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**THE STRUCTURE OF INCENTIVES IN  
A MAJOR INFORMATION SYSTEMS  
OUTSOURCING CONTRACT:  
THE CASE OF A NORTH AMERICAN  
PUBLIC ORGANIZATION**

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# **The Structure of Incentives in a Major Information Systems Outsourcing Contract: The Case of a North American Public Organization\***

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## **Abstract / Résumé**

*We use agency theory to shed light on a complex, multi-year outsourcing contract between an important public organization and three major information services outsourcers. The contractual arrangement shows that innovative contracts can be drawn that reduce the scope of supplier opportunism.*

Nous utilisons la théorie des mandats pour analyser un important et complexe contrat d'impartition. Ce contrat lie pour plusieurs années une importante entreprise publique et trois impartiteurs de services informatiques. L'étude de l'entente montre que certaines innovations contractuelles permettent de réduire l'opportunisme des fournisseurs.

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## **Introduction**

We recently evaluated the governance features of hundreds of IS outsourcing contracts (Aubert, Rivard, and Patry, 1994). The results showed that incentive measures are used in only a limited number of cases. Apparently, the parties to the outsourcing contracts we analyzed did not use very elaborate or sophisticated contractual provisions, but relied instead on conventional purchasing contract agreements. Prices and, in many cases, the required levels of services are specified, but not much else. This is a far cry from the often depicted “partnerships agreements” and “strategic alliances” described in the literature.

On the other hand, agency theory suggests that the outsourcing of complex activities often calls for the implementation of more sophisticated contract management mechanisms. For instance, incentive contracts will provide for risk- and profit-sharing, for the existence of various committees to facilitate the exchange of information and elicit greater cooperation, for the exchange of employees between the client and the supplier, and for different forms of partnerships. These activities are all designed to improve the coordination between the efforts of clients and suppliers and to foster the emergence of a common vision.

In this case study, we describe and analyze, with the help of agency theory, a major outsourcing agreement that illustrates the potential of sophisticated contracts.

## **The Relevance of Agency Theory**

In a world in which economic agents cannot commit themselves costlessly to refrain from self-serving behavior, there is a risk of opportunism. An opportunistic buyer or seller will seek its interest “with guile”, will deviate from the behavior that is prescribed by the contract whenever this is advantageous to him, will “cheat”, “shirk” or “lie”. Outsourcing and the internal provision of IS services are plagued by the risk of opportunism.

This does not mean that all clients and suppliers are behaving opportunistically all the time. The moral codes of individuals, the existence of social norms, the risk of being prosecuted and possible damages to one’s reputation refrain from opportunism. But these constraining factors do not prevent all opportunistic behavior. The risk is always there, and it depends on the conditions in which the transaction is executed and on the structure of incentives facing the individuals.

In outsourcing contracts, the principal is the client. The agent is the outsourcer. The problem of the client consists in choosing an agent and in motivating him. The client wants the outsourcer to perform its tasks as he would prefer. If it were possible and not prohibitively costly to write and enforce complete contracts which specify the contributions expected of the agent in all possible states of the world, then there would be no problem. It is the complexity of the contractual process and uncertainty, when matched to bounded rationality, that render the writing and enforcement of complete contracts utopic. Contracts are always incomplete to some degree. Some circumstances can never be foreseen: a breakthrough in technology, a new regulation, an institutional or political constraint, etc.

Whence the possibility that the outsourcer will reduce its level of effort, will refrain from developing all the software that could efficiently be produced under the contract, or from making the transaction specific investment that would be needed to achieve the desired levels of efficiency (such as learning the specifics of the business environment of the client), etc. The costs of writing the contractual agreements, of enforcing them, and the residual loss resulting from inadequate coordination or motivation are the agency costs. The design of efficient contractual agreements, which minimise those agency costs, is a major contribution of agency theory (Eisenhardt, 1989; Milgrom and Roberts, 1992; Sappington, 1991).

