in this study.

In this sense, it should be noted that the existence of a possible selection bias could be a hindrance to this empirical analysis, since it has much more information in relation to

successful partnerships than in relation to their peers. This becomes even more complex in the case of projects that end up not being implemented, because in this case, it would be necessary to identify, in each company, the individuals responsible for the creation of the project was not implemented. That is, the process of data collection, in this case, is not as trivial as it may seem.

However, in some studies that analyze the reasons that lead to the failure of partnerships of a similar nature to those which constitute the object of study in this research, there are aspects mentioned such as the poor definition of the rules and procedures of decision and the lack of clearly defined metrics to measure the performance and value attributed to each one of the parties (SEGIL, 2005).

Both factors, translated into the language of this study, show that partnerships fail due to difficulties in the definition of the property rights, since they are what determine the distribution of value between the parties. In addition, poor decision rules and metrics to measure the contribution of the parties also constitute problems to measure marginal contributions (ALCHIAN, DEMSETZ, 1972) and determine the party that holds the residual decision rights (HART 1993); although in these cases, the agents had not anticipated such problems and therefore, still invested.

However, the fact that these reasons led partnerships to be unsuccessful provide evidence that the theory developed in this study is in the right direction of a long path still to be pursued.

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