

**MONITORING QUALITY IN CENTRALISED PROCUREMENT:  
AN EMPIRICAL ANALYSIS OF COMPLAINTS IN CONSIP  
FRAMEWORK CONTRACTS**

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**ABSTRACT.** Monitoring contractual performance ensures effective value for money in procurements. Consip (Centralised Public Procurement Agency) created a Monitoring Team (MT) to collect and analyse data about suppliers' performance. Focusing on a specific performance measure (public bodies' complaints), through the 2001-2006 dataset on photocopiers' framework contracts,<sup>1</sup> we study complaints determinants as a function of some relevant characteristics of public bodies and the contract structure. We adopt two complementary approaches: Discriminant Analysis (DA) estimates the probability that the event "complaint" occurs and Poisson Regression (PR) studies complaint frequency. Decentralised institutions are more likely to complain, especially about high-performance photocopiers. Thus possible dissatisfaction may focus more on elements such as post-purchase assistance effectiveness, rather than on intrinsic machine low performance. Frequency is mostly explained by the complaining public body size and if the framework contract is compulsory. Finally, data show that complaints refer mostly to less contractible aspects of quality.

**INTRODUCTION**

In each transaction, agents require the coincidence between goods/services contracted and those really performed. This requirement is equally valid for both private and public transactions, and it assumes a greater importance when we look at the entire public procurement system: not only for the considerable volume of resources

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moved upon the demand of Public Administrations, but also considering that recently many procurement systems underwent changes set to improve public spending efficiency. Efficiency can be summarised in terms of monetary savings, higher price/quality ratio, transparency and accountability of procurement process.

In this context, it is important to evaluate all the benefits linked to the improvement of new measures adopted in each phase of procurement and, at the same time, it is necessary to monitor performances. Monitoring of contractual performances implies attention to all the contractual tools: contractual frame, awarding criterion and so on. Therefore, buyers could enable themselves to support different kinds of costs related to lack of competition among bidders and/or maintenance costs due to bad quality delivered. In particular, measurement involves regular collection of specific information regarding the results of services provided by an organization. A good performance measurement system should provide answers to question like what has been achieved, how efficiently the organisations' activities are performed, and whether the clients or citizen are having their expectations met with regards to the services provided by organisations. According to Mayne and Zapico-Goni (1997) a program or service that satisfies its intended results and benefits in the most effective manner without causing undue unintended effects is a well performing program. Finally performance measurement is more a process of gathering and reporting information in order to alert the managers concerned of any potential problems or benefits and it is also a way to ensure accountability with regards to the use of public money by public organisations (Osborne et al. 1995).

First of all, it is important to define the notion of monitoring. The key elements in defining monitoring are:

- Monitoring is a *systematic* activity, i.e. a repeated activity with more or less standard research methods and indicators;
- Monitoring is a *periodic* activity (Poister 1983), not a permanent one;
- Monitoring focuses on *different* measurement *moments*, which can be compared to develop policy measures; and
- Results have to be summarised in a *report* and included in a database.

The present study focuses on the importance of quality of procured goods/services. Quality is a key element for many reasons: firstly, final users base the value of goods/services on its quality. Secondly, due to the fact that procured goods/services are often inputs in a production chain where all inputs are relevant and interdependent to the final output and outcomes, in a similar scenario, inefficiencies or lack of quality may determine lower quality outputs, and hence generates a vicious circle of inefficiencies. Last but not least, quality is not always easily observable and verifiable, so it is often difficult to create a good system of incentives to facilitate suppliers' opportunistic behaviour.

This study investigates how qualitative aspects are managed in Consip's Framework Contracts. First of all, we look at those tools proposed in the literature on procurement and adopted by Consip in the definition of the tendering strategy and contractual frame (quality ex-ante); then, we analyse information resulted from those tools adopted for performances monitoring, which allow us to check how qualitative aspects, and in general centralised procurement contracts, are evaluated by final users (quality ex-post).

Using a unique dataset on photocopiers' framework contracts awarded in the period 2001-2006, we study the determinants of complaints as a function of some relevant characteristics of public bodies (e.g., nature, location, dimension) as well as the structure of the contract (e.g., compulsory or not). We adopt two complementary approaches: Discriminant Analysis (DA) and Poisson Regression (PR). The former is used to estimate the probability that the event "complaint" occurs while the latter is used to study *how often* a certain public body makes a complaint.

DA shows that Municipalities and Regions are more likely to submit complaints, and also that these complaints tend to concern high-performance photocopiers. This suggests that possible dissatisfaction may focus on elements such as the ineffectiveness of post-purchase assistance, rather than an intrinsic low performance of the machine. PR shows that the frequency is mostly explained by the size of the complaining public body and whether the framework contract is compulsory for the public body.

Finally, data show that complaints refer largely to less contractible aspects of quality (namely, assistance and logistics), which are particularly difficult to enforce in the contract.