Notice, though, that the same conditions make the internal provisions of IS services subject to agency problems. The IS department of an enterprise may ask for unwarranted budgets, select technologies better designed to please the IS staff than to serve the users, let the quality of services deteriorate, and so on. The “control” of the firm over its own IS operations is far from perfect. The risk of opportunism persists. In this paper, however, we focus on the structuring of incentives between a client and its outsourcers.

## **The sources of opportunism**

The presence of private information lies at the root of opportunism. Any information possessed by one party that is not verifiable by the other party is “private”. When private information and conflicting interests are joined, agency problems develop. In the absence of complete contracts, the parties will try to reduce the importance of agency problems by a better alignment of objectives or by reducing the asymmetry.

First, clients and outsourcers can align their goals through the design of contracts (risk-sharing contracts are one example, they definitely dominate “cost-plus”

contracts or fixed price contracts), by developing strategic alliances and business partnerships, by using their reputation as a bonding device, etc. Then they can produce information and reduce its distributional asymmetry: the client will measure the performance of the outsourcer, the outsourcer will signal its quality to clients by offering warranties, etc.

## **The Effects of Incomplete Contracts**

The manifestations of opportunism are numerous and possibly very damaging. The most obvious manifestation is a reduction in the level of effort by the outsourcer (as well as by the client which may, for instance, cheat on the training of its employees and then blame the supplier of the software for low performance), resulting in a deterioration in the quality of the services. Unless performance has been contractually specified, less than maximal effort is to be expected. And even when performance targets have been specified, the performance of the outsourcer will depend on the quality of its measurement and on its verifiability (the possibility that a third party could observe it).

Clients and outsourcers may also be tempted to renege on their promises and commitments. No contract is immune from such behavior. A client will refuse to pay for services rendered because it faces a liquidity problem or because it claims that costs have been “inflated”. A supplier will refuse to deliver the services or adapt some applications because, for instance, it claims that such adaptations had not been foreseen, or because the language of the outsourcing contract is not clear. The problem is the incompleteness of the contract itself, which precludes a swift and economical settlement by a third party like a court. Even when both the client and the outsourcer know very well who cheated, the cheating may not be verifiable because of private information.

In many instances, instead of litigations, the parties will opt for renegotiation. Both parties may find it advantageous to reopen the contract in the light of information which was not available ex ante (or perhaps was available to only one party, which preferred to keep it secret). But as far as the client or the outsourcer can foresee that possibility, they may be unable to draft an efficient contract in the first place. In one case that we encountered, a major insurance company found itself trapped with an outsourcer which refused to modify the software in ways that were required by changes in regulatory regimes. The outsourcer had spent all the allocated development time half-way in the contract execution period. Forced to renegotiate, the insurer finally decided to reintegrate the IS services it had outsourced. The costs on both sides were stupendous.

A most serious consequence of imperfect commitment is the diluted incentive it creates to make transaction specific investments. Such investments lose their value when the assets they supported are allocated to an alternative transaction. An outsourcer will have a reduced incentive to invest in the development of knowledge, in the training of personnel, etc., that are specific to one client. On the other hand, as the client is confronted to an outsourcer which is unique because it has made such investments, it begins to worry about the possibility of being held-up in the relationship. If there were several suppliers at the time the decision to outsource the activities was taken, the number of potential outsourcers with similar characteristics is greatly reduced at the renewal period. Those who made the transaction specific investments can then use their position advantageously in the negotiation. Therefore, in general, the client will want to safeguard itself against the risk of hold-up.

### **The Tools of Incentive Contracts**

Faced with such risks, we should expect clients and outsourcers to devise contracts that will elicit the greatest effort and cooperation of both parties. Agency theory provides many insights. It clearly shows that fixed price contract, often awarded using standard auctions, are inefficient. They do not elicit optimum effort and they expose the client to many risks of opportunism. Outcome based contract (risk and profit sharing) are superior.

