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VERTICAL RELATIONS

Recent developments and lessons for telecommunications

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Summary: *The organization of client–supplier relations is the subject of the economic theory of vertical relations. Since Ronald Coase's seminal work, this issue has been considered in connection with the boundaries of firms. This article recapitulates the main concepts used in discussing this general problem, while stressing that when specific investments are made in a context of uncertainty and incomplete contracts, an optimal a priori form of inter-firm relations does not exist. Trust between partners is therefore one of the essential factors in stabilizing long-term contractual relations. In the telecommunications sector today there is great diversity in the organization of economic relations between operators and manu-*

facturers. The institutional environment (regulation, industrial policy objectives and national independence considerations) has been and remains the main element in the structuring and evolution of these conflictual long-term partnerships between network operators and their main suppliers.

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The chairman of British Telecom said after his group was privatized: "Now when I buy equipment, I can shop not only in Britain or Europe but wherever I am offered the best value for money." This statement backed up analyses forecasting a restructuring of the traditional relations between equipment manufacturers and the infrastructure operators they supply (electricity, telecoms, gas, railways, etc.). The implicit reasoning is that monopoly operators have always favoured local suppliers for reasons of "national interest". This introduced many inefficiencies into relations between manufacturers and operators. The "demonopolization" of infrastructures, privatization, and globalization will force operators to improve their productivity and give better value for money in the services they provide, which in turn will oblige them to improve the efficiency of their relations with suppliers. In point of fact, the nature of operator–supplier relations cannot be reduced to such a simple outline as this, and many studies over the past several years have helped to put this type of reasoning into perspective by updating previous concepts and research results.

Three approaches can be identified. The first involves determining the efficient organization of vertical relations from the standpoint of the players directly involved. The second deals with the use of vertical relations by one of the players to bolster its market position. The third puts vertical relations into a more macroeconomic perspective, in order to analyse their potential effects in terms of industrial policy.

This presentation focuses on the first approach, which is part of the economic theory of the firm, putting the accent on the relationship between a company's internal operating methods and the ways it interacts with its business environment. In this article I will set out the principal concepts developed in this new problematics and infer some lessons for studying vertical relations between telecommunications operators and their suppliers in the field of public switched networks.

Vertical relations and transaction theory

In this new problematics, a vertical relation is broadly defined as a transaction in which part or all of the production of a firm is supplied directly to another firm which uses it as a production input.

A transaction denotes the transfer of a good or service between two processes that are technically separable. If the transaction is between two legally separate entities, the transfer of the good is accompanied by a total or partial transfer of property rights. In a market system, acquisition of the property right is counterbalanced by a corresponding cash transfer, which constitutes the price of the good. The transaction is thus the elementary operation in relations between economic activities and agents, whether or not they are part of the same organization. This concept is broader than that of exchange, generally associated with effecting a particular type of transaction in the marketplace.

The question of how to organize a vertical relation thus hinges on the definition of the terms of the transaction between a supplier and its customer or customers, that is, on setting the terms for the exchange of goods or services produced by the supplier, with special attention to the division of the profits generated from the value added by the customer.

Specific investments, expropriation, and market imperfections

Transactions between two firms involve goods or services that are either standard (available on catalogue or off-the shelf), hybrid (that is, adapted from a standard product) or custom-made (made entirely to the customer's specifications).

When a transaction concerns a non-standard good, one of the firms has to adapt its technology or product to the specifications laid down by the other. This adaptation implies that a specific investment has to be made to carry out the transaction between the supplier and a given customer . The firm making the specific investment "binds" itself to its partner in the exchange, because the investment produces a specific asset that cannot easily be re-used if the transaction with the planned partner falls through. The eventual cost of re-using the specific asset (switching cost) is reflected in losses, or sunk costs .

In a purely market relationship in which there is no prior coordination between the firms, a supplier who made a specific investment in order to offer a good that could be used by only one customer would no longer control the value derived from its assets. This value added also depends on the customer deciding to accept the transaction involving the custom-designed good with no prior commitment on its part. The supplier's loss of independence constitutes a deterioration of its property rights in the assets created for the customer. The customer can use this dependence to literally expropriate the supplier's assets by buying the good at much less than cost price.

