

A Critical Study of the Brazilian Procurement Law

By: Andre Pinheiro Machado Mueller

Advisor: Prof. Robert Dunn

Minerva Fall1998

1. Introduction

In the past three years, in Brazil, there has been talk about modifying the present Law N° 8,666/93, also known as the national Procurement Law. There are many criticisms to this law. The main one being that it does not permit the public administrator to do what the law is suppose to regulate in an effective way: procurements.

Even though written recently in 1993, the Procurement Law has received many modifications through the years. These changes mostly occurred through the use of amendments, in the form of *Medidas Provisorias* (a power given to the executive branch to make laws, which latter have to be ratified by the legislative branch). In 1994, a complementary law was passed by Congress, Law N° 8,883/94, but as a whole, the procurement issue in Brazil remains the same as when the Procurement Law was passed. All recent modifications have not changed the *spirit* of the rules that regulate public purchasing in Brazil.

Congress has even considered drafting a new procurement law. In 1997, drafts of what would be this new law were passed to all federal agencies involved in procurement, for them to make suggestions and comments on the subject. The legislators were also asking for suggestions, through the Internet, by any interested party. But as to today, no new legislation has seen the light of day.

This paper intends to take a broad look at the Brazilian procurement issue and particularly the actual Procurement Law. In the process, first some economical theory that may be applied to procurements will be examined, then aspects of the present law will be commented on, and finally modifications on certain aspects of the law will be suggested.

This study does not have the intention of covering the entire subject nor to make a final suggestion of what the Procurement Law should be. Its purpose is to serve as reading for any person interested in considering new aspects of the procurement issue.

2. Private and Public Procurement

Procurement is an acquisition process in which a public or private entity engages when it wishes to contract goods or services from the private sector. This is generally a three phase process,

which includes specifying the product the entity wishes to acquire, researching the market for the available products that meet the specifications (including price) and contracting from the best available supplier.

For a private firm, this may be a simple operation. Since the end result of the firm is focused on profit, it will seek the goods or services available in the market which, when added to the firm's business, will bring about the best relation of cost versus benefit. When the best supplier is identified, the negotiations that follow are quite straight forward, because both parties wish to break the best deal possible. Accounting for payments are also uncomplicated, since the accounting principles of private firms are already standard, generally defined by law.

Government procurement, on the other hand, is a complicated task. The end result, the objective of the purchase, is not based on profit, since government agencies are not profit-orientated. The objective of the purchase or contracting is not always well defined. This complicates the elaboration of precise specifications of what the agency wishes to procure. Negotiating with private firms follows different rules compared to private sector negotiations. In government procurements, the parties involved are different legal entities, where the buyer sovereignty has the power to affect rules, terms and conditions. Public accounting is also much more complicated than private accounting, leading to compliance with public procedures.

All of these differences lead to the fact that when the government wishes to purchase something from the private sector, the process is much slower and not always as efficient as private sector purchasing. Table 1 compares private with public procurement.

Table 1 - Comparison of Private and Public Procurement

Topic	Private Sector	Public Sector
Status of the parties.	Supplier and buyer are equal legal entities, differing only in size and financial strength	Buyer sovereignty affects rule making, terms and conditions, and creates unilateral power to change or terminate the agreement
Accountability	Both parties are expected to meet general standards of law, precedent, and ethical conventions	Added standards to support public oversight of expenditures and compliance with public procedures, ethical perceptions and information policies.
Process complexity	Relatively simple and practical solicitations and award procedures and documentation of contracts and claims	Detailed procedural guidance dictated by public oversight, concern for equity in public decisions, frequent use of cost type contracts and social policy imperatives
Operational objective	Systems designed for production support, non-product purchases, and commercial resale	Purchases are for consumption by the government, for public use and benefit, and often to support research, development, or major systems innovations
End objectives	Operations are focused on profit and loss enhanced competitive position	Multiple objectives, primacy unclear, subjective measurement of success, efficiency on of many objectives

Systems requirements and cost generation	Few, if any, non-product or non-program-oriented requirements	Many non-product or non-program oriented system requirements, such as formal representations and certifications, audit, post-award administration, flow down of clauses and policies
--	---	--

There are many critics of governmental procurement who wish the government to purchase as efficiently as the private sector. But, when compared, one can see that they are two different processes, with some common traces. The requirements that are legally and ethically imposed upon the public sector are reflected in the whole public procurement process. All these facts must be taken into account when trying to perfect public purchasing.

Even though private and public procurements are two distinct processes, efficiency in governmental purchasing should still be directed towards maximum efficiency. The fact that public procurement is not profit-oriented does not mean that the spending of public money, raised through tax collection, can be done in a careless manner. On the contrary, because the funding for public procurement is done by the taxpayers, this process must make the most of the money provided to the government by its people. The process must also be transparent; meaning that any person can have access to the information of the purchasing or contracting. It is up to the government – legislative, executive and judicial branches – to see to it that procurement done by the public sector sets a standard of morality and efficiency.

This can be achieved by the setting of rules for government procurements. The rules need not to be rigid, for the market is very flexible, and the contracting environment is always under constant change. The rules must be able to adapt to these changes. Purchasing through the Internet, credit cards and "just on time" techniques are just some examples of new technology introduced by the market. But they must be not as flexible as to allow bad management or corrupt management of public money. These seem like simple requirements on paper, but consist a very difficult task for those writing the rules.

1. Regulation and Procurement

In many senses, procurement can be compared to the regulation of public utilities. In both cases, there is the need of the government to set out rules for functioning of processes that are untouched by the *invisible hand of the market*. Where there is a natural monopoly, such as telecommunications or water supply, the agencies are regulated in such a manner that they operate as close as possible to a competitive market. The government opts to let the private sector take control of these public services, but reserves the right to set the rules under which they can operate. In this manner the consumers are protected from a monopolistic market, and the government obtains greater economical efficiency in these services, as well as a better result of the finances of the public sector.

In government procurement there is also a kind of natural monopoly. This is because there is only one agent acting for the government as a purchasing unit. Even though there may be a number of agencies procuring for the government, as a whole, they can be considered as one, following the same procedures and rules. The reasons for regulating this sector of government intervention in the private sector are the same for regulating the public utilities market. There is a need to protect the consumers (manly the taxpayers) from unwise spending of public money, and also to obtain greater economical efficiency of the process. This will reflect on the positive result of the finances of the public sector.

