PERFORMANCE OF INDUSTRIAL SERVICES OUTSOURCING: A FIELD STUDY OF SERVICES COORDINATION IN A BRAZILIAN STEEL COMPANY

André Carlos Busanelli de Aquino
University of São Paulo

Alexsandro Broedel Lopes
University of São Paulo

January 2010

ABSTRACT

This research analyzes if the measurement costs of a traded good's attributes reduce control sharing in contracts for the provision of industrial services, as forecasted by the contract theories of measurement and transaction costs. Theoretically, when an industry outsources an activity it used to perform internally, it yields partial or full control on the execution of the service and maintains service quality monitoring rights. The choice of the control level the contracting industry exerts on the service provider would affect that activity's economic income. In a field study, 80 non-spot transactions at an iron and steel mill were analyzed, representing 81% of the mill's annual service budget. In a quantitative approach, the contract documents were subject to content analysis. The evidences observed in the contracts were triangulated with interviews held with supervisors and operators, in addition to critical observation of the services involved in the mill's production process. Through the contract design, the results confirm that the measurement costs of the contracted services, directly related to the complexity of the activities involved, encourage control maintenance by the contractor, deriving from lower expectations of using legal enforcement of the contracts and additional use of extra-contractual enforcement mechanisms. In addition, the misalignment between the enforcement mix expected by theory and what is found in practice influences service performance.

Key words: Transaction cost; Incomplete contracts; Controllership; Industrial services; Outsourcing.

1. Introduction

Industrial service provision has attracted increasing attention in research as well as in business practice. In general, companies choose between producing a service internally through some subsidiary under their control, or some area of the corporate unit in question, and between buying the service from independent suppliers in an arm's length or long-term relation (MERINO and RODRIGUEZ, 2007). One of the first theoretical explanations for this choice, known in economic literature as "make-or-buy", came from Coase in 1937. In Williamson (1975, 1996), the transaction cost approach was widely used to explain what became known in management practice as outsourcing. The term is used in management and consulting practice to represent any external supply relation, ranging from simple commodity

supplies through spot (*arm´s length*) contracts, to relations of alliance for shared technological development, including service provision in long-term contracts (SANDERS et al, 2007). In academic literature, particularly in contract theories of the firm, all of these supply relations are seen as alternative ways of obtaining a product externally. These contract alternatives, on a scale suggested by MacNeil (1978), range from highly hierarchized supply relations to spot purchases in the market, composing a myriad of hybrid forms, to use Ménard's term (2004). That scale represents how much control the contracting company is willing to yield in exchange for greater presence of market incentives. The activity managed in a certain control/incentive composition generates a particular economic performance, which is why this choice is so important.

The contracting of industrial service provision, such as routine and safety inspection, electrical and mechanic maintenance, civil works, food, internal logistics, modernization of production systems, specialized equipment operation, up to full outsourcing of a given production step, is increasingly common in industries. Through operation & maintenance contracts, companies delegate support operations, maintenance of buildings and equipment, monitoring and coordination of specific areas, routine inspection, to outsourced teams, generally associated with recurrent activities. Although industrial buyers treat these services differently from the purchase of physical goods (JACKSON et al., 1995), service contract research remains restricted (YANAMANDRAM and WHITE, 2006).

The central themes of service contracting research are divided as follows: (i) what service should be outsourced and whether it should be outsourced or not, and (ii) as a given transaction was outsourced, how can it be coordinated? As to the first type, Merino and Rodriguez (2007) discussed services in general, while Carson (2007) addressed product development services. The most common theories are transaction cost economics (TCE) and resource-based view (RBV), mainly applied to physical goods (ESPINO-RODRIGUEZ and PADRÒN-ROBAINA, 2006). Recently, modified versions of the TCE have been proposed for application to service provision (ERRAMILLI and RAO, 1993). Wynstra et al (2006) highlight that less attention is paid to the second type of research question – how to coordinate the ex post phase of the contracting. It is interesting to highlight that the little attention this research question receives contrasts with companies' increasing preference to reduce the number of suppliers, in exchange for long-term relations.

The inseparability of the production and consumption steps in most services turns interaction between the buyer and supplier, after the contract negotiation and signing, an intense and critical phase for the quality of the contracted service (WYNSTRA et al, 2006). This interaction depends on the information dynamics between the parties, in which the contractor will make service attribute measurement efforts to manage the supply. Exceptional studies that involve the ex post moment in service transactions include Simpson et al (2000), about supplier performance assessment, and Talluri et al (2002) about monitoring and incentive arrangements. However, these two initiatives do not involve testing theories, but adopt a prescriptive approach. Wynstra et al (2006), on the other hand, in a contingency approach, propose that the interaction strategy chosen, that is, the intensity of interaction, the scope attributed to the supplier, the level of accepted specific investments, are a function of the expected degree of cooperation, the number of agents involved, market uncertainty and service characteristics (e.g. degree of complexity involved). Some studies involving TCE and RBV, such as Barthélemy and Quélin (2006), tested and confirmed the impact of the kind of service contracted on the form of coordination, for information technology services (IT vs. non-IT). Other studies, such as Erramilli and Rao (1993) and Murray and Kotabe (1999), found that service inseparability exerts a moderating effect on the relation between asset specificity and outsourcing probability. However, these studies do not look deeper into the

service quality measurement issue, which entails a relevant theoretical gap, as enforcement is impaired without information about a contracted attribute.

With a view to contributing to the research question "given that a certain transaction was outsourced, how can it be coordinated?", the authors propose a modified view on the TCE through Barzel's measurement theory (2005), to explain that the contract design chosen by the service buyer, that is, the arrangement chosen varies along with the measurement costs. This research line in incomplete and relational contract literature has been called contract design, which considers the expected efficacy of each enforcement source, in a rational choice of the contract design (MASTEN, 2000).

A field study was carried out in one of the mills of a Brazilian iron and steel group, comparing 80 service transactions and the way they are coordinated. In 2006, this group, which is one of the most competitive steel producers in Brazil, was incorporated by the leader in the global steel industry, which is also the largest steel producer in Europe and Latin America. The mill where this study was carried out produces crude steel for civil construction and drawn bars. In line with the quantitative field study approach by Anderson and Widener (2007), we chose "industrial service purchase transactions" as the unit of analysis. The final non-random sample, in line with a specific case selection strategy, adds up to 81% of the mill's annual service budget. Data collection departed from the content analysis of the contract documents ruling the sample transactions, permitting the establishment of variables on the contract design. The characteristics of the service involved in these transactions and the presence of extra contractual mechanisms were collected during interviews with supervisors and operators in loco. Through a cluster analysis aimed at joining the identified categories, the solutions used by the service purchasing mill to coordinate the transaction were summarized, related to the replacement of control sharing through market incentives by the expectation of ex post use of the contract terms. Finally, the influence of the transaction characteristics on the contract design were tested (completeness, incentive terms, or use of residual control rights). Following Yvrande-Billon and Saussier (2004) we measured the misalignment between the enforcement mix expected by the theory and what was found in practice, and then we tested the misalignment's influence on service performance. After the conclusions, the study limitations will be presented.