### **Consip and the Italian Procurement System**

In Italy, the reform of the public procurement system began in 2000 when Consip S.p.a. (the Italian Centralised Public Procurement Agency), owned entirely by the Ministry of Economy and Finance, was designated as the supporting agency of the Rationalisation of Public Spending Program. From this point onwards, features have been added to Consip's original role of managing and improving the digitalisation of Ministry services.

Nowadays, Consip offers consulting and planning services to public bodies. Consip is engaged in the strategic conception and realisation of procurement processes, by searching the market for the best innovative solutions for public administration needs. Consip also works as a Central Purchasing Unit (at national level): it plans, manages and awards tenders on behalf of public administrations.

In 2001, a centralised procurement system (to learn more about the advantages and disadvantages of a centralised system see Dimitri, Piga & Spagnolo, 2006, paragraph 1.3) was established, where only a single central public unit, Consip, had to take all relevant decisions (what, how and when) to purchase products. The contractual conditions were the same for both firms' local branches and local public administrations. Moreover, initially, the Italian system could also be defined as a seller side system: once the contract was in force, Consip was not responsible for any business relations between the single administration and the seller. It is relevant to note that Consip did not manage all the phases and the activities of a procurement process. These latter activities could be collected into two categories: the first one concerns pre-contractual activities (analysis of demand and strategic planning, suppliers' certification for e-marketplace) whereas the second one concerns the management of contracts and the evaluation of performances (monitoring delivered quality and evaluating the contractual performances).

In 2005, Consip created a Monitoring Team (MT) in charge of collecting and analysing data about suppliers' performances in framework contracts. Performance measures are based on: customer satisfaction surveys, inspections carried out by selected third party entities, and complaints. Such complaints raised by public administrations (through e-mail, letters and phone calls) are used by Consip to construct performance indicators of perceived quality.

Consip's role changes according to the evolution of the legislative sphere regarding procurement contracts of goods/services and works; this evolution is determined by national normative measures and the achievement of European directives.<sup>2</sup>

For the aim of the present study, it is important to consider some relevant national legislative measures decreed each year by Financial Law. Regarding these measures, if we focus on economising public current spending both in terms of volume and efficiency, public administration purchases are bound in different ways to Consip's procurement institutes. In particular, each year, Financial Law imposes a compulsory regime on some Administrations that implies a duty for the designated bodies to buy through Consip's framework contracts if the spending value is above the European threshold, and to buy through the e-marketplace if spending is below the European threshold (or likewise through Consip's framework contracts). The second regime regulates the public administrations for which the mandatory regime is not active: these administrations can call for tender independently, but they must respect the quality/price benchmark settled in Consip's framework contracts. This implies that if public bodies not subjected to mandatory regime want to call for tender independently, then they cannot buy a good or service which has a framework contract (penalty invalidity of the contract) by paying more than the unitary price (settled in the same framework contract), discounted at 20%.

### **TOOLS TO SUBSTAIN QUALITY**

Going back to the principal theme of this study, it is worth underlining that each procurement agency, following its aims, must be able to run a careful market analysis and to provide incentives for competitiveness. First of all, it is necessary to foster firm participation and, above all, try to stimulate the most efficient ones (in terms of price and quality ratio), in order to avoid a loss of balance in the trade-off between monetary savings and level of quality purchased. Competitiveness and price-quality trade-off are crucial factors in procurement because they involve a dynamic aspect of a procurement system. Competitiveness among firms should be secured in each phase of a single process (invitation, participation, bids and also in the execution phase where there is a chance to renegotiate part of the original contract). In order to achieve this goal, it is necessary for tenders to be designated

in an intertemporal perspective and to protect market dynamism from phenomena such as lock-ins, which could waste actual gains and encourage suppliers' opportunistic behaviour.

More specifically, if quality delivered is lower than the contracted quality, buyers often have to bear further costs. These costs are categorised as "direct" costs, which involve maintenance activities and/or the renegotiation of the contractual terms. However, there are "indirect" costs, which are all monetary and non-monetary costs caused by the negative impact produced by an inefficiency in the referential system, especially when the system considered is composed of interdependent parts. This implies a system where inputs employed are all necessary and complementary to final output success. It is easy to see that public spending is an instrumental part of a system composed of interdependent parts, since public spending is a key element of government projects. In particular, public spending is a basic instrument through which a government project will be implemented both in the case of a project aimed at citizens and/or at the improvement of administrative functions, which are key in obtaining efficiency in other purposes of private or public interests.

#### **Tools to Consider during the Definition of Tender Strategy (Pre-Contractual)**

Main pre-contractual tools, used in the pre-contractual phase to ensure high quality/price ratio, are tendering and scoring rules. Tendering rules express how participants' bids will be judged. Usually, Consip uses the "most economically advantageous tender", which differs from the "lowest price criterion", meaning that the procurer selects bids by taking into account price, monetary aspects, non-price attributes and quality. Technical aspects are all qualitative contractible elements concerning the contracted object. To be more precise, the "most economically advantageous tender" is a more flexible criterion which allows the procurer to choose among different kinds of contracting methods in order to achieve better control in a complex purchase and to balance the price-quality trade-off.