Monitoring the agent can also help motivate him. Direct observation of the outsourcer's behavior and the access to economic or financial information about the supplier can also be profitably exploited. Competition among two or several outsourcers will also generate useful information about the effort level of each. The idea is that if environments are correlated, the relative performance of the outsourcers will reveal their relative effort level. Compensation, when tied to relative performance, will then induce higher effort. The practice of dual and parallel sourcing in the procurement decisions of many enterprises is partly grounded on this principle. In the U.S., the Department of Defense has been advised to expand the use of second sourcing (Sappington, 1991) and in Japan, firms rely often on parallel sourcing (Richardson, 1993).

It is often claimed that partial outsourcing can provide a useful benchmark. Partial outsourcing calls for the internal production of a fraction of the needs of the firm for some given set of activities. A supplier provides the residual demand. One problem with partial outsourcing, though, is the difficulty faced by the top management in getting an unbiased appraisal of the relative performance of the internal and external sources. The internal division may claim the quality of the

services provided by the outsourcer is not the same as that provided by the IS employees, or that the transfer prices used by the firm do not reflect true costs or values. Opportunism pops up, once again, spurred by the private information in the hands of the IS managers. Unless top management can learn about the actual costs and service levels, any comparison risks being distorted by rent protecting behavior.

And when, as is the case with many IS outsourcing deals, the relations between the client and the supplier will be ongoing, linking compensation to average performance over time is superior. The duration of the relationship also helps to develop clan-like mechanisms which allow both firms to compensate short term inequities over time.

## **The Puzzle**

In a recent study (Aubert, Rivard, and Patry, 1994), we looked at the outsourcing decisions of 640 Canadian firms. Our questionnaire included many questions about the governance mechanisms that had been developed by the clients and suppliers to control their transactions. To our surprise, very few contracts were “sophisticated” from an agency perspective. Why this is so is beyond the scope of this paper. On the other hand, respondents and executives we met showed they were concerned about the possibility of being held-up and the importance of measurement.

As a result, our analysis shows that a very significant determinant of the level of outsourcing for a given IS activity (we broke down IS operations into 14 activities) is its measurability.

Nonetheless, very few agreements contained incentive contracting provisions. One notable exception was a large public organization which had undertaken a very ambitious outsourcing program. We turn to this particular agreement in order to evaluate how agency theory can help in explaining the structuring of complex contracts.

## **Methodology**

Our objective in this paper is to gather detailed knowledge on an innovative outsourcing relation, to better understand its nature and complexity, and to show that contracts motivating the agent could be drawn. Case studies are appropriate to collect such information (Yin, 1989; Benbasat et al., 1989). The case study method was chosen because it is more flexible in terms of the type of evidence it permitted to

gather, and because it enabled the researcher to go back to the site and collect additional data as necessary.

The site chosen for the analysis had outsourced all its IS activities. Evidence was collected on the governance mechanisms established. Data was collected by different means. The organization's leading information systems manager acted as the respondent. First, we conducted a semi-structured interview with the IS manager. This interview enabled us to gather substantial information and get an overview of the situation. A series of written questions were then sent to the respondent to follow-up on some issues raised during the interview. Finally, phone interviews were conducted with the respondent to gather any details that were still missing in the case description.

## **Description of the Organization**

The public organization chosen for this case made intensive use of information technologies for every aspect of its business. At the time of the study, the organization was using all types of information technologies. It employed two large IBM main-frames (3090-600G), over sixty-five VAX machines in a DecNet/Internet environment, and more than ten thousand work-stations, ranging from early Intel 8086 to 80486. There were gateways for all types of technologies. In order to meet the technological challenges it was facing, the organization decided to outsource its information systems activities. It concluded a complex deal with three different suppliers. Major projects were underway and more than 1000 consultants (from the three suppliers) were involved.