When regulating the procurement process, the legislator must give some thoughts on what incentives the rules he is making can give to the government's purchasers. Rules, laws and regulations have

many loopholes and flaws that, if do not incentive complying with them, and can result in disastrous outcomes. This can be done by punitive enforcement (with a great expense to the enforcer) or through a system of objectives and results, which awards the positive outcomes. A mix of what incentives are to be used is a question that should be always present when regulating.

There is a branch of Economics that deals with this aspect of incentives, and which can be applied to the regulation of the procurement process. It is called the Principal-Agent Model. The relationship between the public administrators who regulate procurement and the public administrators who actually procure have all the characteristics of a principal-agent relationship. To understand this relationship better, let us consider some of the definitions of this theory, and how they can be applied to procurement.

The principal-agent model is applied in the analysis of relationships where the following conditions hold true:

- **Delegation** of a task from one economical agent to another. He who delegates is called the **principal**, and he who receives the delegation of the task, and who actually performs the task, is called the **agent**.
- **Asymmetric Information**. The agent, as defined above, has certain information about the task that he is to carry out that the principal does not. He knows, for example, how much effort is needed to achieve the objectives of the task, while the principal does not observe effort, but the results of these efforts.
- **Imperfect relationship between effort and results**. When determining the payment for the performance of the task, the principal cannot make a relationship between the effort placed by the agent and the results. There is no strict relationship between both.
- **High monitoring costs**. The principal has no way of supervising the agent, at a low cost. Any attempts of supervising the amount of effort put into the task by the agent will result in higher costs to the principal.
- **Non-aligned objectives**. The objectives of the principal do not coincide completely with those of the agent.

By applying these notions to the procurement process, we demonstrate this is in fact a principal-agent relationship and the various complications that this implies. The task of procurement is delegated by the legislator (principal), which represents the citizens (also principal), to the procurement agencies (agents). This is done through laws designed to protect public finance, and thus the public as a whole, against bad administration of public resources.

The legislator expects to incentive the agency to spend wisely the money collected through taxing. But the agencies are the ones who will have to go to the market to purchase goods and contract services. They are the agents of the relationship who have the information of how the market operates, where to search for the best products and how to contact the best suppliers. The agents also know the amount of effort required to zeal for public spending. There is a high degree of asymmetric information in the process.

There is also an imperfect relationship between the amount of effort put into the procurement process by the agent and the results. As seen above, the results of government purchasing are non-profit orientated. The agent is faced with many objectives, not only technical, schedule, or cost achievements, but also social or economic goals and policies to protect or aid labor and other preference groups. The amount of effort put into procurement by the agencies is not reflected in the results. Consequently, the public buyer lacks any certain basis for success.

The price of monitoring the effort of the agent in procuring is high. The principal uses the tools that are available to him, such as internal audits and inspections. If he were, to say, consider monitoring every single procurement, the cost of such action would be so high as to consume more money than that saved in effective procurement. What are needed are the proper incentives for the agent to carry out

the task, procurement, without the need of such ostensible supervision. If the right incentives could be identified, then public spending would be saved twice: by more efficient procurements, and by low cost monitoring.

The objectives of the principal and the agent in terms of procurement are also non-aligned. The principal - the legislator or the public administrator – wants the procurement to be an efficient process, maximizing the public money. He desires that the procurement be done on schedule, meeting the technical and social specifications determined for the task. On the other hand, the agent – the procurement agencies – are worried about diminishing the amount of work to be done. They are worried on maximizing their daily efforts, concentrating on turning their tasks into an easier routine. Diminishing paper work, repetitiveness, and other day-to-day tasks may be some of their objectives. The objectives may be coincidental at some points, but mainly need incentives to bring forward the desired overall results.

The principal-agent model can also be used to study the relationship between the procurement agencies and the market. In this case, the agency will take the part of the principal, and the suppliers that of the agent. As already commented, public and private purchasing differ in many aspects. One of them is the manner by which the buyer – the principal – contacts the suppliers – the agent - to seek a specific good or service. In the private sector, the firm will go to the market and contact the supplier. The firm will take the action of initiating the purchasing procedure.

The public buyer, on the other hand, will wait passively for the supplier to contact him before initiating any purchase. Usually the procurement agency will let the market know it wants to purchase a good or contract a service, and will determine which supplier to contract with only between those that offer their services to the government. Even though many procurement agencies do try to attract the greatest number of interested suppliers, they only negotiate with those who show interest in participating in the process.

From the agents' point of view this process is also different from dealing with the private sector. The suppliers who are interested in dealing with the government will have to take a more active attitude. They will have to spend resources finding out what the government wants, and going through a lot of bureaucracy to be apt to deal with the government. It will have to comply with different market rules and to take part in a selective purpose. It will also have to reveal information about itself that it wouldn't have to do when dealing with the private sector.

All this implies on costs, especially if viewed through the asymmetric information condition of the principal-agent model. If information about quality and motivation to supply is costly to obtain, as is the case in public procurement, then it is no longer plausible that buyers and sellers have the same information about the goods involved in the transactions. When an agency deals with a supplier, it is very difficult for it to determine whether the goods offered are market-priced, whether the supplier has the ability to deliver in the specified schedule, with the correct specifications, and in the desired quantities. Such information has high costs. These costs are lower in the private sector, for the reasons detailed above, but also for the fact that the private sector buys less quantity and has less formal procedures to follow.

By contrast, the supplier probably has a good idea of the quality of the goods or services that it is offering. It knows of how much overprice it is putting on its products to make up for government procurement procedures. This asymmetric information may cause significant problems with the efficient functioning of the procurement process.

To understand this better, theory divides asymmetric information into two categories: adverse selection and moral hazard. By examining both in this principal-agent model, where the principal is the procurement agency and the agent the supplier, we will see how they can affect the results of the process.

Adverse selection is a problem of precontractual opportunism and arises, in our study, because of private information that the suppliers have before they enter the procurement process. They weigh whether it is beneficial for them to comply with the procurement obligations and if they can sell at a price guarantees the award of contract. The procurement agency knows nothing about the supplier's motivations and capability of complying with all technical specifications, and bureaucracy. Because it is in the passive side of the process, the agency has little information on other suppliers who could possibly carry out the task better and cheaper and their reasons for not participating in the procurement.