To avoid this, the supplier can contact the customer before investing in the development of the good it intends to produce for the firm, seeking to establish a consultation mechanism that is essential to carrying through a "no-risk" transaction. Such collaboration before the exchange takes place means that the transaction is no longer part of a purely competitive framework as understood in economic theory. The goal of the negotiation is obviously to set out the terms of the transaction between the two firms, which are presumed, at least at the outset, to retain total decision-making autonomy.

Contracts and transaction costs

In order to set the terms of a future transaction, the firms sign a legally binding contract. Drawing up the contract involves direct and indirect costs that are jointly termed transaction costs. They can be broken down into two main areas:

- set-up costs, covering researching information on products, technologies, reliable partners, negotiation costs, drafting costs, etc;

- execution costs, covering management of possible conflicts, explicit or implicit adjustments to some contract clauses, costs caused by the bankruptcy of one of the partners, etc.

Many expenses associated with signing contracts can be booked as fixed costs. Once the terms of a contract have been set, transaction costs tend to vary little, whether with the number of transactions effected under the agreement or with the diversity of goods and services covered by the contract. As with production, the organization activity thus benefits from the classic effects of economies of scale and economies of scope: the unit cost of a transaction per good exchanged falls with the number of transactions and the number of goods covered by a contract. The frequency and scope of transactions will logically influence the mode of organizing contractual relations chosen by the agents.

Nevertheless, one can well imagine that the setup and execution costs of a contract increase with the level of uncertainty surrounding the subject of the transaction. Uncertainty means the impossibility of foreseeing all the events that could occur during the term of the contract. Uncertainty is always the result of a lack of information.

Both partners may suffer from a symmetrical lack of information, which may not be voluntary. It is often impossible to envisage everything that may happen in the future and therefore to protect oneself against unanticipated events by including appropriate and precise clauses in contracts. In this case, uncertainty is radical. In this situation, completely unforeseen losses or profits may arise. Who reaps the profits or suffers the losses when unforeseen events occur? It is obvious that contracts cannot lay down which partner wins or loses by totally unforeseen events; to this extent, such contracts are incomplete. The challenge and the difficulty of drafting a contract that is incomplete because of radical uncertainty reside precisely in the attribution after the fact (*ex post*) of what are termed residual rights in such profits or losses, the amount and origin of which are assumed not to have been defined at the outset. Logically, the more clearly one or both of the parties perceives the uncertainty involved in the contract, the higher the transaction costs will be, because the two sides will have to come to an understanding about unforeseeable events, which implies researching and revealing information that is very difficult and therefore very costly to obtain. It would seem possible to protect against uncertainty by signing only short-term or even extremely short-term contracts that minimize future commitments. But many customer–supplier relationships cannot be short-term; that is neither possible nor desirable, especially if the activities concerned are capital-intensive, as in the case of the networks discussed here.

Delegation of authority, opportunism and controls

Another form of relationship between customer and supplier can be envisaged in this context. Direct participation by the operator in financing research seems to be a good way of consummating a transaction by sharing the risk between both firms. Here we move from the level of cooperation to the level of partnership.

One of the contracting parties loses some of its autonomy and agrees to a delegation of authority to the other. The firm holding this authority can thus take decisions on the interpretation of the contract if events occur that are not covered by the clauses. The more authority is delegated, the more loosely the contract will be worded, because adjustment procedures can be imposed by one party on the other. Delegation of authority constitutes a deterioration of the property rights for the firm that agrees to it. Naturally, the delegating firm will insist on retaining a power of control over the decisions taken.

Economists call this type of relationship between two entities an agency relation. The principal entrusts the performance of a task to the agent, usually in return for remuneration. The question that immediately springs to mind is: does the agent deserve the trust of the principal? In other words, does the agent have all the skills to justify being paid for the task entrusted to it?

Behind these questions lies the problem of asymmetry of information. In practice, the agent has more information than the principal, because it knows better than the principal how much real effort is required to carry out the task. So in a vertical relationship, the customer (principal) is in a situation of information inferiority compared to the supplier (agent) if it only has imperfect knowledge of the supplier's real production circumstances. This imbalance is even more marked if the business is new (radical uncertainty), if the customer has few data for making comparisons or exerting pressure (supplier monopoly) or if checking the supplier's costs (audit) is complicated and therefore expensive.