In these arrangements, the three suppliers invested a great deal in knowledge acquisition. Many protection mechanisms were established. The most important was the presence of three suppliers. This meant that competition was always possible between these three suppliers. This significantly lowered the hold-up possibilities. There was also a risk for the suppliers and long-term guarantees were offered by the client. The contracts also provided the suppliers with privileged access to foreign markets, with the assistance of the public organization. The measures used for software development projects were very detailed. They took the form of contingency tables which discriminate for the type of technology, the complexity of the problem, the interconnectedness with other systems, and many other factors affecting development effort.

The contractual agreements between the client and the three outsourcers departed significantly from standard, arm's length, market transaction. They called for the setting up of a unique and complex governance structure. The huge volume of

development activity needed by the public organization justified the establishment of such a governance structure. The result was a long-term relationship with multifarious features that enabled each party to gain from the association. The high volume of activities motivated the suppliers to assume a larger share of the risks since they expected to realize their profits over several transactions.

### **Mechanisms Used to Increase the Incentives for the Agent to Perform in the Principal's Best Interest**

This section presents the various mechanisms established in the contracts to better motivate the agent to perform in the principal's best interests. These features differ from a simple client-supplier relationship. They make the contract more complex (and therefore more costly) to manage but increase the probability that the agent will behave in the principal's interests.

#### *Benchmarking*

Benchmarking increases the information available to the principal about the agent's performance. It is therefore easier for the principal to link the agent's performance to its rewards. A high correlation between the agent's efforts and the its rewards increases the incentive of the agent to put forth a higher level of effort (Alchian and Demsetz, 1972; Eisenhardt, 1989; Sappington, 1991).

The public organization has measurement guidelines for main-frame applications, distributed systems applications, and for most other systems. Some of the standards were established on the basis of projects that were conducted internally, others on competing submissions that were received by the public organization. As a result, during negotiations, the organization could closely adjust the price paid to the supplier undertaking a project to the resources and the efforts required by the project. However, once an agreement has been reached, the contract takes a fixed price format.

#### *Monitoring*

The contract placed the outsourcers in a situation they were not used to. They had to cooperate on almost every project. Since the architecture work was outsourced to Supplier A and the data base and technology support was outsourced to Supplier B, any one of the three suppliers doing a new application development needed to work with suppliers A or B in order to get their signature and approval on architecture and on data base designs. Similarly, Supplier C had the responsibility for the utility on which all the software was running. The suppliers had no choice but to cooperate with Supplier C. The outsourcers had to put aside their competitive instincts, in the best interest of the public organization, if they were to fulfill what was agreed upon in their

contract. An interesting result introduced by this type of arrangement was that the public organization was automatically getting a third party's view of each supplier's work.

For the public organization, all these required interactions among the suppliers provided information about each one's performance. The principal knew that a shirking supplier would be denounced by the two other ones since the poor performance of a supplier would ultimately affect the others.

#### *Dynamic Interaction*

The public organization wanted to negotiate a long-term agreement that would accomplish two things: induce the suppliers to make significant investments in order to learn its particular business, and enable them to leverage their investments and reduce their risks over time.

This type of relationship differs drastically from a single project agreement for which a supplier must charge a risk premium to cover its specific investments. By being assured that several projects will be awarded to them over many years, the suppliers saw their risks reduced. Even if they were not making profit on a specific project, they could still expect an overall profit because of the continuing business they would be doing with the client over many years. Unprofitable projects are compensated by very profitable ones, thus netting a reasonable average profit margin.

#### *Countervailing Incentives*

Linking two stages of production can be an incentive for an agent to perform in the principal's interest. When two stages of production are not independent -when, for example, the effort level required at one stage depends on the preceding stage level-, allocating both stages to the same agent can motivate him to perform adequately. By putting extra effort in the first stage, the agent will lower the effort required in the subsequent stage. Inversely, by shirking during the first stage, the agent will increase the effort required later. Therefore, the agent cannot claim that he has put excessive effort in both stages. The link between the two stages provides information to the principal that compels the agent to report its efforts honestly.