Basically adverse selection is a source of inefficiency, representing the idea that the selection of suppliers which offer their services to the government is determined in a way that is adverse to the interests of the buyer. The legislator should study this notion and, in his procurement laws, try to diminish the lack of incentives for suppliers to use adverse selection when dealing with the government.

The other form of asymmetric information that can lead to procurement inefficiency is called moral hazard. This notion is defined by the inadequate information that affects the agreement that holds between the supplier, which was awarded the contract, and the agency. There may be inadequate information afterward to tell whether the terms of the agreement have been honored, or acquiring that information may be costly.

For moral hazard to arise, three conditions must hold. First, there must be some potential divergence of interest between the parties making the agreement. In the case of procurement, when receiving the award of the contract, the firm's interest is to deliver with the minimum amount of cost possible. When the procured item is a good, there is usually no problem. But when services, such as maintenance of buildings or machines are concerned, this may turn out to be a problem. The interest of the agency, which will be in charge of the post-award administration of the contract, is that the firm carries out the agreement in the most effective way possible.

Second, there must be some basis for gainful exchange or other cooperation between the principal and agent that activates the divergent interests. Simple market arrangements would do the trick. Divergent interests are a factor in almost all exchanges, and yet exchanges are often made successfully without being affected by moral hazard.

The third requirement is that there must be difficulties in determining whether in fact the terms of the agreement have been followed and in enforcing the contract terms. The difficulties for the post-award administration of contracts are usually shortage of procurement personnel, other procurements being carried out simultaneously and the amount of contract awards inside a single agency.

The solutions to these problems should be taken into account when regulating government procurement. They exist also in the private sector, but to a less degree.

The problems that arise from the principal-agent model can be attacked also outside the law. Government employees can be trained in elaborating more effective specifications, in interacting between the agencies, learning from each other experiences, and in elaborating better contracts, which are easier to administer. An incentive based on results for firms awarded maintenance contracts could diminish moral hazard a great deal. The important thing is to treat these problems as a totality, and not as isolated disturbances of the process. Even if information outside the agency is difficult and costly, inside the government information on procurements should be accessible and on time.

0. The Brazilian Procurement Law

This paper will not go into the details of the Brazilian Procurement Law. Instead, it will highlight some of the aspects of the law and comment on their influence in the public procurement

process. The intention is to give a broad view of the Procurement Law and how it affects public purchasing culture in Brazil.

1. Procurement in the Constitution

In the Brazilian Constitution, under the heading of Public Administration, there is the 37th article that gives a broad scope of how the constitutional legislators intended the administration to function. The heading of the article reads:

"37 - The public administration....of any of the Powers of the Union, of the States, of the Federal District and of the Municipal districts will obey the principles of legality, impartiality, morality, publicity and, also, to the following:"

The 37th article then lists all the constitutional obligations for public administration to follow. In item XXI, the article defines that the Powers stated in its heading should only purchase through the use of public procurement. It reads:

"XXI - excepted the cases specified in the legislation, the works, services, purchases and selling of public goods, will be contracted by means of a procurement process of public bidding that assures equality of conditions to all the competitors, with clauses that establish payment obligations, maintained the effective conditions of the proposal, in the terms of the law, which it will only allow the indispensable demands of technical and economic qualification to the warranty of the execution of the obligations."

The heading of the article defines the ethical principles that federal, state, municipal and district government should adopt. Item XXI includes procurement under the constitutional principles expressed above. Let us consider each one separately and their connection to the procurement process:

- **Legality** is the basic principle to all Public Administration. What it basically does is confine the discretionary acts of the public administrator to the law. All administrative acts must be predicted by the law, and any act done outside the law is, therefore, invalid. Procurement legislation should determine the legal boundaries inside of which the public procurement agent can function. It should contain the rules for carrying out each of the steps involved in public procurement, but not to such specifics that there is no space for the use of discretion by the procurement agent. The procurement law should confine its text to what it doesn't want the agent to do, and let the agencies define how to carry out their procurement tasks inside the law.
- **Impartiality** is the principle that demands all Public Administration to treat its subjects in without favoring or persecutions. This follows the principle that all are equal under the law. In procurements there are many of opportunities for the public administrator to favor or persecute a certain supplier that he may have sympathy for, or feelings against. Following this principle, in procurement, the only objective should be the public interest.
- **Morality** is the presupposition of all Public Administration. For it to be legitimate, it has to be moral. All public purchasing and contracting have to not only be legal, but, in a more subjective way, be moral as well. This is a principle that is very hard to translate into legislation. It involves a matter of administrative culture and behavior. Never the less, the legislator should consider what incentives could be brought into the law that sees to it that this principle be observed.
- **Publicity** means that all administrative acts should be widely disclosed to the public. Not only the act should be carried out in public, but also its goals and purpose should be clear to all. When spending public money is involved, this principle is very important. All taxpayers and contributors to the public budget are entitled to know how the government is administering their money.

The constitutional principles stated above are not separate items. They, in fact, can be considered as one, since their definitions are very related. They establish a line of conduct for the public administrator to follow. Even though very broad, these principles can, and by the Constitution shall, be observed when regulating the procurement process.

The Brazilian Constitution does not regulate, however, the manner in which a public procurement should be carried out. It only gives the general lines that one should observe when writing procurement laws. Since article 37 applies for all form of governments inside of Brazil, which power shall then regulate item XXI, procurement? The answer is in the Constitution, 22nd article, item XXVII, which states that this is the federal government's competence. It reads:

"Art.22 - it competes privately to the Union to legislate on:

XXVII - general norms of procurement and contracting, in all the modalities, for the public administration, its instituted foundations which are maintained by the public power, in the several governmental spheres, and in the companies under its control."

In 1993, Congress issued law N° 8,666/93, which regulated the procurement and contracting process in the Brazilian Public Administration. The Procurement Law, as it became known, substituted the anterior legislation about the subject, Decree-law 2,300/86, which only applied for federal administration and autarchies. The new law was to be observed by federal, state, municipal and district powers, as well as any public company and foundation. To procure, the public agents are obliged to what Law N° 8,666/93 determines.

2. The Procurement Law as a General Law

When regulating the procurement process, the federal legislators (Congress) did not observe the competence that the Constitution passed to them. The mother-law stated, in article 22, item XXVII that the Union was competent to legislate on the **general norms** of procurement and contracting. The end result, and all modifications afterwards, was a very detailed procurement law, regulating all aspects of public purchasing and contracting. No matter what the size of the municipality or of the purchase, it still has to follow the procedures in Law N° 8,666/93.