Lack of information can also result from the agent's strategy. Deliberately concealing information in a contractual context indicates the existence of opportunist behaviour. The aim is to make profits by guile, trickery or procedural ingenuity, either at the time the contract is negotiated or when it is executed. A firm that is a potential victim of opportunism must protect itself by inserting appropriate clauses in the contract, particularly concerning *ex ante* and *ex post* controls, which increase the costs and make the organization of transactions more complex.

It is even more crucial to supervise the execution of a contract when the two firms are legally separate. Opportunist behaviour arises when the information that would enable the principal to check on the agent is non-observable and/or non-verifiable. Verifiable means capable of being used as proof invokable against a third party (including in court) if the contract is not complied with.

The quantity of the good or service provided can be observed, but supplier performance quality cannot be verified. Only an insider can acquire enough knowledge to verify the quality of the efforts made within the supplier firm. Substituting internal control for external control is one possible way of overcoming the obstacle of checking information. In practice, principals destroy the independence of their partner firms by acquiring part or all of their share capital. By acquiring a property right in the company it acquires the authority to obtain information about its internal management and its strategy.

Shareholdings, integration and organization costs

Taking total or partial shareholdings, be they minority or majority stakes, or reciprocal holdings, will have the effect of merging the decision-making centres of the firms to a greater or lesser degree. This results in a partial or total loss of autonomy for the companies, whose relations are henceforth organized in a hierarchical rather than a market context. The transaction costs involved in organizing the relations between previously independent firms therefore disappear and a decision-making authority (head office, management, supervisory board, etc.) has the power to organize, or impose, the terms of the transactions between the companies. The establishment of this authority and its functioning create costs of managing and controlling transactions within the organization, known as organization costs. These costs counterbalance the savings made on transaction costs. They include:

- internal control costs to counter opportunist behaviour caused by the asymmetries of information inherent in any hierarchical organization in which there is delegation of authority (see above): such behaviour also occurs within the organization.

- transfer costs, management costs and the cost of sharing information or not, because any non-tyrannical or non-dictatorial organization implies taking decisions in a more or less collective way. Economists have long ago described the insurmountable failings of such decision-making procedures.

In a configuration in which vertical relations are governed by an authority, the price of transactions negotiated between companies belonging to the same group are known as transfer prices. These prices may reflect the strategic goals of the integrated group rather than the cost structures of its component companies. The terms of the transactions between affiliate companies are governed by the structure and the balance of property rights between the companies concerned and, in the case of business corporations, by the balance of voting rights, which determine the effective hierarchical subordination. Only integration, that is, total control of the property rights in the two companies by the same owner, can avoid this type of problem.

For the upstream business, integration creates a captive market. The downstream company's absorptive capacity may even be considered great enough for all the upstream company's production to be sold to the downstream unit. The securing of outlets has both positive and negative aspects. On the positive side, integration enables subsidiaries to cooperate fully and avoid the ups and downs involved in specific investments. On the negative side, it eases competitive pressure and may so dampen the dynamism of both the upstream and downstream companies that an integrated business may in the long run turn out to be lower-performing than independent companies. An integrated group must put in place internal incentives that can emulate the competition that was ensured "spontaneously" by the market when its component companies were independent. Many transaction management mechanisms can be envisaged to minimize the drawbacks of integration, such as organization by profit centre. None of them is a panacea.