It also forces the agent to internalize the impact of his first stage effort level on the second stage. Linking the two stages of production was a very efficient way to ensure that the agents would put the required efforts to develop and optimize the systems. Since the agents were responsible for the maintenance of the systems they had developed, they had strong incentives to develop these systems in the most efficient manner, in order to minimize their maintenance efforts.

This represents a major departure from the usual way of doing business in the industry. Until it entered into these agreements, the public organization paid for maintenance on an hourly basis, thus inducing suppliers to factor in extra hours and bill for them.

#### *Goal Alignment*

An often mentioned mechanism that ensures that the agent will behave in the principal's best interests is the alignment of the goals of the two parties. The arrangement between the public organization and its suppliers is a case in point.

As the deal was being negotiated, other administrations elsewhere in the world were just starting to realize the challenges posed by the new technology. This created an opportunity for the public organization and its suppliers. At the time of the interviews, the organization, in association with its three outsourcers, was transferring its technology in approximately eight countries. Neither the client nor the outsourcers would have had the capacity, alone, to market that technology.

The public organization would probably not have sold its technology if it had not been collaborating with its current suppliers because selling IT solutions is not the public organization's core business. On the other hand, the IT suppliers lacked the credibility to compete effectively in a highly specialized line of business as well as the access to a network of government agencies and public administrations throughout the world. Suppliers and client depended on each others. In this joint-venture, they were more partners with closely aligned goals than they were client and suppliers.

#### *Reputation Effect and Signalling*

The reputations of the outsourcers serve as a strong binding mechanism that assures the client for the quality of service. Information systems services suppliers are large and very well known. They invest huge amounts of money to promote and improve their image. These investments are one of the mechanisms used to guarantee an adequate performance (Klein and Leiffler, 1981). Reputation is an important but fragile asset which could, if lost, lower substantially the value of a firm. This explains why the outsourcers have incentives to provide an adequate service level, even if they sometimes have the feeling they are not paid enough. The service level they provide is a key determinant of their reputation and enables them to obtain new business.

It is also quite clear that the reputations of the public organization and of the suppliers were essential elements in the success of the joint-venture abroad. These external deals were extremely attractive for the outsourcers. The public organization received calls on a regular basis from other very large public sector organizations, primarily in North America, considering the outsourcing route. They were talking to

the outsourcers that the public organization was dealing with, and three suppliers used the public organization as a reference point and a marketing tool.

This expansion to outside markets emphasized the effect of reputation safeguarding. Since the suppliers heavily depended on the public organization to introduce them to other administrations, the cost of not providing adequate service to the public organization was much higher than the simple loss of the public organization contract. It also meant that the international deals would be threatened. The presence of this externality, the dependence of the suppliers on the public organization ensured to some extent the latter against the risk of substandard performance.

#### *Competition Between Agents*

Competition is often used to prevent opportunism. If a supplier knows that he is evolving in a competitive market, the price he will ask for a product or service is likely to reflect his true costs since he risks losing the contract to an alternative supplier otherwise. By awarding the contracts through a tournament, the principal does not need to know what are the true costs of the supplier beforehand. The tournament frees the principal from the information asymmetry problem (Sappington, 1991).

The public organization had measurement guidelines for all types of applications. As mentioned earlier, these estimation techniques were an incentive for the suppliers to remain fair. But such guidelines do not exist for totally new technologies or applications, which are bound to be developed over the years. The public organization resolved that it would rely on competitive bidding for these systems, until a solid base for comparison could be established. The outsourcers can bid, but are not assured to be awarded the contract.

Some might argue that the outsourcers enjoy some advantages in this process. After all, they are “first-movers”, know better than other competitors the environment the organization and can point to the complementarity between what they have developed and the new activities. We agree with this assertion but think that the option of involving another supplier, or even the threat of using that option, will have a disciplining effect on the incumbent suppliers. At the very least, it provides the client with extraneous information. And there subsists always a risk that a new player may be brought in to share in the lucrative contracts.