The law begins with Chapter 1 - General Dispositions, on the subject of public purchasing and contracting. In its first article, there is a broad definition of the law:

"Art. 1. This law establishes general norms about procurements and administrative contracts pertinent to all works and services, including publicity, selling of public goods and renting by the federal, state, municipal and district governments."

When reading the text that follows the General Disposition, one will find that the law establishes much more than general norms. But, for now, let us concentrate on this first chapter of Law N° 8,666/93, for it is in fact very well written, and does apply to the generality expected by the Constitution.

The constitutional principles stated above are restated in the third article of the law. Along with them, the legislators chose to include other principles, which they thought were more close to the procurement issue. The introduced principles are:

- **Formal Procedure.** This principle states that a procurement process is linked to all legal prescriptions that regulate it in all acts and phases of the process. By this the regulators intended that the public administrator had not only to observe what the law stated, but also all complementary procurement regulation, such as agencies internal norms, and procedures. If this in fact were a general law on procurement, then this principle would guarantee that an agency or municipal government, for example, would be obliged to follow the complementary rules in their sphere of action.

- The **Publicity of the Procurement Acts** principle states that there cannot be a secret procurement process. Not only must information about the results and objectives of the procurement be available to the public, as placed in the Publicity constitutional principle, but also that all steps involved in the procurement process should be made public.
- **Equality among the Bidders** is the principle that prohibits the procurement agent from discriminating among any potential supplier. Differentiating from the constitutional principle of Impartiality, this principle goes a bit further. It states that the state may establish minimum requisites for participation, when these are necessary to guarantee the execution of the contract. Any firm interested in participating in the procurement process may do so, if it meets the minimum requisites. This principle does not permit, however, the procurement agent to discriminate among the suppliers that are capable of participating.
- The next principle guarantees the competitiveness of the procedure by stating that all **Proposals are Secret**. This also guarantees a more objective examination of the proposals. The proposals are only disclosed to the public when they are opened for examination.
- **Commitment to the Invitation to Propose to the Government**. This principle states that once the procurement agency specifies what it intends to purchase from the private sector, and once it specifies to the interested suppliers how it will carry out the procurement process and awarding of contract, it may not change the rules in the middle of the process. This principle is closely linked to the first one examined above.
- **Objective Judgment**. This principle states that when choosing the best proposal based on the specifications and invitations to bid sent to the interested parties, that the public administrator shall judge them according to concrete factors. These factors should be known beforehand by all interested parties willing to participate in the procurement.
- Once the best proposal has been chosen, it is **Compulsory to Award the Winner**. This principle impedes the public administrator from awarding any other proposal that he favors better, but which was not judged to be the best one.

Again, as in the constitutional principles, the ones stated above complement each other. They deal directly with the issue of public procurement and contracting, as opposed to the ones stated in the Constitution, which deal with Public Administration as a whole. These conduct principles pave the way to a general law about procurement. Unfortunately the legislators abandoned this constitutional objective in the latter chapters of the law.

Other aspects of Chapter 1 of the Procurement Law are also very positive, regulating government purchasing in a broad sense. In the text, there are rules prohibiting differentiated treatment to suppliers. All proposals that answer to a procurement solicitation must be treated equally. The public administrator cannot discriminate among the firms interested in negotiating with the public administration in anyway. The law specifies that:

"Article 3, §1, item II – It is prohibited for the public administrator to establish differentiated treatment in terms of commercial, legal, labor or welfare nature of any Brazilian or foreign firm; inclusively in reference to currency, and modality and place of payment..."

It is interesting to note that the law obliges the public agent to treat national and foreign firms as equals. It goes further than that. Anticipating the opening of the Brazilian market, it prohibits discrimination between the currency of the payment of the procurement. What it does do, though, in its fifth article is to determine that all monetary values used during the procurement procedure shall be expressed in the current national currency.

This does not contradict the third article, as it may seem. Article 3 expresses that foreign firms may participate in a public procurement, and that the fact that they are competing against national firms cannot be used in a discriminatory nature. If the foreign firm is awarded the contract, it will be paid in the currency it wishes to be paid in, and in the locality of its choice. But to participate in the procedure, in its proposal, it has to express all its costs and values in Brazilian currency. This obligation is derived

from the Equality among Bidders Principle. By its application, all of the proposals will be of equal content, making the judgment of the best proposal an easier task for the procurement agent.

Chapter One continues by defining procurement terms. In its text, there are the definition of what the legislator wants the public administrator to understand by work, service, purchase, and alienation, large versus small purchases, direct versus indirect execution, taskwork, public administration, contractor, and other technical terms.

Again, this is very useful and necessary in a general norm about procurement. By standardizing the definitions of procurement terms, any other rule or norm that intends to regulate this activity will have to use the same words following their meanings. The new regulation will have not only a legal link to the general law, but also a sementical link. Any interpretation of procurement rules derived from the general one will be bound to these definitions.

Following general regulation of public procurement, the law ends its first chapter by regulating how the public agents are to deal with purchasing of goods, services and works. Goods are manufactured items, such as pencils, cars and computers, available in the market. Service is any activity that whose purpose serves the interest of the Public Administration, and which has a certain utility for the Administration. Activities such as repair, installation, operation, conservation, transport, publicity, maintenance and demolition are considered services. Works are understood to be the activities of construction, restoration, fabrication and building.

In a general terms, the law determines that before any solicitation, the agency responsible for the procurement of a service, good or work has to elaborate detailed specifications of what it intends to purchase. In the case of goods, the desired object has to be well characterized. The specification of the good shall contain all the details about the good, as well as its intended uses. Law 8,333/93 prohibits that the agency uses brand names in its specification. It also determines that all purchasing of goods shall, whenever possible:

- "attend to the principle of standardization...
- be processed through a procedure of price register,
- be submitted to the acquisition and payment conditions used in the private sector,
- be grouped into as many portions necessary to make use of the peculiarities of the market, seeking lower prices,
- to beacon for the prices practiced by other public agencies.'

Let us comment on these general terms. The legislator determines that the public agent use standard goods, whenever possible. The law also determines that the market method of payment and acquisition should be used. The intention here is not only to save public money, by avoiding the use of custom made goods or unusual method of purchasing, but also to save time and effort by the public agent. Efficiency is the goal.