2. Theoretical structure and hypotheses

Williamson (1996) formulates the question as follows: "Why are [contractual] protections so important?" For the author, the combination of investments in specific assets and uncertainty is the answer. This combination would produce a condition of bilateral dependence, in which measurement problems generating property rights are badly outlined (and cannot be contracted ex ante, given the impossibility to anticipate future events). These conditions, in additions to flaws in the institutional environment, justify the attempt to use contractual protections, such as guarantees, penalty terms etc. These contractual protections are necessary when the firm decides to change the total hierarchic control of an existing activity by involving a supplier. In that case, part of the control is ceded, and hierarchical power is replaced by contractual enforcement. In line with Williamson's logic (1991), the more control is ceded, distancing the arrangement from the vertical integration, the following will be observed: i) stronger intensity of incentives for supplier performance, ii) greater administrative control maintained by the contracting company to monitor and correct the process, iii) less flexibility for ex post adaptations, iv) and less tolerance towards excuses for unsatisfactory results. Finally, as to the contractual logic of the TCE, the contracting company makes efforts to select and negotiate the agreement (called ex ante transaction costs) and to

measure service quality, correct eventual flaws, enforce the terms of the agreement, adapt the agreement conditions to its internal needs, solve conflicts and carry the losses of failures in the relationship (ex post transaction costs). Finally, following the TCE statements, the recursiveness of the transaction would also affect these costs.

The specificity of the assets involved in the transaction implies the risk of hold-up by the owner of those assets. The more the service involves specialized personal skills, specific training and know-how, the more risks are offered to the contracting company if the supplier does not deliver the service according to specifications or in time, as alternative service provision sources are restricted (MURRAY and KOTABE, 1999; ERRAMILLI and RAO, 1993). On the other hand, in cases of specific demands, the supplier would face difficulties to reapply the developed competencies in other buyers. Extreme cases of asset specificity are expected to be organized internally (high specificity) or via the market (low specificity). However, specificity is a necessary but insufficient condition to explain the vertical integration. An income hold-up action could only be justified if the residue could be appropriated, but this condition only occurs if the relation contains attributes that cannot be contracted. Thus, non-contractibility is necessary for the risk of income hold-up (BRÉCHEMIER and SAUSSIER, 2001).

Hence, non-contractibility is a relevant characteristic of services' intangible nature (MERINO and RODRIGUEZ, 2007). In services, the attributes' performance (e.g. service quality) cannot be observed ex ante and, as the assessment of this performance is at least partially subjective, this performance cannot be verified by the third party (BARZEL, 2005), although it is observed by the contracting parties. As such, formal contracts are not sufficient to regulate service provision, demanding relational contracts (WILLIAMSON, 1975, 1996; MÈNARD, 2004). The difficulty to measure service attributes (the effort to break the asymmetry about ex post quality) has explained, together with technological and environmental uncertainty, choices in cases of services (BRÉCHEMIER and SAUSSIER, 2001; KALNINS and MAYER, 2004). Hence, the non-contractibility of certain attributes in services becomes the central argument, on top of asset specificity and environmental uncertainty (BRÉCHEMIER and SAUSSIER, 2001). In the same line, for Barzel (2005), in the presence of significant uncertainty and non-significant asset specificity, what guides the arrangement is the effort to quantify the information on an object's attributes, that is, the measurement cost (BARZEL, 2005). The measurement cost directs the use of control on the service delivery process vs. the use of incentives for the supplier's performance. The higher this cost, the lesser the capacity to get access to public protection and, thus, the less use is made of incentives in the contract, and the greater the control on the process. The contract design covers a mix of enforcement via the third party and self-enforcement, such as the threat to end the contract early. Each type of enforcement acts on a part of the agreement for which it has greater comparative advantage (BARZEL, 2005). The effect of the complementariness of formal terms and self-enforcement was confirmed in Lazzarini et al (2004).

If contracting costs in general grow exponentially, along with the number of tasks involved in the contract (MACLEOD, 1997), it is to be expected that, in the case of services, measurement costs are also affected by service complexity. If the firm saves on transaction costs, the contract will be specified, detailed, to the extent that this will represent an increased potential of enforcement via the third party. Hence, contractual completeness decreases along with difficulties to measure service conformity, in the attempt to save on ex ante transaction costs. These specification efforts are replaced by residual control rights in order to previously establish who will decide when a non-predicted contingency occurs.

H₁: The higher the measurement cost, the lower the expectation of enforcement via third party, reducing contractual completeness and increasing residual control rights.

Some transactions entail high risks for people's safety, fires, large production losses etc. (WILLIAMSON, 1999, p.322), and contractual risks cannot be fully reduced through financial punishments (MACLEOD, 1997), like in some civil aviation companies' activities, in which an operation failure can cause severe accidents. Generally, these transactions are not outsourced (BRÉCHEMIER and SAUSSIER, 2001), or the contracting company maintains strong residual control rights. For high unrecoverable costs in research and development projects, Ulset (1996) found that greater residual control the client maintains on the supplier's process will reduce efforts to contract service quality and to specify its control rights.

H₂: The impact of the service failure moderates the effect of measurement cost on the use of residual control rights and enhances the effect of this cost on contractual completeness.

The variation in the expected conditions generates a cost to make adjustments through negotiation and consensus. Generally, in literature, the most discussed source of uncertainty is environmental. Together with a costly contract revision, it makes the parties reduce the specification efforts in the contract's definitive terms, in favor of flexible terms that, although less precise in defining performance obligations, permit adjustments and compensations (MASTEN and SAUSSIER, 2002). Another source of uncertainty is the variability of the supplier's process which, as the service attributes are not observable *ex ante*, some type of ex post inspection is used. The contractor follows the supplier's process to interfere and act on the variability cause, and establishes control rights on the process, and no longer on the service output.

H₃: The greater uncertainty about the variability of the process, the lower the terms' level of detail and the greater the use of residual control rights on the supplier's process.

Finally, the more recursive the service, the greater the supplier's expectation will be to obtain income from the relation, increasing the strength of the threat to end the contract early in case of low quality (KLEIN, 1996). On the other hand, recursiveness generates scale economies of *ex ante* costs, reducing the cost of completeness in contract revisions. However, this specification is less useful though, due to the lesser expectation of legal enforcement use.

H₄: The greater service recursiveness, the greater the use of residual control rights and the lesser contractual completeness.

Figure 1: Relations between variables and moderating effects
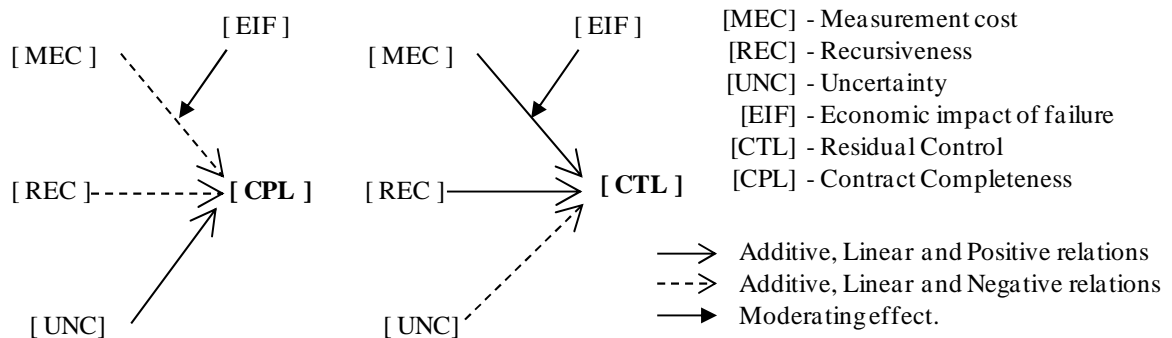
In terms of extra-contractual mechanisms, the probability that a more relational arrangement will occur, tending towards a situation of quasi-hierarchy, is positively related with measurement costs. Uncertainty, in turn, reduces the possibility that the service is organized through contract only, as it demands *ex post* adaptation mechanisms. And the economic impact of a possible operation failure intensifies, in conditions of uncertainty and high measurement costs, the probability of vertical integration (BARZEL, 2005).