Also, the management of the public organization had the cleverness to include in the contracts the right to solicit competitive bids when the bids submitted by the outsourcers fell outside a determined range of “reasonable” prices for

contracted activities. Since opening up the competition is costly to all, it is viewed as a last resort mechanism. Like the threat of a heavy penalty, it is likely to curb the extent of opportunism.

## **Conclusion**

The public organization had an extremely high volume of information systems activities. The figure of one million development hours put forward by a public organization's representative was impressive. There were few organizations facing such challenges in terms of software development. This high volume of development activity justified the establishment of complex governance structures. A long-term relationship emerged between three suppliers and a client, a relationship with multifarious features enabling each party to gain from the association. Each supplier delegated more than three hundred employees to handle the organization's business. This is a very significant number of employees dedicated to a single contract for a consultant. If the size of the contract had been smaller, or the volume of software development activities lower, it would not have been as profitable for the suppliers to invest in such a relationship and it would have been more difficult for the public organization to convince them to make the required investments.

It was also this very high volume that enabled the organization to deal simultaneously with three suppliers, providing them with a sufficient workload to keep them motivated. If there were only one or two suppliers, the ex-post bargaining problems would have been higher, as would the risks of lock-in problems. Our conversations with many managers who dealt with a single outsourcer have convinced us that lock-in problems are very serious and not fully taken into account when the decision to make or buy is taken.

On the other hand, we were somewhat surprised not to find performance-based compensation provisions in the contractual arrangements. Agency theory predicts that whenever possible (when output is observable and measurable), risk- and profit-sharing agreements will align goals efficiently (Holmstrom, 1979). In this case, the three suppliers were large firms, with a probably lower risk aversion than small consultants on which it could have been more difficult to transfer some risk. There are many ways in which performance-based compensation could have been introduced. We do not know presently why this is so. This is clearly an area for further research.

Nevertheless, the contractual agreement that we analyzed shows that innovative contracts can be drawn. And that these contracts can better serve the client and the suppliers.

## References

- Alchian, Armen, Demsetz, Harold, "Production, Information Costs, and Economic Organization", *The American Economic Review*, (December 1972), 777-795.
- Aubert, Benoit, Rivard, Suzanne, Patry, Michel, "L'impartition des activités informatiques au Canada : Portrait de 640 grandes entreprises", Cahier du GReSI, no 94-07, (1994), 40 pages.
- Benbasat, I., Goldstein, D., and Melissa Mead, "The Case research Strategy in Studies of Information Systems", *MIS Quarterly*, (Sept. 1987).
- Eisenhardt, Kathleen, "Agency Theory: An Assessment and Review", *Academy of Management Review*, vol. 14, no. 1, (1989), 57-74.
- Klein, B. and K. Leffler, "The Role of Market Forces in Assuring Contractual Performance", *Journal of Political Economy*, vol. 89, no. 4, (1981).
- Holmstrom, Bengt, "Moral Hazard and Observability", *Bell Journal of Economics*, vol. 1979.
- Milgrom, Paul and John Roberts, *Economics, Organization & Management*, Prentice Hall, (1992).
- Ouchi, William G. "Markets, Bureaucracies and Clans", *Administration Science Quarterly*, vol. 25, no 1, (March 1980), 129-147.
- Richardson, J., "Parallel Sourcing and Supplier Performance in the Japanese Automobile Industry", *Strategic Management Journal*, v. 14, (1993).
- Sappington, David, "Incentives in Principal-agent Relationships", *Journal of Economic Perspectives*, vol. 5, no. 2, (Spring 1991) 45-68.
- Yin, R., "Research Design Issues in Using the Case Study Method to Study Management Information Systems", in *The Information Systems Research Challenge: Qualitative Research Methods*, vol. 1, Cash, J. and P. Lawrence (eds.), (1989).