The use of price register is also to lead to greater efficiency of the process. To have a price register, the public agent must make an ample survey of what the market is charging for the good for which he will procure. Not only will the result of the survey help to determine if the proposals of the suppliers are what the market is charging, but also to permit the agency to have a notion of what firms and product characteristics exists in the market. The law also encourages the various agencies to trade information on procurement, serving the same purpose as stated before.

The Procurement Law also makes similar demands for the contracting of works and services. In these cases, the agency must also detail its specifications as much as possible. The law demands that before contracting, a basic project of what is to be detailed be elaborated. After technical and market considerations of the project are examined, an execution project is then elaborated. In the execution project there must be all the steps necessary to see to it that the service or work be carried out from the contract of the firm to the completion of the task. There must be included a prediction of the cost of

each step. The execution of the service or work object of the procurement is the final step in completing this process.

Chapter two of the law contains the definition of the types of procurement in which the public administration can engage in, in order to award the best proposal, considering the public interest. The law determines five modalities of procurement, and defines them as:

- **Competition.** The competition between any interested firm that can prove to be capable of meeting the minimum requisites demanded in the solicitation, in order to execute the object of the procurement.
- **Price Taking.** The competition between firms, which have been previously officially listed, or which meet the requirements necessary to be officially listed.
- **Invitation.** The competition between firms invited by the agency to participate in the procurement, and by firms interested in participating, but which were not invited, if they can prove capable of executing the object of the procurement.
- **Auction.** To be used when selling public goods.
- **Contest.** To be used in choosing a technical, scientific or artistic work, by rewarding with a prize the winner.

Excluding the auction and contest modalities, what basically differentiates the other three are two aspects. The first is the complexity of the formal procedures to procure under each one. Competition involves more steps than price taking, which, in turn, is more complex than invitation. The law intended that the legal requisites for a firm to procure under each modality also have a similar decline of complexity. In practical term this is not the case.

The second differentiating aspect of the three first modalities is the cost of the good, service or work to be purchased through procurement. For any cost, the competition modality may be used. In order to use price taking or invitation the cost of the object of procurement must fall inside determined cost limits. These limits are changed periodically, now not as often as when Brazil suffered from high inflation, but even so, very often.

There is also a cost of the procured object for under which the law permits the agency to purchase without the use of procurement. When establishing the cost limits for each modality, the legislators also discriminated between goods, services and works. As the writing of this paper, October of 1998, the limits for using each modality of procurement, expressed in US dollars and Brazilian Reais, are displayed in Table 2.

It is worth noting that the use of one modality may be used for the procurement of a good, service or works which cost fall under the limit of the modality just before it. For example, if the cost of a good to be purchased falls within the limit for invitation, the public agent has the option of using price taking or competition.

Table 2 – Cost Limits of the Procurement Modalities

MODALITY	GOODS AND SERVICES		WORKS	
	REAIS	US\$	REAIS	US\$
COMPETITION	Over 650,000.00	Over 561,000.00	Over 1,500,000.00	Over 1,250,000.00
PRICE TAKING	Up to 650,000.00	Up to 561,000.00	Up to 1,500,000.00	Up to 1,250,000.00
INVITATION				

	Under 80,000.00	Under 67,000.00	Under 150,000.00	Under 125,000.00
--	--------------------	--------------------	---------------------	---------------------

From: Diario Oficial da Uniao – October/1998

In this section, we have focused on examples contained in the first two chapters of Law 8,666/93 that contain general rules on public regulation. The intention is to show that the legislators have initiated regulation of procurement following the constitutional intent of a procurement law that serves as a foundation for more detailed procurement rules. As one proceeds studying the text of the law, however, he will find that the law details such things as choosing the best proposal; publicizing procurement notices; number of days necessary to award the contract; number of days necessary to wait for proposals, how many firms have to be invited to participate; formal procedures on conducting public announcements; registering of suppliers; writing of contracts; negotiating contracts; purchasing of air tickets; and other activities best left to specific rules.

1. The Centralized Aspects of Procurement in Brazil

One of the great breakthroughs in modern commerce was the perception by the market of the existence of segmented consumer groups. One can perceive this when watching advertisement on television. Depending on the program being transmitted, the commercials that are aired are all directed for the consumer group that is thought to be seeing TV at that moment. During cartoons, for example, we get toys, children cereals and fast food adverts. During the new broadcast, insurance and car commercials are aired. This is because the suppliers have information about who the viewers are, and direct their advertisement towards these specific groups.

This brings greater efficiency to the advertisement of the products, and also to the consumer. The consumer gets directed information that will help him deciding on what exists in the market for him. He will not be bombarded by data that is not useful for his needs. So both sides of the commercial process are benefited by segmentation of the market.

This holds true as well for government buying. Each public administration has different necessities, depending on various aspects. These could be the number of civil servants it employs, the size the population under its rule, the area under its competence, or whether the fact it's a municipal, state or federal government. Not only that, but also the many agencies have different needs. The process purchasing of goods in a municipal education agency differs in purchase size, urgency and total costs to that of a federal administered agency responsible for the generation of atomic energy.

Even though needs between public agencies and governments differ, the Brazilian Procurement Law treats all public administration under the same legal umbrella. All have to follow the same methodology, time limits and cost limits specified in the federal law.

Let us take two large purchases as examples: the acquisition by two large agencies. One is a state agency which is interested in purchasing a years supply of pencils for the public schools under its competence. The second is a federal telecommunications agency interested in purchasing high tech computers for linkage to communication satellites. For theory sake, the calculated costs of both acquisitions fall within the limit of the competition modality.

Both agencies will have to go through all the bureaucratic specifications for their products that the law requires. Both will have to demand various qualification documents from the suppliers interested in selling the goods. Judging the best proposal will be carried out in the same manner by the small state and the large federal agency. When we consider the time necessary for all the steps detailed in the law, both agencies will have to spend the same time limits between the steps. So that both procurements will be completed in the same number of months.

This example was chosen to show that if procurement were regulated as to meet the demands of a particular public agency or government, then the public purchasing process would be much simpler and efficient. This would signify a better administration of public money.

As already mentioned, the Brazilian Constitution establishes as the Federal Government's duty to legislate the general norms of procurement. The second paragraph of the 24th article of the Constitution determines that:

"Art.24, 2nd § - The competence of the Union to legislate on general norms doesn't exclude the supplemental competence of States."