H₅: The higher the measurement cost, uncertainty and economic impact of failure, the higher proximity of quasi-hierarchy the arrangement will assume.
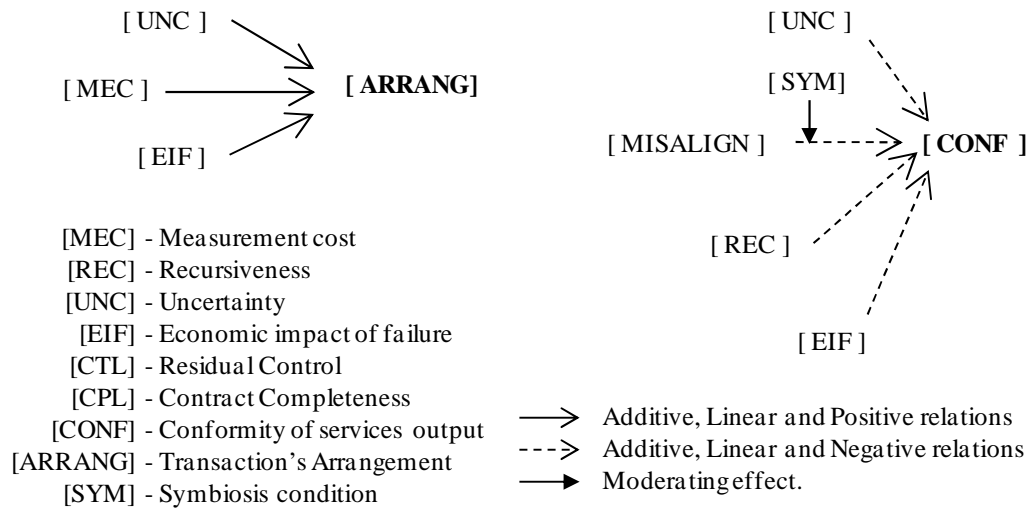
TCE's main statement is that firms, in order to save on transaction costs, will choose the governance arrangement to mitigate contractual hazards (or transaction characteristics), and doing this will increase the performance (WILLIAMSON, 1996). The misalignment between the theoretical and actual arrangement will prejudice the hazards mitigation, and will then reduce the transaction performance.

During the interview phase, we perceived that the low performance condition is moderated by the mill supervisor's expectation to preserve gains by rejecting actions towards optimal but uncertain performance in the short term, preferring a sub-optimal but more reliable condition with the current supplier. This symbiotic relationship can emerge within subjective assessment schemes, in which the supervisors can accommodate this absence of performance.

Supplier performance and transaction cost are shared between many mill areas, and the same occurs with the produced gains. Some of these gains will disappear in the corporate indicators, and the supervisor will not receive any acknowledgement for these eventual solutions. A single failure, however, if associated with a relevant loss in the entire production process, may be very dangerous for the supervisor. Thus, he considers the supplier switch cost (e.g. learning effects, organizational assets that will be lost) to refuse the contract termination, and still tries to work within this sub-optimal condition.

H₆: The greater the misalignment between theoretical and actual arrangement, the lower service performance will be. This effect is moderated by the presence of relaxation in the current evaluation process.

Figure 2: Relations between variables and moderating effects

[MEC] - Measurement cost
[REC] - Recursiveness
[UNC] - Uncertainty
[EIF] - Economic impact of failure
[CTL] - Residual Control
[CPL] - Contract Completeness
[CONF] - Conformity of services output
[ARRANG] - Transaction's Arrangement
[SYM] - Symbiosis condition

→ Additive, Linear and Positive relations
--→ Additive, Linear and Negative relations
→ Moderating effect.

3. Contract Management at the Iron and Steel Mill

The study was developed in one of the mills of an iron and steel group. Hereafter called "mill", it is an integrated production unit that basically consists of sinter production, pig iron production (in blast furnaces), steel production, continuous casting, lamination and shipment of end product.

The mill has contracted services autonomously and the group considers it a reference point for contracting among other units. The responsibilities for service contracting, delivery and coordination are shared between the operating supervisor and other administrative areas. The service is contracted through competition among invited suppliers. While the final preparations[1] are made for the supplier's entry into the mill, the contract is validated by the legal area, which is not a condition *sine qua non* to start the service. While the agreement is in force, the contract area follows measurements and payments and renegotiates prices and conditions.

Contract is defined here as a set of formal documents (main contract, attachments, price tables, projects and designs mentioned, amendments and formal requisitions exchanged between the parties), with legal power of execution, which regulate the supply transaction. At the mill under analysis, one typical contract regulates a single transaction, but other contracts join 2, 3, 4, 10 and 14 transactions. The typical contract contains between 15 and 20 pages, (without attachments and tables), and covers scope, price, measurement, protection and environmental and labor co-responsibility, assignment of equipment, correlated contracts, guarantees and fines. The presence of amendments (ranging from zero to 34) is not strongly related with the contract's age. These amendments mainly address term renewals and price revisions.

---

[1] Preparations include workforce registration (verification of labor documents and characteristics of the workers involved, such as criminal records, e.g.), security training, making identification badges, health exams. To finish the entire process, the outsourced company's tools and equipments taken inside the mill are registered. These procedures, in shorter and emergency contracts (most common situation), represent a barrier against new suppliers' entry, due to the time the entire procedure demands.

The contract flow, deadlines, payments and measurements are followed by the contract area through the in-house developed information system. The supervisor can request contract renewal for an additional period. This recursiveness derives from the company's acceptance of the service quality, or from its impossibility to change suppliers in reasonable time. The supervisor (from the mill) and the supplier's team manager exchange timetables and details on scope and ex post adjustments. In some cases, the proprietor personally coordinates the service but, in others, he is not involved in the operation, and interactions occur between the supervisor and service teams.

For each transaction, in line with Williamson (1975), costs are associated with the achievement of the agreement, either before (*ex ante*) or after (*ex post*) it is signed. According to TCE, the firm attempts to reduce these costs through more efficient contract designs. The contract is written by the contract area, and conflicts are not solved in court, except in labor cases or cases involving some kind of occupational accident with a fatal victim. Thus, the corporate legal area is not held accountable for many of the transaction cost sources in the case of service contracts. This is illustrated by the number of employees in these areas, significantly higher in the contract area, and by the restricted role exercised by the legal area in the contract design phase.

4. Sample and Data Collection

To test this theory, the authors adopted the quantitative field study approach proposed by Anderson and Widener (2007, p.331). Following the same logic as for cross sectional field studies discussed by Lillis and Mundy (2005), Anderson and Widener recommend choosing an organizational unit at the lowest possible analysis level, in this case "industrial service acquisition transactions".

At the start of the study, the contract area of the group's headquarters provided the first informant, who had led contract design for more than ten years. For the sake of a better understanding of the entire process, initially the selected mill, located at 150 km from group headquarters, was visited twice. During this initial contact, the first version of the research protocol was designed, starting with contract analysis at headquarters, supported by the first informant, due to lesser propensity to subjectivity in comparison with direct observation and interviews, and because it permitted previous knowledge about the mill, reducing respondent bias (MCKINNON, 1988) in interviews with supervisors.

The viability of the intended analytic unit was confirmed when observing that the mill received a wide range of service types and industrial inputs. As the research is interested in arrangements between vertical and arm's length integration, the services performed by the company itself and service transactions via spot contracts were discarded. The authors departed from 414 non-spot contracts (duration of more than 30 days) active at the time of data collection. These contracts involved 473 transactions with different kinds of services and inputs, 46 supervisors and 287 suppliers. On the whole, these contracts corresponded to 95% of annual service spending (the remaining 5% were spent on spot contracts).