Briefly, when evaluating the competition among bidders, the "lowest price criterion" is based solely upon price, whereas the "most economically advantageous tender criterion" concerns both price and technical aspects, which refers to different qualitative elements considered relevant by the procurer. However, when choosing the latter

criterion, procurers should set a scoring rule according to their preferences on dealing with the trade-off between price and quality management of supply.

In general, a scoring rule is given by:

$$\text{Total Score} = \text{Technical Score (TS)} + \text{Price Score (PS)}$$

And the scoring rule is a particular relation between technical and economic score defined by the procurer in a specific tender. The relation mentioned above implies not only the weighting of two elements, but also the discount level accepted, which mathematically translates the following questions: what is the maximum price that a procurer could accept for an incremental point on quality and/or which are the score combinations that give an equivalent total score? Thanks to the scoring rule, tenders can be ranked and awarded to the supplier with the highest total score.

However, weighting cannot always be defined a priori. Indeed, the possibility of defining a scoring rule is mainly linked to the chance of evaluating ex-ante all the qualitative aspects, so that the procurer is able to attribute scores and score increasing due to enhanced quality level. Otherwise, there could be a previous selecting phase, where the buyer asks to submit offers competing only on technical dimensions.

“Quality can also be taken into account by performing a price-only competitive tendering when minimum standards are introduced. Minimum standards allow bidders to compete on price only if they meet some minimal technical/quality requirements. This scenario is preferable when the buyer can specify and measure all relevant technical aspects. In this case, a price-quality trade-off is not faced” (Dimitri, Piga & Spagnolo, 2006, pp. 82-120). (This is the awarding criterion used in the contracts analysed in the empirical case study).

### **Relevant Tools in the Definition of Contract Frame (Contractual Instruments)**

“Well-designed supply contracts are essential to effective procurement: a bad choice of contract could set negative consequences to a buyer in terms of cost and quality of supply” (Dimitri, Piga & Spagnolo, 2006, pp. 82-120).

Initially, a choice depends on qualitative characteristics of the goods/services contracted and on all the possible endogenous and

exogenous contingencies that can modify the same characteristics. An essential point of this issue is the availability and/or the costs through which a third party could measure the actual performed quality.

Briefly, two different contractual categories exist:

- *Explicit contracts* should be used for standardised goods/services where quality is verifiable. It is always recommended to specify quality standards and to impose penalties (fines) when quality falls below those standards. In this case, a non-performance or a bad one can be exactly verified by a third party and this judgement cannot be contested. Vice versa, procurers can set a bonus if quality is above standard.
- *Implicit contracts* should be adopted when qualitative dimensions are observable but not verifiable. Thus it is impossible to define incentives or penalising clauses. This is the case of a contracting strategy based on discretion among parties and reputational effects. The latter dimension should be monitored in order to avoid contractors' opportunistic behaviour.

In real scenarios, different kinds of quality (contractible and non-contractible) characterise simultaneously a particular good/service, so public officials in charge of procurement activities should know these characteristics to adopt an appropriate degree of contract's flexibility. As discussed before, contract flexibility depends on a number of clauses defining contractual performances and specifying incentives and/or penalties.

Finally, in order to effectively ensure contractual terms, penalties must be convincing for agents: if contract management induces false expectations for the counterpart, in which the penalties are just formal. Then, the implementation of such penalties would produce the opposite effect in terms of a low performed quality and a higher price (Dimitri, Piga & Spagnolo, 2006) (and maybe prices go up).

In the empirical part of this study, we will better investigate the effectiveness of a specific contracting strategy showing evidence of the correlation between ex-ante and ex-post quality.

### **CONSIP'S MONITORING ACTIVITIES**

Performance monitoring is a key element in contract execution and in securing contracted quality. An efficient monitoring system is a complementary tool to contracting strategies and tendering rules. Since it allows step-by-step performance checks it acts as a deterrent for suppliers. In this way, suppliers are conscious of a well/carefully-managed contract and are encouraged to respect contract terms in order to avoid penalties. Monitoring is also an efficient tool in providing contract analysis and in finding new procurement solutions

For this purpose, Consip built the Monitoring Team in 2005, which operates through three different instruments:

- Onsite inspections of public administrations and suppliers, which are carried out by third parties involved by Consip. These inspections aim to check possible infractions concerning terms. Any violations are punished by fines as established in the contract. Each inspection ends with a qualitative and quantitative report released by the inspection body.
- Surveys drawn up for all Consip framework contracts are provided to a sample of public administrations by phone calls, through the Consip call centre. As described before, surveys can be considered as a tool in perceiving quality.
- Complaints, together with surveys, are a monitoring tool strictly held by Consip that offers public bodies the possibility to indicate voluntary contingent inefficiencies with regards to delivery. Complaints reach Consip through three different channels: by e-mail, through the call centre, and by letter.