Market/hierarchy choice: outline for a synopsis

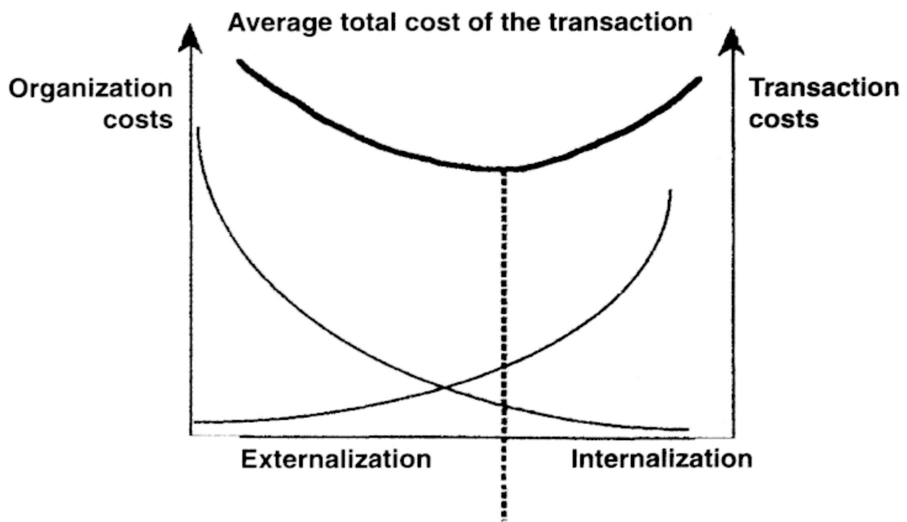
Vertical relations thus cover a field that is more complex than had long been recognized by economic theory. The many forms of organization that are employed to govern relations between customers and suppliers are first and foremost a product of the business environment in which they are structured: standardization or non-standardization of the goods and services exchanged, the level of uncertainty, and the virulence of opportunistic behaviour.

In order to determine an appropriate organizational form for managing a vertical relationship, companies must have a way of choosing between the transaction costs of contracting with an outside firm and the organization costs of carrying out the transaction in-house. If transaction costs are lower than organization costs, a market transaction (separation of activities) is the obvious answer; if on the other hand transaction costs are higher than organization costs, the tendency will be to choose the hierarchy solution (integration of activities). Following this argument through, and imagining a very theoretical continuum of organizational forms, margin theory could even come into its own: to paraphrase Coase, a firm tends to grow until the organization costs of supplementary transactions in-house become equal to the costs of carrying out the same transaction by a market exchange, or to the costs of organizing it in another firm. The make-or-buy decision thus becomes a question of optimization under constraint (see Figure 1).

Williamson has suggested a normative and synoptic approach using the above concepts. Efficient organization of vertical relations is the goal of both contracting firms, which seek to minimize the total cost of their transactions. The parties to the exchange must choose a transaction governance structure that helps them reach this goal. The method chosen depends on the values of the three parameters that influence, *ex ante* and *ex post*, the total transaction cost: radical uncertainty, transaction frequency, and

Figure 1
The make-or-buy decision: an optimization approach

Let us suppose that a firm is interested in a given activity. For each method of organizing this activity, it evaluates a total transaction cost equal to the sum of the costs of the transactions that it carries out in the course of this activity and it can calculate an average total cost of the transaction. If the minimum of this average total cost falls at a point where transaction costs are higher than organization costs (to the right of the dotted vertical), the activity should be internalized (integration of the activity and management of the transaction in a more hierarchical than market mode). Conversely, if the minimum average total cost falls at a point where transaction costs are lower than organization costs (to the left of the dotted vertical), the transactions connected with the activity should be managed in market-oriented ways (the activity remains externalized and is carried out by one or more firms retaining a greater or lesser degree of autonomy).



investment specificity. The agents are presumed to be opportunistic and one of the considerations in choosing the governance structure is protection against such behaviour at minimum cost.

There are three degrees of uncertainty: low, intermediate and high. The generic model is located in a context of intermediate uncertainty. This presupposition avoids the need to consider extreme situations. In practice, if there is no uncertainty, contracts can be complete and there is no real need to look for the best governance structure, as contracts can cover all the eventualities that may arise from transactions. In contrast, a broad approach would give little guidance in situations of extreme uncertainty, which should be tackled on an *ad hoc* basis rather than by following rules drawn from ready-made blueprints. All in all, as Linda put it, "When you know everything or nothing about a given market, it is better to put economic instruments in a drawer and lock it".

As a single transaction is considered exceptional and so not of interest, the analysis is restricted to two levels of transaction frequency, occasional and recurrent.

Three degrees of investment specificity are used: non-specific, for standard goods; average specificity, for hybrid goods; and specific, for completely made-to-measure (custom-made) goods.

In a world of intermediate uncertainty, Williamson's model indicates the most efficient form of transaction governance structure, depending on transaction frequency and the degree of investment specificity. Four typical cases emerge (see Figure 2), among which firms can choose the governance structure best suited to the nature of the transactions they carry out.