For the sake of adherence to the research question, the authors focused on contracts that involved services (operation of production steps, maintenance, improvement projects and consultancy) and that characterized an economic relation between companies[2]. Finally, 18

---

[2] Leasing, loan for use (area, equipment, furniture), equipment hiring, usage permission and consignment, gas supply, scrap, fire-resistant materials, industrial pieces, agreements and sub-product sale contracts were excluded. Next, those contracts were excluded whose providers were private persons, former employees who continued working for the company after their retirement, or any other cases in which contracts were a mere

contracts were eliminated to guarantee data consistency in the management software transition the group was going through at the time the study was carried out. Thus, the population of the service provision relations at that mill, organized in an arrangement between vertical and arm's length integration, was composed of 141 contracts, with 192 transactions, joining 29 supervisors and 94 suppliers.

In a field study, differently from random logic, the sampling follows the logic of replication to predict similar results (literal replication), or to propose opposite results (theoretical replication) through foreseen reasons (EISENHARDT, 1989). Therefore, the sample composition considers the endogenized variables, varying in terms of the cases chosen, and the controlled variables, which remain constant in all cases chosen (VOSS et al, 2002). As mentioned, the nature of the service transactions in long-term arrangements was controlled. The authors also consider the variation in contract technology, corporate incentives and other institutional incentives as fairly controlled. To guarantee sample variability, concentration in one single type of transaction or service was avoided, intentionally choosing 43 contracts, totaling 88 transactions. The choice considered: (i) the range of activities, (ii) materiality of the amount involved, (iii) complexity of service quality measurement, (iv) frequency and assets involved, and (v) attention given to its coordination. The materiality criterion is justified because contracts with greater economic impact receive more attention in negotiations, intensifying the process and contract area supervisor's action. Besides payments to suppliers, the economic impact includes risks due to the involvement of the contracted services in critical operations at the mill. That is the case of programmed maintenance contracts, which demand a high degree of supplier coordination in a specific time period. Finally, the authors observed if the sample broadly joined the mill's operations and logistic flows, although they did not control negative externality effects and conflicts between suppliers who execute activities with a high level of friction in the same area, that is, a non-conformity in one activity may generate delays or costs to other activities.

After selecting the 43 contracts (88 transactions), the contract documents were subject to content analysis (BARDIN, 1977) at the group's headquarters. Next, during four month, interviews were held and participant observation took place at the mill. In that phase, the authors received the support of the key informant, who was responsible for the outpost in the contract area at that mill. The choice considered the time of work in the organization and previous functions that granted that person access to a large part of the supervisors and area managers to be interviewed, as well as to suppliers. The outpost had a copy of the same contracts, which allowed for the analysis of divergences between observation and the formal document. In the information triangulation between contracts and interviews with supervisors, inconsistency was found in eight contracts (8 transactions), which were discarded. In the final test phase, 35 contracts (80 transactions) were used, totaling 749 analyzed contract terms, involving 81% of the annual service budget contracted at the mill.

---

legal formality to reduce the risk of labor cases, or contracts only to guarantee the stay of employees from equipment suppliers at the mill during guaranteed technical maintenance periods, or for logistic follow-up of raw material unloading.

4.1. Content analysis of contract terms

In the search for objectiveness and reliability, the content of the contract terms (hereafter only "terms") was coded and quantified through content analysis of the original contract, its amendments, attachments and price tables[3]. One responsible from the contract area helped to understand the objective of specific business terms at the start of the analysis. The authors observed the economic instead of the legal context and, to avoid the bias of using earlier classifications based on other theories, the analysis did not depart from a previous category definition. The authors started with floating and exploratory reading (called fishing expedition in Bardin, 1977, p. 95 and 103), saturating the categorization in two further rounds. The recording unit was the contract term and the rule to count the presence of the term in the category.

In the first round (fishing expedition), the authors selected the 25 most complete, complex and different contracts to cover the most diverse clauses and situations as soon as possible, accelerating the learning effect and the validation of the database. The terms were classified according to their underlying economic reason. Semantic variations and order of quotation in the document were ignored. In the remaining 28 contracts, the recurrence of similar terms confirmed the initially intended diversity, reaching 714 different terms, classified in 152 categories. The authors observed that some contracts involve more than one transaction. Thus, there are terms that regulate the relation mill-supplier, which can be applied to all services present in that relation, while other terms are specific for the service itself. Also, four dimensions of quality performance were identified: (i) service conformity, security, environment or social co-responsibility. This does not mean that the dimensions are mutually blocking. They are not, as accidents cause low performance in terms of security as well as in conformity at the moment the failure interrupts production. The same is true for the environment and security dimensions. Finally, there are some standard terms in different contracts and what distinguishes the contract design of the transactions are the specific terms. Among the 152 past categories previously identified, five summarized categories were achieved through cluster analysis: (i) terms that establish best efforts; (ii) terms that define scope; (iii) terms that align incentives; (iv) terms that define the process; (v) terms that seek to control the process. Finally, these five categories were reduced through a second cluster analysis, summarizing three final categories. Terms that established categories i to iii were reorganized under "completeness", in the understanding that they progressively complete the contracts. Categories iv and v, respectively, constituted "incentives" and "control".

4.2. Onsite Interviews and Field Observation

The interviews were held face-to-face, guided by a script established in the protocol[4]. Starting with the "most friendly" respondents (first six) indicated by the key informant, the authors tested and adjusted the script. On the whole, 32 interviews were held, with a mean duration of 90 minutes. In 72% of the interviews, the authors contacted the respondent to solve information inconsistencies or make new inquiries.

---

[3] Normally, econometric studies ignore the attachments, which determine the essence of the agreement by the specifications they contain (MÈNARD, 2004, p.362).

[4] The script included open questions involving the following aspects: the area as a whole, transaction status (active, motive for eventual infringement), activity description, supplier's performance, contract design, budgets and incentives, interactions and dynamics. The interview started with a short description of the research theme: "a study of the relationship with suppliers". Discussion on the hypotheses or central problem was avoided. The interview was guided through key words, such as "and what about the supplier's performance?", "tell me a bit about what severe problem can occur if the supplier fails to do something...". The discussion was guided and the interviewee could talk freely.

In the interviews, the following was observed for each area: the way the services were contracted (triangulation with the already observed contract), relation dynamics (e.g. daily management, renegotiations, conflicts etc.) and extra-contractual coordination mechanisms. Also, to validate if the authors were not simplifying when interpreting events associated with the process, the origin of the outsourcing was questioned. As the outsourcing involved the gradual choice and transference to an external agent of activities that used to be performed internally, the origin of the decision and the firm's limit were sought. Attempts were made to identify the current limit of the mill's total control of the process, that is, in that specific area, where did the mill finish and the supplier start? For example, the construction of fire-resistant materials is outsourced, but the operation of converters and pans is not. The same is true for maintenance of all tracks into the mill's area, but not for ultrasound inspection activity on the stretch of pig iron transfer by the torpedo car.

To decrease information distortions, omissions or misunderstandings by the interviewees and permit evidence triangulation, before the interview, the contract was reminded; performance indicators and targets of the areas exposed in the quality panels were collected and analyzed, and the key informant provided a short orientation about the area that contracted that specific service. During the interviews, the respondent was invited to show the process in loco. After each interview, the collected information was confronted with the key information. The authors participated in meetings, performance assessment and other routine events at the mill, which Atkinson and Shaffir (1998, p.54) call observation by passive participation.