All monitoring tools lever on five macro-classes, in which inefficiencies are summarised. These macro-classes are:

- a) Quality in the execution process refers to activities which recede effective supply, such as delivery time, site and goods installation;
- b) Quality of supplied goods/services indicates non-conformities in delivered products;
- c) Management of service quality refers to many activities such as product information and training;

- d) (suppliers') Call-centre quality refers to the call-centre services provided by suppliers;
- e) Quality of assistance. This is one of the most important categories because it takes into account logistic activities after product delivery such as maintenance, substitution of faulty products, goods pick-up and disposal.

Finally, it is important to note that monitoring is pursued to evaluate quality trend of supplies. At the same time, it is a useful tool in researching innovative contractual solutions, which aim to obtain contracts that could guarantee a high price-quality balance.

## **EMPIRICAL ANALYSIS**

### **Data and Methodology**

The empirical analysis uses information on public administrations' purchasing: the amount spent by public bodies on photocopiers and the complaints raised by these buyers, concerning the same procurement contracts. Data collected concern a set of Consip's framework contracts of photocopiers services rent. It is important to note that printers, the primary object of the contract, are homogeneous in quality. We analysed only the rental market of photocopiers, even if some results could be generalised in other public procurement activities.

The time range covered by the contracts is between 2001 and 2007 with a 12 months delay. In any cases, Consip can decide to extend the length of the contract if the total amount is not sold out in the first 12 months. Each rental contract between public procurers and supplier has a length of four years.

Awarding strategy is based on lowest price criterion with minimum quality standards. In the report, qualitative aspects are fixed for photocopier quality and also for rental and accessory services. In this way, price becomes the only aspect on which competition is based.

Accessory services scheduled in the contracts are the same for all framework contracts considered. These are:

- Delivery, machine installation and removal;
- Technical assistance and maintenance;

- Call centre.

It is important to underline that, in general, framework contracts are timing related in order to guarantee the satisfaction of Public Administrations' demand in each subsequent period. For example, contracts named Photocopiers 5, Photocopiers 6 (for year 2003) and contracts named Photocopiers 8, Photocopiers 9 (for year 2006). In this way, the overall time of the contracts' activation allows public procurers to dispose of active contracts whose primary objects are medium-low and medium-high quality goods, so public administrations can choose which is the specific agreement that satisfies their specific needs.

Data on complaints were collected during 2005 and 2007. It is clear that there is a temporal discrepancy between contract and complaints. Therefore it was not possible to make an analysis considering the time dynamic of data's relation.

Methodology has been carried out in many stages to analyse the phenomenon from different points of view. In particular, the applied methodology fulfils many relevant purposes: a) understanding which contractual terms are more frequently contested during the execution time by procurers (descriptive analysis); b) detecting variables which mainly bias the probability of receiving a complaint (discriminant analysis); c) detecting variables which explain elements associated to the event "number of complaints" (Poisson Regression, count data).

It is also assumed that all the information on which dataset is built are trustworthy, i.e. each protest received by Consip's call centre on suppliers' performance inefficiencies (breaching of contract) is a real complaint on one of the activities mentioned in the contract.

To be coherent with the above assumption, data for complaints have been cleaned to ensure the uniqueness. I.e. all complaints raised by the same Public Administration, with the identical date, in reference framework contract or lot and, identical contents have been deleted. The exclusion of described information has been executed indistinctly to all sort of Public Administration: it avoids any possible discrimination among public bodies on trusting the information they give back to Consip's performances monitoring activities.<sup>3</sup>

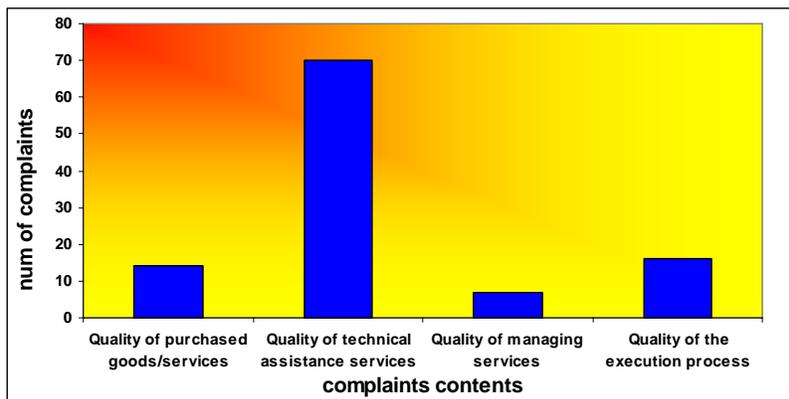
In this way, the probability that a complaint does not reflect a breach of contract but that it is only due to public officers' incapability in using the photocopiers and/or their ignorance of contractual terms should be

reduced. Ignorance of contractual terms can always occur because final users of goods/services procured are not constrained to know the contents of contracts, and they have the right to raise a complaint. So, there is evidence that data are biased in terms of trustworthiness.