The Constitution already permits the Union Government to make the general norms on procurement and the States Governments to make the supplementary laws. This should be taken into consideration when discussing a new procurement law in Brazil. There would be no need to go through all the difficult process of constitutional change, as there is with many of the other state reforms, which are currently being carried out in the country.

Many politicians and political analyzers are concerned that if this were the case, there would be different treatments to procurement in the various states and in the federal government. Contradicting this criticism, one may argue that this would establish a competition between the various regulations as to which one is more effective and just, considering the public interest. If a general norm issued by the Federal Government were elaborated with this in mind, soon the market would appoint which state, for instance, had the best law. Not only the market, but also the various legal analyzers and intellectuals concerned about the issue of procurement. In Brazil, the press is always bringing to the public the results of corrupt procurement practices. Surely, as the Brazilian voter becomes more accustomed to expressing his demands, the states that have weak procurement laws, and are thus spending badly tax money, will be forced to legislate harsher rules in this matter. On the other hand, the states that have better and more efficient rules will be pointed out to be benchmarks in this area.

The same type of positive competition would arise between the various federal agencies if the Federal Government would permit each one to write its own specific procurement rules, based on a general procurement law, which fitted their needs.

2. Procurement as a Tax Enforcing Process

According to Hely Lopes Meirelles, one of Brazil's most respected public law professor, procurement is the administrative procedure by which the Public Administration selects the most advantageous proposal for a contract in its interest. From the former definition, the conclusion is that the public interest must always be the objective of the procedure. In terms of purchasing with the use of public money, this means that not only must the outcome of the procurement process be the best supplier in terms of the price of the good or service supplied, but also in terms of other costs involved in the process.

When regulating the use of public money, one should consider all costs involved. The price paid for the contract of the procured good is easy to see, and thus is usually considered the only indicator of the success of the purchase. But other costs are involved, such as the amount of civil servants working on the procurement and the amount of time it takes to procure the desired object. A good procurement law should be written as to make the procedure effective and efficient, in terms of personnel, time and money.

The Brazilian Procurement Law does just the contrary. The procedure it obliges the public agent to follow is long, time consuming and involves a large number of personnel. In this section, we will detain ourselves in the procedure detailed in the law of the receiving till the judgment of the proposals.

In syntheses, when procuring, the Brazilian agency must write detailed specifications of the good or service it intends to contract, advertise the intention to procure, provide a copy of the specifications and rules of the procurement to all interested suppliers, receive and chose the best proposal. The latter two steps require complicated procedures.

The agency must hold a public receiving and opening for all the proposals. In the time stipulated in the rules of the procurement sent to all interested bidders, these must hand their proposals to the public agency in two envelopes. One contains their bid, and the other, a number of documents belonging to the supplying firm. On the outside of the envelopes must be written the firm's name and the identification of its content. On the envelope containing the bid, "PROPOSAL" must be written. On the envelope containing the documents, the word "HABILITATION" must be used to identify it.

Once the public agents in charge of the procurement receive all the proposals, it must go through a "habilitation" procedure, in which they will check all the documents in each of the envelopes in order to legally qualify the bidder's proposal to proceed to the next step of the process. Law N° 8,666/93 stipulates four kinds of legal qualifications that the bidder must pass through in order for his proposal to be considered. They are:

- **JURIDICAL QUALIFICATION** (article 28) in which the bidder must provide documents identifying the firm or the individual supplier. In case of a firm, its constitution including election of board of directors and social contract must also be provided.
- **FISCAL QUALIFICATION** (article 29) by which the bidder must prove to the agency that his firm is up to date in the payment of all municipal, state and federal taxes.
- **TECHNICAL QUALIFICATION** (article 30) by which the bidder must prove to be associated with all the professional associations required for his line of trade, and that he is capable of carrying out the contract.
- **ECONOMICAL-FINANCIAL QUALIFICATION** (article 31) by which the bidder must provide the agency with his firm's latest balance sheet and other documentation which proves that it is economically and financially capable of carrying out the contract.

As can be seen, the interest of the legislator when writing the Procurement Law was not only that the agency act as a procurement agent, but also to act as a supervisor in the fiscal area. For a firm to be legally qualified to participate in government procurement, it must provide the agency a series of documents. Not only must the firm obtain these documents from municipal, state and federal revenue agencies that prove that his taxes are up to date, but also from other agencies, such as the social security and welfare areas. The procurement agency is therefore acting as a tax inspector.

The procurement agency is also acting as an inspector in other areas. It has to verify that the bidder is part of the professional association of its area, that the monthly or annual contributions to this association are up to date, and that all persons employed by the firm are registered in their legal association. From the accounting point of view it is also acting as an inspector. When opening its balance sheets to the procurement agency, the latter will only accept the document if it is written in the manner prescribed by law.

Many problems arise from these legal qualifications. The main one is that it delays the award of contract. The public agent in charge of the procurement will spend a great deal of time examining every one of the documents belonging to the various bidders. He will have to verify that each one is still valid, that it is real, that it is what the law specifies for the kind of firm bidding, and other details. Depending on the number of bidders, this process may take various hours, and even days.

For a firm to enter a public procurement, it must go through the trouble of going to the various agencies in order for them to issue the necessary documents. This takes time and costs money. So that not all of the firms in the market are willing to go through all this trouble to take part in a process which may or may not end favorable to it. The firms, which do decide to enter the procurement process, will price their goods or services in such a manner that compensates these extra costs. The

public agency is not getting the best offers available, and consequently buying at a higher price than a private company.

Since the process narrows down the number of firms who are willing to bid, it makes it much easier for any collusion to take place among the bidders. What happens in Brazil is that the same firms participate in the procurements of certain goods and services all the time. There are penalties for collusion, as we will examine later, but proving and enforcing such practices are difficult and have a cost. The law should be written in such a way that to incentive more firms to participate in public procurements, resulting in greater competition.

After all the documentation from all the bidders has been analyzed, the public agent will hold a session to publicly disclose the names of the firms which have been qualified for the next step of the procurement. The firms that were not qualified will receive their proposal envelopes back, unopened. The remaining proposals will be opened, and the document awarded to the firm with the best bid.

Simple modifications of the law could make this a more agile and efficient process. The procurement agency should first open the proposal envelope and make a list of all the bids, in order from the best bid to the worst bid. Then it could give a few days for the firm in the top of the list to deliver all the required documentation. If, at the end of this period, the firm does not do so, the agency will ask the same for the firm with the second best bid. This will also happen if the first firm is disqualified. This is how the World Bank carries out its procurements.