4.3. Observing extra contractual mechanisms

Theoretical antecedents and empirical evidence in the literature cited consider extra-contractual mechanisms as the "glue" joining relations in order to reduce contractual hazards and preserve performance (KLEIN, 1996; MÈNARD, 2004). The non-verifiability of service conformity by third parties, and the economic impact of failure can generate losses beyond suppliers' reimbursement capacity. In addition, the presence of specific intellectual or organizational assets could be used for hold up movements. Such mechanisms represent a degree to which the contractors increase their expectation to use private ordering instead of public ordering (supported by contracts and courts).

The investigated transactions showed different mechanisms usage degrees, including interaction between supplier teams (permanently installed at the mill) and contractor teams, which permitted increased trust and empowered the information flow between those teams. Besides, we noted the presence of co-investment strategies, bilateral dependence conditions and severe authority usage (*fiat*).

In addition, in some cases, we observed a strict delimitation of responsibility areas, using: activity segmentation among suppliers, specialization of suppliers when critical services are involved, crossed supervision by crossing suppliers' claims and duties, design of buffers and provisions within suppliers' activities, even when not mentioned in contracts, and efforts to increase and guarantee the stability and reliability of the production process through recurrent transactions, permitting the emergence of reciprocity and cooperation standards. And, in extreme cases, the mill uses temporary vertical integration of a specific activity. After all interviews accomplished, four main mechanisms were identified: information sharing, supervision, trust and reputation.

5. Variables

5.1. Contract variables

To observe control sharing in the contracts, the authors attempted to capture complementariness between the use of legal enforcement and extra-contractual enforcement mechanisms. Hence, each transaction i is regulated by a contract that, on the whole, covers terms that attempt to specify, detail conditions (completeness) and terms that seek to leave residual control rights (control). These two types of terms are distinguished by the expectation of typical enforcement. The value attributed to the completeness (CPL) and control (CTL) variables is the sum of terms categorized within that type, divided by all terms in the contract related to that transaction. The terms that attempt to detail conditions present the highest expectation among the three in terms of efficacy in the third party, given by the percentage of terms to define the scope of service attributes and operating procedures, as a way to decrease uncertainties deriving from the operation. While residual control rights are established exactly with the expectation to avoid the third party, for this to occur, they leave room for ex post adjustments and private legal mechanisms over time[5]. Also, during the analysis, terms were identified to encourage service performance, through payments (or charges for punishments) to the supplier. These terms, assumed as intermediaries for completeness and control, consider mere specification insufficient to hold up the supplier's best efforts. These terms presented excessive homogeneity in the transactions and were ignored in the tests.

5.2. Service characteristics variables

The breach in information asymmetry between supplier and contractor related to the service execution quality entails some cost. The measurement costs (MEC) of service quality, in line with Kalnins and Mayer (2004) and Poppo and Zenger (1998), are held up by the service buyer's difficulty to obtain information on the supplier's performance. Through the interviews and in loco observation of the processes, the authors observed how each supervisor acts to try and break information asymmetry about service quality. The following scale was used: 1 if the quality observation is visual and low-cost; 2 if equipment is needed in the field; 3 if specific tests are needed; 4 if observations are not possible after assemblage or lining; 5 if the observation is more expensive than redoing the service itself.

The economic impact of failure (EIF) is the potential economic loss deriving from an unidentified non-conformity, which ends up triggering a failure. The degree of this impact is a function of the type of consequences unchained by this failure which, for the mill, represents the risk of interrupting production for a given period, without recovering the production losses. Production continuity, measured by the maximization of monthly production capacity, besides unit cost, is the areas' main target, each of which has its specific indicator. Hence, the impact of the failure on the potential interruption of subsequent processes is more critical than in local economic losses, such as the rejection of a product that is in process. In the interviews and observations, it was identified that the impact of the service failure is mainly a function of

---

[5] In Carson (2007), to capture ex post control, it was asked if the contracting party, towards the contracted party: (i) exercised close monitoring, (ii) requested extensive reports during the execution, (iii) was involved in decisions during the contracted party's work, (iv) enforced changes in the initial plan, (v) demanded execution of the work in a specific way, (vi) eventually denied the contracted party permission to do something he intended to do. To capture ex ante control, it was questioned whether the following specifications were demanded: (i) technical and engineering, (ii) performance for technology, (iii) for the contracted party's staff allocated to the project, (iv) process for use in the contracted party's work.

the point in the process where the service is executed (support vs. main processes), and the capacity of the buffers in the production process that absorb the failure, avoiding its transfer to other production steps or a generalized stop. That is, the effects of a failure can range from simple rework to generalized production loss. For each transaction, the following score was attributed in terms of the potential impact in case of failure: 1 for rework, without direct impact on production, or detectable in time (either by existing lungs or by physical separation through other intermediary processes); 2 for loss of pig steel runners or sequences in continuous casting (due to steel leaking); 3 for production stop without impact on shipping; and 4 for shipping interruption (interrupting production, affecting shipping, general performance decrease at the mill in tons/month, losing income)[6].

The uncertainty (UNC) about compliance with service conformity is a function of the variability inherent in the supplier's operation. Service delivery demands intense labor and a considerable part of the conformity depends on the operators' capacity to follow procedures, or on their own expertise and experience to achieve conformity. Variability, then, is a function of the service executor's capacities and skills, mainly in new processes, in test phases or in processes that cannot be standardized. However, the application of technology and other accommodations brought about by learning through repetition stabilize the process, permit the elaboration of norms, models and standards and merely demand the executor's capacity to follow these procedures. The proxy used captures the dependence on the executor's skills, granting: score 0 for a modeled, automated activity (with less need for the executor's skills), 1 for activity oriented by norms, procedures (in which the executor will attempt to follow, but depends on previous skills and experiences) or when the activity is repetitive and simple, and 2 for activities that need case-to-case adaptations (one solution, one practice for each case).

Recursiveness (REC) was identified as: 0 - non recurrent and 1 – recurrent. For operations involved in production and production support, the service demand frequency is intense and uninterrupted in many cases. Examples of high intensity are the haulage operation of a torpedo car, dreg pot movements and the removal of residues from the bays. Examples of less intense operations, but likewise uninterrupted, are the reconstruction of fire-resistant materials and routine maintenance. Other operations are on demand, although set at regular intervals, such as maintenance during programmed stops. On the other hand, single or on demand activities do not characterize recursiveness, in the first case because they are not frequent, in the second because they do not perform future frequency ex ante, decreasing reasonable expectations of long-term contracts.

As a control variable, the need for the supplier's (K) investments in specific assets, ex ante, in equipment or installations, was indicated as 0 or 1. Erramilli and Rao (1993) and Poppo and Zenger (1998) used a similar scale for human assets. However, the authors wanted to distinguish between the effect of physical assets (equipment and installations) and the potential broad hold-up that can happen as a result of intellectual assets developed along the relationship and as a result of economic dependence.

The symbiotic relation between the mill's supervisor and supplier (SYM) was considered as present when the relation displayed: (i) low variance in the values of the mill supervisors' assessment of suppliers' performance, without target improvements; (ii) values

---

[6] This variable presupposes a scale, in which class 2 impact is greater than class 1 and so on. However, it cannot be supposed that class 2 impact is the double of class 1 impact. Moreover, the distance in terms of "intensity of potential losses" separating class 1 from class 2, the distance from class 2 to 3, and from 3 to 4 sensitively are not in line with that scale. These are two strong limitations of the IE variable. To test the variable's limitation, the IED variable was also used, which classifies class 2, 3 and 4 impact transactions as 1, in which failure exerts a relevant economic impact. The remaining transactions were classified as 0, whose failure does not exert any relevant economic impact. The results found were similar for the two scales.

below the lowest acceptable target, even in case of problems in the service process during the same period, (iii) absence of formal performance assessment, or (iv) contracts with more than one renovation, with performance below the critical target appointed by the respondent (who demands the service) during the interviews. The variable assumes one for transactions with evidence of one of those symbiosis aspects, or zero.