### Descriptive Analysis

First of all, it is necessary to have an overview on the distribution of complaints, i.e. considering complaints' content in an aggregate level for all framework contracts considered. Graph 1 clearly highlights that complaints mainly refer to technical assistance quality (post delivery): 70 out of 107 complaints, or 65% of total observation. This result underlines that public procurers mostly perceive breaches concerning accessory services, like maintenance or defective goods substitution. Moreover, 15% of complaints refer to "quality of execution process", which concerns delivery time, while 13% refer to "goods/services quality" and 6.5% refer to "quality of managing services".

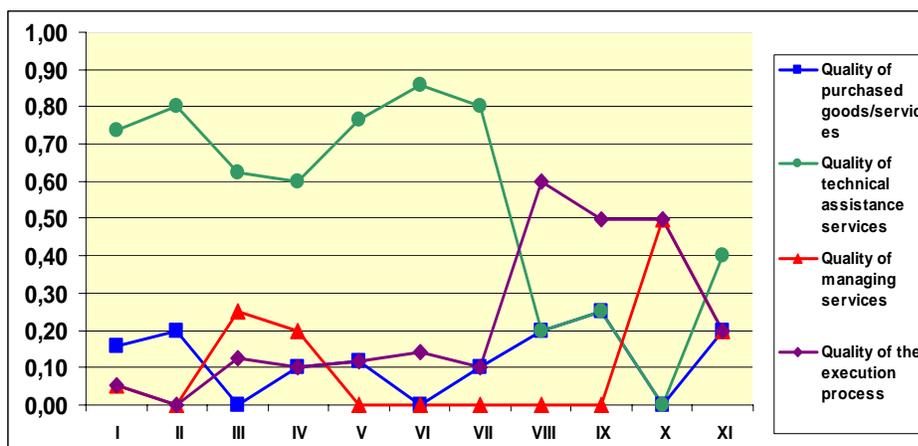
**GRAPH 1**  
**Complaints' Contents Distribution on all Framework Contracts Considered**



Even if in general this first evidence narrows the complaints' content, analyses should be elaborated on different kinds of complaints' trend: trend of complaints' contents during the sample period 2001-2007 and trend of complaints related to suppliers. In Graph 2, x-axis represents

single lots of the agreements here considered, while the y-axis reports the ratio between each type of complaint and the total amount of complaints.

**GRAPH 2**  
Trend of complaints' contents of towards the contracts



First of all, this graph shows that the ratios of complaints referring to technical-assistance quality are noticeably higher than the ones referring to other types of complaints for majority of the slots considered. However, for the more recent slots, it shows a decreasing trend, and there is evidence showing that technical-assistance quality is the only complaint category with a decreasing trend. The other (complaints) categories have an increasing trend but with different intensities. Finally, frequency of complaints referring to goods/services quality is constant. We will try to broaden the evidence surrounding the distribution of complaints concerning the perceived quality on primary objects of the contract (that in this specific case are printers). Consequently, it is relevant to understand why, how and when primary contract objects are contested by final users.

Table 1 shows for each administration type the amount of complaints referring to quality of goods/services procured for the 8<sup>th</sup> and 9<sup>th</sup> lot (contracts edition Photocopiers 8 and 9).

**TABLE 1**  
**Number of Complaints by Administration Typology Weighted by the Amount of Purchase**

Administration Typology	Number of Complaints	Purchasing of each Admin. Typology	Total Contracts value for Photocopiers 8+9	Number of Complaints weighted
State and Peripheral Departments	10	14061188	14389240,4	10,23
Local Entities	5	48120,32	14389240,4	1495,13
National Health Entities	3	242407,5	14389240,4	178,08
Others	2	37254,96	14389240,4	766,9

The last column in the table shows the values of weighted frequency of complaints, which are calculated by taking into account the ratio given by total expenditure of each administration type and total contracts value, are considerably different from the absolute frequencies. This implies that complaints regarding the primary object of the contract do not depend on purchasing volume. Another important result emerges from this simple table: a low level of demand satisfaction in terms of quality does not depend on compulsory regime imposed by Financial Law. In contract editions Photocopiers 8 and 9, State and Peripheral Departments are subjected to compulsory regime, but at the same time those administrations contested less for each transaction.

In brief, results highlight that even though a compulsory regime implies higher probability of a complaint (as described later), in most of the cases, the analysed complaints do not concern the quality of goods/services purchased, but the quality of the accessory services included in the contract.