Some lessons for telecommunications

Many commentators have pointed out that these new approaches bear little relation to real-life operations. This is a

Figure 2
Transaction parameters and organization modes

legitimate comment. The theory stumbles over serious problems of how to measure its concepts against what happens in the real world. This obstacle calls into question the validity of the theory. Nonetheless, when we consider the extremely restricted nature of the hypotheses needed to validate the theory of pure and perfect competition, we should ask ourselves whether ultimately this criticism of the "inoperational" nature of the approaches advanced here does not apply first of all to competition theory, and by extension to the whole of microeconomic theory. Still, we cannot fall back on such a reply to brush aside some fundamental issues raised by the new theory of the firm.

The effective "operationalization" of the theory of the firm raises two separate types of problem. Firstly, it requires a practical definition of the content of the concepts used, using an approach that will no doubt be multidisciplinary, interweaving established advances and knowledge in the fields of law (to indentify and evaluate contractual forms), management and sociology (to identify and evaluate organizational forms) and economics. Secondly, this operationalization raises the problem of obtaining information about the contracts signed between firms or within groups. It is perfectly understandable that the closer economic theory comes to the practical functioning of the business world, the more clearly it reveals the mechanisms and issues involved in the players' decision making, and the more difficult it becomes to acquire data with which to confirm or invalidate its hypotheses.

This is one of the main reasons why many empirical studies based on the concepts set out here have restricted their work to an analysis of make-or-buy decisions. By confining vertical relations to the alternatives of competition or integration, researchers have tried to validate some of their hypotheses on the basis of information that is mostly in the public domain, and therefore easily accessible. Thinking on the subject has thus concentrated on the two extreme ways of organizing vertical relations (competition and integration), to the detriment of intermediate modes. Yet there is no reason to think that these extreme forms dominate the field of inter-company relations; on the contrary, a glance at the real industrial world leads to the conclusion that it is indeed intermediate forms that make up most of the fabric of relations between economic players. Incidentally, Williamson himself says he was long convinced that intermediate governance structures were difficult to organize and therefore unstable, but that he became convinced that such structures were the most common form.

I present here a practical outline of six ways of organizing vertical relations (Fig-

Figure 3
Principal ways of organizing vertical relations

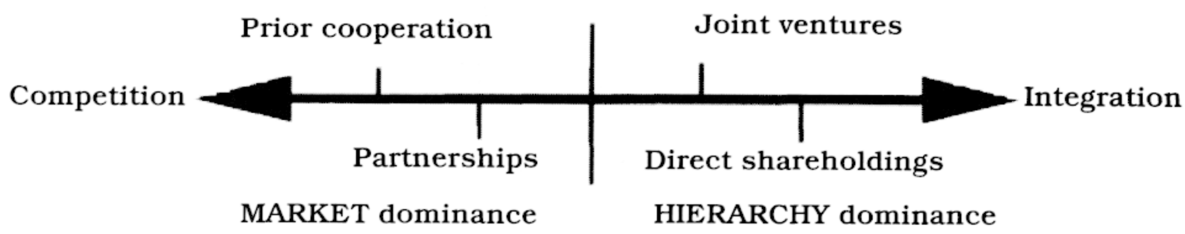


Table 1: Current organization of vertical relations in public switched networks

ure 3): on one side there is competition, cooperation and partnerships, which are oriented more to a market organization of relations, and on the other, joint ventures, shareholdings and integration, which are increasingly hierarchic forms.

This grid can be applied to the forms of vertical organization between equipment manufacturers and telecommunications operators in the five major industrialized countries (see Table 1 below). The table sets out the forms of vertical relations with suppliers adopted by operators in the field of public switched networks.

The first observation is that the forms adopted differ widely. In fact, all the configurations shown in Figure 3 are present, with the notable exception of one - competition. This clearly shows, it seems to me, that investment in switching equipment is specific. The partners in the exchange therefore have to "bind" themselves to each other to organize their transactions and avoid the purely competitive mechanisms the inefficiency of which I have demonstrated in this context. The choice of organizational form seems to depend more on factors external to the transaction than on its own attributes, in contradistinction to the outline proposed by Williamson (see Table 1). The institutional and regulatory constraints on operators have largely contributed to structuring these relations.