5.3. Extra contractual mechanisms variables

Sharing information related to process technology and current performance (0 for evidence not found, 1 for evidence found) increases integration between suppliers and contractors, who work on technological solutions, sharing intellectual capital. The performance achieved by the supplier and the way that supplier executes the activities are shared and discussed in order to support periodical planning meetings, improve quality processes, environmental accident syndication and quality auditing routines.

Supervision and direction in real time, schedule and priority control, discretionary allocation of resources between contracts under the same supplier are signs of supervision power usage by the contractor – fiat – (0 for evidence not found, 1 for evidence found). The area that coordinates the supplier manages the supplier's team schedule in order to reduce the risks of non attendance of deadlines. This authority may be a routine or eventual, occurring in critical events when the mill's teams assume the entire control of the process. According to the necessary coordination level, it is common to use radio communication, meetings at the beginning and at the end of the workday. Other forms of supervision include the authority used by the mill to validate the suppliers' team composition in order to refuse a non qualified or cheaper workforce.

The employees switch between suppliers and mill is not something sporadic, it is almost a rule or an institutionalized practice. We found managers who work for suppliers that previously worked for the contractor. Nowadays, those managers work in the same function, but on the other side. We observed that the mill eventually concedes employees to suppliers. The supplier employees' expectation of being hired by the mill in the future sounds like a promotion, constituting an incentive for their performance. Observing the relationship records, we searched for employees interchange, even supervisor or managers (0 for evidence not found, 1 for evidence found). These movements reduce information asymmetry in the relationship and reduce moral hazard strategies, increasing trust.

A supplier develops reputation through frequent services delivery, attempting the contracted attributes. Reputation level was measured by the time (months) of relationship with the same supervisor.

Such mechanisms are not excludable themselves. Then, we accomplished a factor analysis, reducing to two factors, the first of them summarized supervision and trust, and the second summarized shared information and reputation. Next, through a cluster analysis, we indentified three clusters that represent typical arrangements: (i) contract regulation, (ii) relationship, (iii) quasi-hierarchy. The incidence of these mechanisms on each cluster was measured by the average presence of those four mechanisms (Figure 3).

Figure 3: Cluster analysis and service arrangement types

ARRANGEMENT	Shared Information	Supervision	Trust	Reputation
Quasi-hierarchy	++	++	++	++
Relationship	++	-	-	++
Contract regulation	-	-	-	-
. ++ Strong incidence, - Weak incidence				

The services coordinated by contract only, through relationship and through quasi-hierarchy, represent, respectively, 21.2% ; 50% and 28.8% of all transactions analyzed. Each transaction was classified within the typical arrangement (ARRANG). We used 1, 2 and 3, respectively, for regulation by contract only, relationship and quasi-hierarchy. This ordinal scale represents Williamson's (1975) market-hierarchy continuum.

5.4. Performance variable

In the case of the mill under analysis, environmental issues, social co-responsibility and security were assessed as performance dimensions, but service conformity (CONFOR) is the main dimension considered in the service assessment. Conformity considers compliance with specifications and ready service availability upon demand. The value attributed to the variable is the score the area demanding the service attributes to the delivered service in the formal assessment system. Scores were standardized from 0 to 1. Transactions without formal assessment (25% of the transactions) were scored according to the supervisor's declarations. Score 0.85 (mean of upper two quartiles of the scored assessments) was attributed when the supervisor appointed that the supplier was providing the service above the target. When the supervisor declared that the supplier merely and only complied with the target, score 80 was attributed (highest target found in sample transactions). Score 0.70 (division line, below which performance is classified as insufficient on most demanding criterion) was attributed when the supplier's performance does not comply with targets. In cases of contract breach or non-renewal due to low performance levels, score zero was attributed.

Correlations between variables do not present risks for the statistical analysis[7].

6. Tests and Results

6.1. Contract design

In Table 1, there is a consistent negative relation between the effect of the measurement cost and completeness and a positive relation with the presence of residual control. As a result, hypothesis 1 can be accepted. The result also indicates the complementariness of the third party's enforcement and self-enforcement, in line with Lazzarini et al (2004).

---

[7] Correlations significant at 1% shown between brackets are: CTL and CPL (- 0.923), CPL and MEC (-0.577), CTL and MEC (0.573).

In the way it was foreseen, the moderating effect of the economic impact of the failure boosts the reduction of contract specification efforts in the presence of measurement costs. This effect is interpreted by the lack of significance of EIF's direct impact on CPL, and by the significance of CME, EIF in CPL. The expected moderating effect of the impact of measurement costs on the use of control rights, on the other hand, did not occur. Instead, a direct IE effect occurred in CTL, suggesting that, in cases of high economic impact, the use of residual control rights on the process does not depend on how costly it is to measure service quality. Hypothesis 2 is partially accepted.

As expected, recursiveness reduces the completeness of the terms and, at the same time, implies the use of residual control rights. Again, the complementary nature of contractual and extra-contractual enforcement mechanisms emerges. For the sake of verification, the moderating effect on measurement costs was considered so as to guarantee that the recursiveness effect did not affect the contract design through the measurement costs. A non-expected effect was found for CPL as well as for CTL, suggesting that the tested causal mode is not additive, that is, the effects of the variables are not independent. As there is no theoretical support for this effect, the causal form of hypothesis 3 is compromised. It should be highlighted, however, that recursiveness affects the contract choice.

Table 1: Tobit test coefficients (Hypotheses H_1 to H_4)

	COMPLETENESS (CPL)		CONTROL (CTL)	
Intercept	0.451	0.458	0.471	0.459
MEC_i	-0.095 ✦	-0.082 ✦	0.116 ✦	0.104 ✦
EIF_i	0.019	0.003	-0.046 ✦	-0.025
REC_i	-0.037 ✦		0.029 ○	
UNC_i	0.026 †	0.024 ○	-0.018	-0.027 †
$MEC_i\,EIF_i$		-0.023 †		0.013
$MEC_i\,REC_i$	-0.019 ○		0.035 †	
$MEC_i\,UINC_i$		0.005		0.014
K_i	-0.004		0.006	
R^2	0.503	0.403	0.480	0.374
adjusted R^2	0.455	0.354	0.430	0.323
Log likelihood	73.72	66.33	54.56	47.14
N	80	80	80	80

Significance: ✦ - 1%; † - 5%; ○ - 10%
TOBIT regressions.

The higher the uncertainty about the variability of the supplier's process, the greater the efforts made to complete the contract will be, and the less use will be made of residual control rights. This effect is opposed to expectations. In the same way as with recursiveness, the moderating effect of uncertainty on measurement costs was considered in order to guarantee that the recursiveness effect did not affect the contract design through the measurement costs. This did not happen, so that hypothesis 4 was not accepted.

6.2. Extra-contractual mechanisms

In the tests observed in Table 2, only EIF positively and significantly affects the adoption of a more relational arrangement. Hence, the greater the economic impact, the greater the probability that the arrangement will be organized through quasi-hierarchy. This

partially confirms hypothesis H_5.

Without denying the effect of MEC and UNC, it can be interpreted that, in the presence of EIF, the impact of the failure takes the arrangement to the relational extreme, with much greater strength than the measurement cost. This is so because, independently of the attribute's measurement cost, its failure is so costly that the company prefers to allocate it, even inefficiently, over taking the risk of large losses.