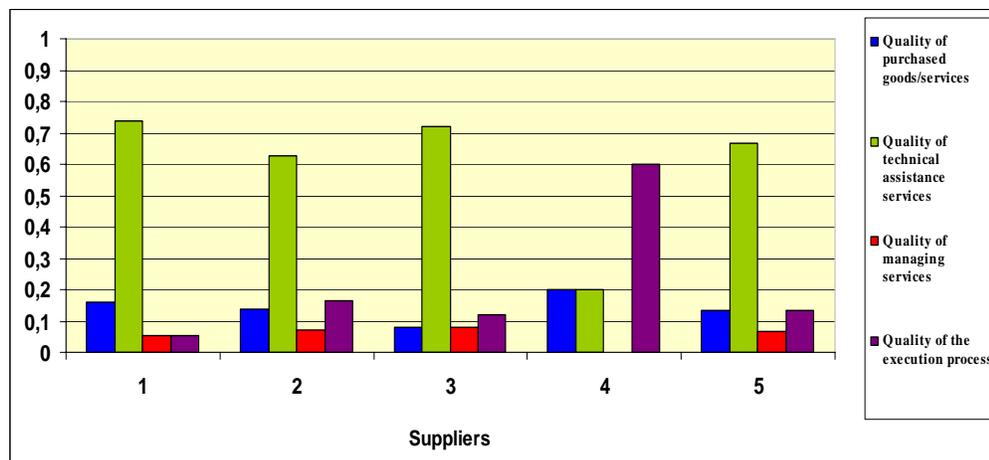
This consideration should be confirmed when we repeat the same analysis for framework contracts Photocopiers 5 (lots from III-th to VI-th), when all administrations were obliged to buy through Consip framework contract for orders with a value bigger than community threshold. In this case, complaints on procured goods quality have been raised solely by Central administrations (i.e. Ministries) and Local Entities (i.e. Municipalities), not by Health Bodies or Universities and, as before, local administrations' complaints count more than the others.

In the end, evidences allow two considerations on how the compulsory regime effects quality perception:

- Liable public administrations are prone to contest more frequently, but their complaints are mostly referred to accessories services.<sup>4</sup>
- Suppliers, knowing the compulsory regime imposed, tend to exploit this liability with opportunistic behaviour by reducing the quality-price ratio of supplying after the awarding phase. In particular, suppliers tend to reduce the quality of accessory services, which is more difficult to define in terms of minimum standards in the contracting phase.

The latter consideration could be checked in the complaints' contents analysis when considering awarding suppliers. Graph 3 highlights that the most consistent inefficiency for each supplier, besides the fourth, is always related to technical-assistance services. The other complaints' categories take similar shares of the complaints' distribution; the only exception is represented again by the fourth supplier, which is mostly contested for the quality of the order execution (delivery delay, billing), but no complaint refers to managing services.

**GRAPH 3**  
**Complaints' Contents Ratio for Each Supplier**

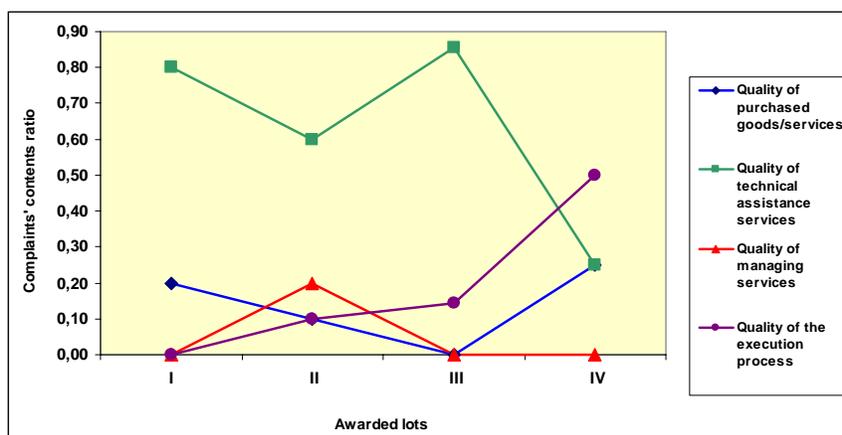


Moreover, data show that each supplier won on average two lots and this allows us to present again complaints' content distribution trend with respect to suppliers, that is how complaints' contents evolve towards the same supplier. By doing this, it is possible to define hypothesis about suppliers' behaviour and understand whether re-awarding the contract has gained in terms of efficiency in contractual obligation progress.