The above is only one possibility of upgrading the efficiency of the Brazilian procurement process. Others should be studied and tested. It is also important to consider if all the documents which are being asked from the firms are that necessary when procuring with the government. The question is: is it interesting for the public administration to have its procurement agency act as a government inspector, or should they concentrate their attention to the procurement process? The impact of the burden for interested bidders to participate in public procurement should also be considered.

3. Procurement and Corruption

Corruption can happen in many ways in Public Procurements. The Public Agent may favor a specific supplier that he happens to know. He may receive, from the bidder, a financial compensation for awarding a contract to his firm. Bidders may collude as to set the results of the procurement. The whole process is very acceptable to many forms of corruption, from within and outside the public administration.

The government purchases large quantities of goods and services. It is also the sole purchaser for some goods, such as hydraulic turbines for large dams. Government spends lots quantities of money in the market and is a guaranteed payer. Hence the interest of many firms in negotiating with the public administration. That is also the reason for many suppliers to cheat in the procurement process and find means of being awarded a governmental contract.

The Brazilian Procurement Law has as one of its main objectives the curbing of corruption in public purchasing and contracting. This can be seen in Brazil's daily press. There are always accusations of public administrators who did not abide to the procurement rules, and are accused of favoring a certain supplier or, worst still, receiving a payment for this favoring. The latest big example was the purchase of a satellite-based system for patrolling the Amazon Jungle. Because of press coverage of the fact that the system was being purchased without a procurement process, it has not been bought till this day.

When writing the law, legislators included many articles that established penalties for firms or/and public legislators caught in corruption activities. There are two types of penalties stated in Law N^o 8,666/93 dealing with this subject. They are administrative actions and penal actions.

Administrative actions are to be brought against a firm involved in public procurement or awarded a contract, and are found to be acting against the public interest. For example, if a firm is awarded a contract, and delays the execution of what is determined in this document, it may receive a fine, as well as have the contract broken. The non-execution of a contract is not a crime, but it does go against the public interest. The law predicts three degrees of punishment for this kind of action:

- A formal warning from the public agent that if the firm does not abide to the contract, a more severe penalty will be applied.
- A fine, which has to be predicted in the contract between the firm and the agency.
- Temporary suspension from participating in public procurements and to contract with the public administration for a period not superior to two years.
- The agency may declare the firm incapable of procuring with the public administration until the agency lifts this ban.

Actions carried out by public agents or firm representatives that go against the procurement principles are considered crimes. These actions may be purchasing with out a procurement process, collusion between bidders, accept or offer advantages bribes, and many others. The law predicts detention penalties as well as fines for the persons caught committing these crimes.

There is a long list of procurement crimes in the last section of Law N° 8,666/93 and the detention and fine penalties to be applied to each one. There is also a whole section of administrative penalties for the non-compliance to contracts. But in both sections there are problems regarding the way the law is observed by the agents involved in the procurement process.

The crimes defined in the law are very long, and one may say that the penalties are very severe. The problem is that the law is not enforced. This happens for a number of reasons; manly that it is very hard to prove most of the crimes listed. Also for the reason that Brazilian prisons are so full with more common criminals, that there is no space for white-collar criminals.

When considering a new procurement law for Brazil, the legislators will find in the present law a complete list of procurement crimes and the respective penalties. The question they should ask is how to enforce the law.

The administrative penalties, on the other hand, are very commonly enforced. They are found, though, to be ineffective, not because the fines or suspensions are too brand, but because the firms always find a way around the penalties.

One way they do this is because of the Brazilian Commercial Code. All firms in Brazil have a registration number, called CGC, which stands for General List of Contributors. When a firm is suspended from procuring with the public administration, its CGC number is passed to all public procuring agencies, so that all will know of the penalty being applied. But the problem is that the firm, if it wishes to continue to do business with the government, can close down, and register again, receiving a new number. Then it will continue to participate in procurements, as a new firm. The Commercial Code permits this change of CGC number.

To stop this action by firms suspended from negotiating with the public administration, legislators are considering suspending the owners or administrators of the firm, not the firm. The people responsible for the firm would not be allowed to participate in any public procurement. This would have a large effect on the behavior of many businessmen, for many of them own more than one firm. Other modifications of this sort ought to be included in a new procurement law.

Another factor that turns most administrative penalties ineffective is that most public agencies do not communicate with each other. There is little exchange of information. So, if an agency suspends a firm from public procurements, the firm, knowing of this lack of communication, may try to procure with another agency. Often it will succeed.

The Ministry of Public Administration and State Reform is starting to implement a countrywide procurement information system. Any penalty applied to any firm would be registered in the system and the information available to all. This system will also be useful to agencies carrying out price research, for this would also be available to all.

If the general rules on public procuring were to be written by the Federal Government, and the detailed rules by each State, Municipal or District Government, as proposed earlier in this paper, how would the subject of corruption be treated?

Many think that there would be more corruption. It is common for academics such as Minas Gerais's Public Prosecutor Carmem Rocha, to state that "if the present law is hard to enforce, imagine separate laws". This problem has to be seen through a different angle. Enforcing of the law is difficult through a series of reasons that escape our discussion. If there were several specific procurement laws, it might happen that one could be written in such a manner that incentive all actors not to undergo corrupt activities would appear. Maybe a state would be pointed out by the press as having the least number of procurement scandals. Other states might perfect this law and create better incentives, in a leapfrog pattern.

Since enforcing the law is difficult, legislators will have to find another manner to prevent corruption in public procurement. The question is one of preventing corruption practices, against one of punishing the ones that already happened.

There is another feature of the Brazilian Procurement Law that should be analyzed. In the law are a number of conditions that permit the public agent not to procure, but to go directly to the market and accomplish the public purchasing. Article 24 of Law Nº 8,666/93 states that for purchasing small goods, which costs are below a certain price level do not have to be procured. This is done to save public money, since the procurement process would be more costly to the public administration than the purchase.

In the same article there is a whole list of exceptions. These include such things as buying a building for the headquarters of a public agency, the acquisition of an artistic object of renown fame, defense acquisitions, parts for machines that are necessary for the normal functioning of these, and many others. The public agent is also allowed not to procure when there is no market competition for the good he wishes to purchase. All these exceptions can be justified and have a reason for being excluded for normal governmental procurement.