Tests were carried out within the transaction groups for each typical arrangement. As the observations were reduced, however, the results were not enlightening. Research within the same kind of arrangement could be expanded to observe micro-movements, including the replacement of private order mechanisms. Until now, the replacement/complementariness between contractual and extra-contractual mechanisms in service coordination has already been observed.

Table 2: Ordered probit test coefficients (Hypotheses H_5)

	ARRANGEMENT (ARRANG)
MEC_i	-0.189
EIF_i	0.555 ✦
UNC_i	-0.094
$LIMIT_2$	-0.914 ✦
$LIMIT_3$	0.634 ✦
LR statistic	17.98
Probability (LR stat)	0.000
N	80

Significance: ✦ - 1%; † - 5%; ○ - 10%
ORDERED PROBIT regressions.

Recursiveness was not included in this test given the high correlation with the arrangement, as all non-recursive cases (n=7) are executed in the same arrangement (market regulation).

The ordered probit technique calculates the variables' coefficients and also provides the probabilistic limits of each arrangement's occurrence. As there are three arrangements, the regression produces two limits on one scale: the limit dividing the first probability range that ARRANG=1 will occur, as from which ARRANG=2 occurs, and the second limit, as from which ARRANG=3 occurs. The angular coefficient signs indicate in what direction the explanatory variables change these ranges. If negative, the value of the second limit increases, decreasing the probability of the most relational arrangement (quasi-hierarchy). On the other hand, if positive, the probability that the most relational arrangement will occur increases.

6.3. Coordination and service performance

Heckman (1979) and Masten (1996) alert to the selection bias present in some models, caused by managers' non-random choice of the arrangement, which is then influenced by some explanatory variables – contractual risks – that influence performance. Performance and arrangement do not obtain consistent coefficients when present in the same regression. Thus, following one of the possibilities to solve this bias, the technique of using the arrangement misalignment variable was used, as proposed in Yvrande-Billon and Saussier (2004). In a first

step, the degree of misalignment between the real and the theoretical arrangement was calculated (MISALIGN). The limits and coefficients regressed in the previous test were used to determine the probability of each specific arrangement's occurrence. The value of the MISALIGN variable is calculated by the difference between this probability and the real arrangement found. The degree of misalignment was used as an explanatory variable, and moderated by the symbiosis present in the relation.

Despite the test's low explanatory power (Table 3), it should be observed that the transaction characteristics do not affect performance. Performance not being sensitive to the nature of the transaction would be possible if the arrangements fully observed this effect, or if the measured performance did not fully reflect the supplier's performance, or if the effect were observed by another factor. The transaction's lack of alignment with the way it should be organized according to theory negatively affects performance, as shown by the coefficient of the MISALIGN variable (-0.056, 1%). The direct symbiosis effect is not significant, but the moderating affect on misalignment is. Hypothesis H_6 in its above form is already rejected because of its low explanatory power, although the effect of misalignment on performance and of symbiosis mitigating this effect is highlighted, without any claim on validation.

Table 3: Tobit test coefficients (Hypotheses H_6)

	PERFORMANCE (CONFOR)
Intercept	0.784
$MISALIGN_i$	-0.056 ✦
SYM_i	0.002
$MISALIGN_i SYM_i$	0.044 ✦
MEC_i	0.009
UNC_i	-0.012
REC_i	0.056 ✦
R^2	0.211
Log likelihood	40.141
N	80

Significance: ✦ - 1%; † - 5%; ○ - 10%
TOBIT regressions.

Recursiveness, not foreseen in the hypothesis but used as a control variable (0.056, 1%), is positive and significantly related with performance. Recursiveness serves as a source for process stabilization and for the development of extra-contractual mechanisms, such as trust and reputation, also permits gains from information exchange and allows supervision to act at a time when many of these suppliers are located inside the mill.

7. Validity and limitations

The field study departed from earlier constructs, articulating economic theory, so as to test it in multiple observations collected in one single organization. This is a quantitative approach based on qualitative data collection, converted into quantitative data. The authors dealt with threats to construct validity by adopting proxies developed in transaction cost literature and empirical studies on service contracts, associated with the use of a systematic protocol (ABERNETHY *et al.*, 1999; MCKINNON, 1988). However, these proxies are still maturing, mainly those related to TCE. The proxy for the economic impact of the failure was proposed in this study, approaching a theoretical development action (KEATING, 1995). As

there was no intent on theoretical triangulation, the authors were not concerned with testing alternative, concurrent constructs (SCANDURA and WILLIAMS, 2000).

In terms of internal validity, it is highlighted that, given the cross-sectional cut, the tests cannot analyze causal relations, and are subject to capturing efficient contract designs, while others are still being adapted. This is due to the friction between bureaucracies and incentives for supervisors and managers to adapt the contract design. Incentive effects not isolated in the model mitigate low performance, even when weak coordination mechanisms are present which distort the true effectiveness of coordination in the relation. One example of these incentives are suppliers' expectations to participate in new expansion phases of the mill, choosing to increase their performance in view of opportunities of being selected for other large contracts. This expectation can raise conformity, not because of the effectiveness of the arrangement (to reduce contractual risks), but because of a temporary incentive element. Finally, the longitudinal path dependence effect on the transactions was not addressed. There is evidence of its existence in the way the contracts are written and in the way the mill regulates relations. The change in the external institutional environment can alter the enforcement level, either by a new law or by decreasing measurement costs for external (public) judgment, through standards.

In terms of external validity, the use of an intentional sample does not affect the study's validity, as the latter only aims for theoretical validity of the particular case (EISENHARDT, 1989). As to the final sample tested, it is considered that potential informants, by impairing access to information on a given variable (and being excluded from the sample), indicated that the variable, which encourages them to refuse to answer, is biased, as the sample only includes those respondents who are willing to answer that variable (MCKINNON, 1988). Despite the impact of this effect on variables used in the tested models, its non-effect cannot be guaranteed. To complete discussions on the application of the case study, it is considered that the external validity related to the replication, outside the sampling logic, has natural potential for multiple case studies. Replication in other mills of the group would be the course to understand the broadening of results, when a controlled institutional environment is still maintained. Another opportunity is to replicate the study logic in other types of service provision, seeking evidence for the theory. The natural gain resulting from the replication of cases is the convergence of constructs and the settling of proxies (LILLIS and MUNDY, 2005).

8. Final considerations

Service quality measurement costs are relevant to explain the contract design of industrial service supplies. The expectation that contracts and extra-contractual mechanisms will replace or complement enforcement of the supply agreements influences the choice of the enforcement mix. Also, the choice of the design is a function of the failure's economic impact.

In the results, the role of economic impact as a moderator of the effect of measurement costs stands out. In cases of considerable economic impact, the firm does not make any effort to add completeness to the contract, given the low enforcement level. However, residual rights are still completed as a way of controlling the process, mitigating the third party's failure potential. As proposed by Williamson (1975, 1996), the recursiveness of the transaction is relevant to explain the arrangement, as it intensifies the self-enforcement strength.

Transaction characteristics do not influence performance directly. On the other hand,

transaction alignment and recursiveness do, the latter perhaps because it stabilizes processes and creates viability for the development of extra-contractual coordination mechanisms. Among explanations suggested in this research, the current sub-optimal time and place condition may be accepted, in which supervisor and supplier prefer maintaining stability over improving performance, avoiding the risks of instantaneous and individual improvements.

As a suggestion for future research, besides replication in other firms for the sake of greater generalization, the same discussion could be held in intra-unit services, regulated by service level agreements, which would involve negotiating transfer prices and area incentives in the same company. In terms of implications for controllership, performance measurement metrics and consequent associated incentives are influenced by difficulties to define and protect property rights. Hence, a more in-depth explanation of costs associated with property rights can be one course to explain the behavior of so-called overheads, for which classifications have been insistently proposed, however, with little explanation. It should be considered that the amounts used in legal, auditing, process standardization areas, among others, are but efforts to delineate and monitor property rights. After all, in a world with positive transaction costs, rights are a probability, not a certainty.