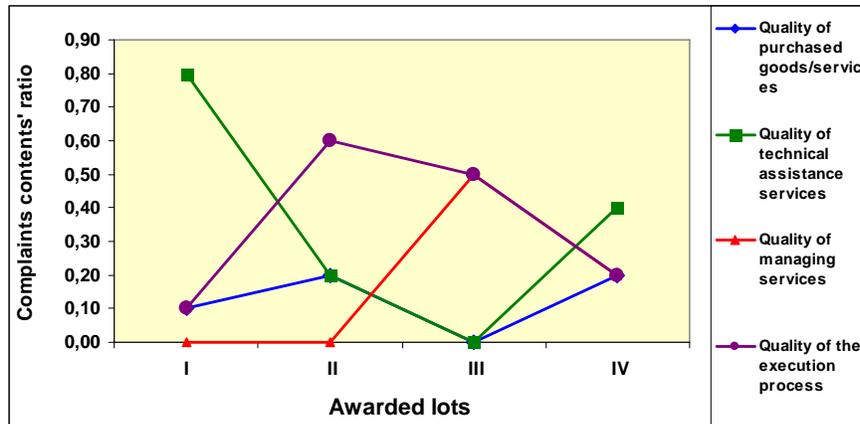
To a certain extent, results from Graphs 4A and 4B<sup>5</sup> are consistent with the ones from Graph 3, which implies that the aggregated trend is a trustworthy synthesis of details developed by focusing on suppliers. Therefore, it is licit to report the conclusion made under this assumption.

First, given the succession of framework contract, the frequency of total inefficiencies characterising the contractual engagements development has maintained a constant level. Second, contestations, expressed by public bodies towards all suppliers, refer mainly to accessory services included in procurements contract. As discussed before, these services are often characterised by a number of non-contractible qualities, which creates difficulties in writing detailed contractual clauses. To end descriptive analysis, it is possible to derive some critical considerations about qualitative trend of contracts considered.

**GRAPH 4A**  
**Complaints' Contents Ratio for Those Suppliers That Won Most of the Contracts**



**GRAPH 4B**  
**Complaints' Contents Ratio for Those Suppliers That Won Most of the Contracts**



Final considerations for both Graphs 4A and 4B highlight a strategic suppliers' behaviour. In keeping with the theoretical account, as we discussed in the first part of the study, it seems that awarding suppliers with a good knowledge of their own strength, tend to offer lower prices but with lower qualitative performances than expected in the contract. In particular, as mentioned before, this strategy is applied more frequently to aspects which are implicitly specified in the contract.

Results confirm the last consideration: complaints on technical-assistance services have a decreasing trend. Taking the maintenance services as an example, it could be summarised by a quality indicator built using certain elements, such as the time required by the producer to solve a repeated problem reported by users. If quality indicators could be defined, it will be much easier for procurers to assess the gap between the received service and the contracted one and thus, to impose penalties (fines).

Moreover, analysis suggests that suppliers who frequently win public contracts have good knowledge of standardised contracts, tend to have strategic behaviours to reduce (or to maintain constant) quality/price ratio levying on services characterised by non-contractible qualities. As we have frequently mentioned, these elements cannot be easily measured

ex-post by third parties. For example, it is too complex to exactly quantify the quality level of training on the use of photocopiers (execution process) or the supplier's call-centre performances about requests on the conditions to make an order (managing services).

However, it is not adequate to solve this problem through suppliers' strategic behaviour because it is not always true that suppliers are motivated only by opportunistic behaviour aimed at maximising their profits. If suppliers work consistently with public bodies (not necessarily with or through Consip), they are aware that public administrations tend to reprove payments. In the case that credits are not on short notice, suppliers prefer to deliver goods/services at a lower quality than contracted<sup>6</sup>. This could imply that procurers and suppliers agree tacitly, but public inefficiencies are not reduced in this way.

### **Discriminant Analysis**

Discriminant analysis is a statistical method elaborated by Fisher in 1936, which allows groups that originally belonged to the same population to be divided into parts, by using a discriminant function. In this context, the aim of the analysis is to determine the features that characterise public procurers  $i=1, \dots, 1275$ , belonging on average to probable complainers. For this purpose, we built the variable *bin\_complaint* which equals 1 if the particular administrative institution raised at least one complaint during the considered framework contracts' activation period; otherwise 0.

Observations are public bodies which are included in at least one of the framework contracts considered. However, it is not the entire population, but only a subset, since it refers to only eight different administration typologies which cover 85% of the total purchased volume and 90% of related complaints.<sup>7</sup>

In the following part, we provide a description of the independent variables, predictors, used in the model:

1. **Administration typology refers to** the administrative divisions, and it includes the following six categories: Central bodies, Hospital Companies and Health Agencies, Municipalities, Provinces, Regions, Educational Institutions-Universities and Polytechnics. This variable is built as a binomial variable,  $A\_T_j$ , where  $j=1, \dots, 6$  that is

$A_{T_j} = 1$  if public bodies belong to j-th typology

$A_{T_j} = 0$  otherwise.