In the European countries and Japan, considerations of national independence and industrial policy for a public operator contracting with private-sector manufacturers have resulted in forms of cooperation and partnership. It is therefore interesting to note that when the entire telecommunications sector was in a competitive situation, the vertical relations adopted tended towards integration. The case of AT&T and Western Electric is an inheritance of that period, but it should be noted that the same situation prevailed in the United Kingdom, France and Japan before the operators were nationalized at the end of the last century. Similarly, it should be borne in mind that since the Bell System was dismantled, many Bell Operating Companies (BOCs) have been demanding that the ban on their entering the telecommunications equipment manufacturing sector be lifted. All these factors seem to show that being in control of innovation upstream produces competitive advantages downstream, such as involvement in the production of technologies by the manufacturers, and that it is vital for operators to hold equipment patents when they are subject to competition in their own business.

The second observation concerns the internal stability of the forms of cooperation adopted, as demonstrated by the start-up dates of these relations, shown in the table. We see that, unless there is a major shift in constraints or institutional objectives, which are external to the relationship between operators and manufacturers, vertical relations in this sector are remarkably stable. So despite the many problems and tensions which are bound to arise between operators and their suppliers, they keep up their links. This stability is a second indicator of the degree of specificity of investments in public switched networks. It is noteworthy that in countries where deregulation has been in force for some ten years, the supplier structure has not fundamentally changed. Only the BOCs have shifted the balance of their suppliers towards Northern Telecom. But this firm, originally a spin-off from Western Electric (the AT&T subsidiary specializing in equipment production) cannot be considered technically and socio-economically totally outside the Bell System.

This stability of vertical organization modes shows that, despite the radical uncertainty associated with the development of new equipment, partners acting under the constraint of highly specific investments do in fact place a premium on long-term relations and can overcome the conflicts that will inevitably arise over the sharing of residual rights in the profits or losses generated by events that are not foreseen in their contracts. The resolution of these conflicts underscores the fact that there is one essential ingredient in contractual relations, and that ingredient is trust. On this subject, Arrow's view is that trust is an important lubricant in social relations. He says it is extremely effective because being able to trust the word of the other party avoids many complications. It can therefore be supposed that the long-term partnerships that have been established in the switched networks sector derive their stability from the trust imposed by the specific nature of the investments that must be made. This trust is a strong cement for relations and it is often the influence of external forces rather than choices by the partners that bring about a change in those relations.

Conclusion

But it remains the case that the new approaches in the theory of the firm do not supplant competition theory in all circumstances, and that they cannot justify a priori an automatic liberation from market rules and constraints. The reader will have perceived that while this theory justifies some competitive restrictions connected with uncertainty and specific investments, the business practices involved in its analyses can in the real world easily lead to monopolistic behaviour. This is probably why the competition authorities still seem to be relatively impervious to the arguments of the new theory of the firm and prefer to base their investigative methodology on the precepts of competition theory.

Businessmen and researchers can find in this approach a fruitful area for cooperation. The aim for businessmen would be to inject into company law a positive recognition of some of their decisions about cooperation, restricted partnerships, shareholdings, acquisitions, etc., and academics would be able to operationalize and validate the theory by measuring the scope and understanding the logic behind the decisions at work in economic organizations. Effective discrimination between the positive and restrictive practices employed in vertical relations would give a better idea of the respective validity of competition theory and the theory of the firm, of the abuse of dominant market position and the search for efficiency.

In outline, there are four forms of protection against opportunism: putting firms into competition with each other; drafting contracts with incentive and penalty mechanisms; internalizing part or all of the transaction so as to establish a decision-making authority; and creating a cooperative mechanism guaranteeing a degree of stability in relations that would make short-term opportunism harmful to the opportunist's reputation and ruin its chances of obtaining transactions in the future. These methods are not mutually exclusive, and none of them taken alone is a panacea.

Historically, economic theory has stressed the benefits of the market and looked askance at any decisions by agents aimed at restricting the full play of competition. The new theoretical developments show that the very varied forms of cooperation between firms, or vertical integration, can be based on a search for efficiency.

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