9. References

ANDERSON, S.; WIDENER, S. Doing quantitative field research in management accounting. CHRISTOPHER S. CHAPMAN, C.; HOPWOOD, A.; SHIELDS, M. Handbook of Management Accounting Research. Oxford: Elsevier, p.319-341, 2007.

ATKINSON, A.A; SHAFFIR, W. Standards for field research in management accounting. Journal of Management Accounting Research, v.10, p.41-68, 1998.

BARDIN, Laurence. Análise de conteúdo. Lisboa: Edições, 1977.

BARTHÉLEMY, J.; QUÉLIN, B.V. Complexity of outsourcing contracts and ex post transaction costs: an empirical investigation. Journal of Management Studies, v.43, n.8, p.1775-1797, 2006

BARZEL, Y. Organizational Forms and Measurement Costs. Journal of Institutional and Theoretical Economics, 161 (3), pp. 357-73, 2005.

BRÉCHEMIER; SAUSSIER, S. What Governance Structures for non-contractible services? in Dynamics of Industrial Collaboration, Plunket et al (eds.), Edward Elgar, p.35-54, 2001.

CARSON, S. J. When to give up control of outsourced new product development. Journal of Marketing, v.71, p.49-66, 2007.

EISENHARDT, K. Building Theories from Case Study Research. The Academy of Management Review, v.14, n.4, p.532-550, 1989.

ERRAMILLI, M K.; RAO, C. P. Service firms' international entry-mode choice: A modified transaction-cost analysis approach. Journal of Marketing, v.57, n.3, p.19-38, 1993.

ESPINO-RODRIGUEZ, T. F.; PADRÓN-ROBAINA, V. A review of outsourcing from the resource-based view of the firm. Intern. Journal of Management Reviews, v.8, p.49–70, 2006.

HECKMAN, J. Sample selection bias as a specification error. Econometrica.Vol. 47, No1, 1979.

JACKSON, R.W.; NEIDELL, L.A.; LUNSFORD, D.A. An empirical investigation of the differences in goods and services as perceived by organizational buyers. Industrial Marketing Management, v.24, p.99-108, 1995.

KALNINS, A; MAYER, K. Relationships and hybrid contracts: an analysis of contract choice in information technology. The Journal of Law, Economics and Organization. v.20, n.1, 2004.

KEATING, P. A framework for classifying and evaluating the theoretical contributions of case research in management accounting. Journal of Management Accounting Research, v.5, p.66-86, 1995.

KLEIN, B. Why hold-ups occur: the self-enforcing range of contractual relationships. Economic Inquiry, v.34, n.3, p.444-463, 1996.

LAZZARINI, S.G.; MILLER, G.; ZENGER, T. Order with some law: complementarity vs. substitution of formal and informal arrangements. Journal of Law, Economics, and Organization, v.20, n.2, p.261-298, 2004.

LILLIS, A M.; MUNDY, J. Cross-sectional field studies in management accounting research - closing the gaps between surveys and case studies. Journal of Management Accounting Research, v.17, n.1, p.119-141, 2005.

MACLEOD, W.B. Complexity, Contract and the Employment Relationship. Boston College Working Papers in Economics, Boston College Department of Economics, 1997

MACNEIL, I.R. Contracts: adjustment of long-term economic relations under classical, neoclassical, and relational contract law. Northwestern University Law Review, v.72, n.6, p.854-905, 1978.

MASTEN, S. Empirical research in transaction-cost economics: progress, challenges, directions. In Transaction Cost Economics and Beyond, John Groenewegen (ed.), Boston: Kluwer: Academic Publishers, 41-64, 1996.

MASTEN, S.E. Contractual choice. In Encyclopedia of Law and Economics, Vol. III, The Regulation of Contracts, Bouckaert; De Geest (eds.), Cheltenham, Edward Elgar, 2000.

MASTEN, S.E.; SAUSSIER, S. Econometrics of contracts : an assessment of developments in the empirical literature of contracting, in Economics of Contracts: Theories and Applications, Brousseau E.; Glachant (eds.), Cambridge University Press, p. 273-293, 2002.

MCKINNON, J. Reliability and Validity in Field Research: Some Strategies and Tactics. Accounting, Auditing & Accountability Journal, v.1, n.1, p.34–54, 1988.

MÈNARD, C. The economics of hybrid organizations. Journal of Institutional and Theoretical Economics. v.160, n. 3, p.345-376, 2004.

MERINO, F.; RODRIGUEZ, D. R. Business services outsourcing by manufacturing firms. Industrial and Corporate Change, v.16, n.6, p.1147–1173, 2007.

MURRAY, J.Y.; KOTABE M. Sourcing strategies of U.S. service companies: a modified transaction-cost analysis. Strategic Management Journal, v.20, n.9, p.791-809, 1999.

POPPO, Laura; ZENGER, Todd. Testing alternative theories of the firm: transaction cost, knowledge-based, and measurement explanations for make-or-buy decisions in information services. Strategic Management Journal. v.19, p.853–877, 1998.

SANDERS, N. R.; LOCKE, A.; MOORE, C. B. A multidimensional framework for understanding outsourcing arrangements. The Journal of Supply Chain Management, v.43, n.4, p.3-15, 2007.

SCANDURA, T.A.; WILLIAMS E.A. Research Methodology in Management: Current Practices, Trends, and Implications for Future Research Academy of Management Journal, v. 43, n.6, p. 1248-1264, 2000.

SIMPSON, P.M., SIGUAW, J.A.; WHITE, S.C. Measuring the performance of suppliers: an analysis of evaluation processes. Journal Supply Chain Management, v.38, n.1, p.29-41, 2002.

TALLURI, S.; SARKIS, J. A model for performance monitoring of suppliers. International Journal of Production Research, v.40, n.16, p. 4257-4269, 2002.

ULSET, S. R&D outsourcing and contractual governance: an empirical study of commercial R&D projects. Journal of Economic Behavior & Organization, v.30, p.63-82, 1996.

VOSS, C; TSIKRIKTSIS, N.; FROHLICH, M. Case research in operations management. International Journal of Operations & Production Management, v.22, n.2, p.195-219, 2002.

WILLIAMSON, O. E. Markets and hierarchies: analysis and antitrust implication: a study in the economics of internal organization. New York: The Free Press, 1975.

WILLIAMSON, O. E. Comparative economic organization: the analysis of discrete structural alternatives. Administrative Science Quarterly, v. 36, p.269-296, 1991.

WILLIAMSON, O. E. The mechanisms of governance. Oxford University Press, 1996.

WILLIAMSON, O. E. Public and private bureaucracies: a transaction cost economics perspective. Journal of Law, Economics, and Organization, v.15, n.1, p.306-342, 1999.

WYNSTRA, F.; AXELSSON, B.; VAN DER VALK, W. An application-based classification to understand buyer-supplier interaction in business services. International Journal of Service Industry Management, v.17, n.5; 474, 2006.

YANAMANDRAM, V.; WHITE, L. Switching barriers in business-to-business services: a qualitative study. Intern. Journal of Service Industry Management, v.17, n.2, p.158-193, 2006.

YVRANDE-BILLON, Anne; SAUSSIER, Stéphane. Do organization choices matter? Assessing the importance of governance through performance comparisons. In New ideas in contracting and organizational economics research. Nova Science Publishers, 69-86, 2004.