What happens many times in Brazil is that a good is bought without procurement, because the agency legally is allowed to do so, but the press announces the act as corruption. For this not to happen, the exceptions should be kept to a minimum. The law should incentive the use of the procurement process in almost all public purchases and contracting. In this way, such misunderstanding as described will not occur.

4. Collusion

As already stated, there are a limited number of firms that participate in Brazil's public procurements. One of the main reasons for this is the difficulty that interested firms have in obtaining all the documentation that is necessary to enter the qualification process. The ones that do go through the hassle of meeting the requirements compensate their efforts by putting the price up. But that is not the main effect of obliging interested firms to go through all the paperwork involved in entering a public procurement. The main effect is that few firms actually do enter, and they become a select group that negotiates with the government.

The situation described above can lead to collusion between the firms. When this happens, the competitors in a public procurement take turns in winning the contracts. They stipulate the winning bid,

and all other firms bid below that price. There is no competition happening and the government is paying a higher price for the contract.

This also happens when the good or service to be contracted is a select item. A good or service which for which the market has only a few firms. In this case collusion may also happen.

To enforce the law by breaking up the collusion groups and fining or jailing the guilty is one way of preventing this practice. But it is a very costly and takes up a huge amount of effort by the public authority. Collusion is not an easy thing to prove. The Brazilian law is hard and time worthy to apply. The law should be very toughly enforced, but there are other actions that can prevent future collusion.

The main cause of collusion is that there are few firms in the market willing to negotiate with the government. So the first step should be to find out why this is so. Is the procedure of entering public competition complex? Is it keeping other firms away? Then the legislator should review the procedures in order to attract more competitors. This can be done by reducing the amount of paper work involved, and by facilitating the habilitation process.

Another step that can be taken is to open public procurements to foreign firms. It is more difficult for firms to collude when there are a greater number of participants in the competition. By allowing foreign firms to compete for public contracts with the national firms, the legislator will be guaranteeing a better price, new products and more competitors. The foremost effect would be the reduction of collusion between the participants.

4.7 Procurement and Bad Administration

There is a difference between dishonest public agents and bad administrators. Both are harmful to the public interest, especially by spending public money in a ineffective manner. Corruption occurs when the public agent breaks the law, when he acts in a manner that the law prohibits him to do. The bad administrator acts inside the law. He follows what is established in the procurement regulations. But he does so in such a manner that the result of the procurement is not what was expected to be. He wastes public money, since most of the procurement processes that fall under his actions will have to be repeated or the goods not used as intended.

The current Procurement Law contains a list of corrupt activities and defines penalties for each one. But there are no penalties for bad administration of the process. There are no indicators to establish the performance of a public procurement. If it is done inside the law, there is no penalty for the bad use of public money and time. There are no studies, but surely a country loses more money through the bad administration of its resources than through corrupt activities. This is something that should be given a special attention when elaborating procurement procedures.

4.8 Non-Economic Goals

So far public procurement was considered to have economical goals as its results, meaning that the price the public administration paid for a contract is suppose to be the minimum possible, considering the price versus benefit ratio. But there are other aspects of procurement that must be considered. Government may, through procurements, issue contracts to help a poor region of the country, or a minority, such as women or small firms.

With the actual procurement law this is not possible. An agency, when procuring, may not limit a region or favor a minority group. When drafting the new law, legislators should consider this aspect of the procurement process. Much care must be given to permit that the agencies pursue these non-economic goals, detailing in which occasions that they may occur and how the process is to operate.

In the United States, for example, there are certain contracts issued to help small firms. Other firms may enter the procurement, but the small firms always will be preferred to the bigger ones. In Brazil

there are many opportunities for using public procurements as a developing instrument, in such places as the northeast and other poor areas.

5. Conclusion

As reported in this study, the Brazilian Procurement Law is to undergo a big change. It is a common opinion among public officials that the procuring rules are inefficient in permitting the agencies to make the best use of public time and money. The law is too detailed and leaves very little discretionary decisions for the public agent.

There has been talk in the last two years of Congress issuing a new Procurement Law. Up till now, all the projects that have been discussed within the government and with the private sector are very much based on the existing rules. There are some slight changes in price limits on the various modalities and other purchasing limits, involving basically time and quantities. But the spirit of the proposals is very much the same as Law Nº 8,666/93. The sad conclusion one arrives at is that Congress will not make structural significant changes to law, only a "facelift".

Brazil is undergoing a major period of transformation. State-owned industries are being privatized. Congress, reflecting an effort to modernize the government is bringing about many constitutional changes. Reforms are being discussed in the social security, fiscal and administrative areas. The scenario is perfect to introduce important changes in all areas.

This also applies to public purchasing and contracting. This paper suggests some potential changes in the procurement process. The main one is to deregulate the existing law, and to permit different agencies and governments to detail the procedures according to their needs, as written in the Constitution. By doing so, the best rules would serve as examples for others to base their own procurement regulation on.

Procurement is not an isolated process inside the public administration. It depends on other governmental actions, such as enforcing criminal law for the dishonest agent and an administrative reform to incentive the public worker to act efficiently and effectively in his public post. It depends on the training of public procurement agents on such matters as product or service specifications, conducting public procurement hearings and others.

Many areas involving the procurement process were commented on in this paper. This was done, not give a final answer to the questions brought up, but to show the intrinsic information involved in regulating public purchasing. The purpose was not to be a final study, but to initiate a discussion on the matter, serving as a source of inspiration for the modification of Brazil's current Procurement Law Nº 8,666/93.

Bibliography:

Meirelles, Hely Lopes. *Licitacao e Contrato Administrativo*, Malheiros Editores, 1996.

World Bank Guidelines. *Selection and Employment of Consultants by World Bank Borrowers*, January 1997, revised September 1997.

World Bank Guidelines. *Procurement under IBDR and IDA Credits*, January 1005, revised August 1996.

Central Bank of Brazil. *Manual de Servico do Patrimonio – MPA 2*, 1997.

The Brazilian Constitution – 1988.

The Brazilian Procurement Law N° 8666/93.

Vietor, Richard H.K. *Contrived Competition: Regulation and Deregulation in America*

Mc Craw, Thomas K. *Prophets of Regulation*, Harvard Univ. Press, 1984.

Milgrom, Paul and John Roberts.. *Economics of Organization and Management*, Prentice Hall, 1992.

Laffont, Jean-Jacques and Tirole, A Theory of Incentives Procurement and Regulation, Cambridge, Mass.: MIT Press, 1993.