2. **Administrations' geographic location** could be the North, the Centre, the South and major islands. First of all, it is important to note that this variable presents a bias concerning Central Administrations and Educational Institutions, which are instituted by central headquarters found in Rome and other offices scattered throughout national territory (often at provincial level). However, the current data is not detailed by geographic location: which site bought and/or raised complaints. For this reason, information has been maintained aggregated and attributed to Centre. The same approach has been adopted for Educational Institutes for which the sole detail refers to the level of schooling. Also administrations' geographic variable is a binomial variable defined by:

$Area_t = 1$  if the administration belongs to t-th area

$Area_t = 0$  if the administration does not belong to t-th area. with  $t=1,2,3,4$

3. **Number of framework contracts joined (ncontracts)** refers to the number of contracts joined by each administration. In particular, the set of possible realisations for variable *ncontracts* is [1,2,3,4,5,6] and it implies that the unit of measurement is the framework contract both when the contract is single-lot or when it is multi-lots. This is justified by the fact that this study examines complaints phenomenon as it emerges from the set of framework contracts considered for printers [2,9]: division into lots is just a characteristic of each contract.

This variable could be interpreted as an administration's "fidelity" degree to Consip.

For example: if we consider three framework contracts, one multi-lots (four lots) and two single-lots, which are six lots in total. If Administration X purchased on all lots, *ncontracts* takes value 3, because the scale of measurement is the framework contract not the single lot.

4. **Volume of purchasing** is defined by the following formula:

$$\tau_i = t_{ijk} / T_{jk}$$

where  $i=1,2,\dots,1275$  (observation index);  $j=1,2,\dots,6$  (Administration's typology index);  $k=1,2,\dots,11$  (Contract's lots index). The ratio expresses the purchasing ratio between each observation and the total amount of purchased volume by the related administration typology.

Examples:

- i. Considering Municipality of Alpha ( $i=760$ ), belonging to Administration Typology Municipalities ( $j=4$ ), joined in Framework Photocopier 5 lot 2 ( $k=5$ ) for a volume of purchasing of 3144,22€, so  $\tau_{760;4;5}=3144,22$ .

If total purchasing of Administration Typology is known, then the denominator of  $\tau$  could be defined as  $T_{4;5}=10.000$  and, so,  $\tau_{760}=3144,22/10.000=0,314422$ .

- ii. Now consider for the same lot of contract  $k=5$ , Ministry Teta ( $i=15$ ), where  $j=1$  and administrations  $j$ -th total amount is  $T_{1;5}=920.000$ . If Ministry Teta total purchasing is 150.000€,  $\tau$  is defined by  $\tau_{15}=150.000/920.000=0.163$ .

Considering the administrations' purchasing ratio on each single-lot allows us to obtain information more precisely, and using discriminant analysis, to discriminate among different contracts to identify which variables are significant in the classification of the units (administrations) between "complainers" and "non-complainers".

Last but not least, purchasing volume highlights in absolute terms the measure of administration dimension. However, the methodology used characterises each administration according to its typology, so it is useful to capture this dimensional effect by using the same methodology. In this way,  $\tau$  has been normalised by the total purchasing volume of each administration typology,  $(T)_{jk}$ .

5. Variables  $S_m$  where  $m=1,2,\dots,5$  refer to awarding suppliers and are built on (administrations') purchasing ratios with regards to lots/framework contracts awarded to each supplier. This variable will explain the supplier's effect in determining whether an administration is more likely to be a "complainer".

6. **Ratio of obliged purchasing (ROP)** indicates which parts of PA's purchases are submitted to compulsory regime.

The choice of a continuous variable rather than a dummy one depends on the fact that the compulsory (or not compulsory) regime imposed by Financial Law is directly linked to transactions carried out by the entire administrative apparatus, in the time range of a commercial year. This is justified by one of the Financial laws proposed, which requires the estimation of a certain volume of spending (currency, in this specific case) of the same apparatus. Instead, framework contracts have a length of almost twelve months, starting from the activation date, but often transactions referred to the same contract are subjected to different regimes. This implies that it is impossible to estimate the compulsory regime's effect with a dummy variable.

Using the variables described above, it is now possible to formalise the discriminant function used in the model:

$$P(\text{bin\_complaint} = 1) = \beta_0 + \beta_1 T\_A_j + \beta_2 i.Area_t + \beta_3 ncontracts + \beta_4 \tau_i + \beta_5 i.F_m + \beta_6 ROP$$

Results:

Actual	Predicted		Total
	Not Complainer	Complainer	
Not Complainer	1122	85	1207
Complainer	46	22	68
Total	1168	107	1275

Discriminant Scores v Group Variable					
Analysis of Variance					
Source	SS	df	MS	F	Prob > F
Between groups	177,47	1,00	177,47	177,47	0,00
Within groups	1273,00	1273,00	1,00		
Total	1450,47	1274,00	1,14		

Bartlett's test for equal variances:  $\text{chi}^2(1) = 613.7460$   
 $\text{Prob} > \text{chi}^2 = 0.000$

Discriminant function used in this model recognises 22 administrations over 68 as complainer; this implies a 32.35% correct

classification. Correct ratio classification for Entities “not complainer” is higher (92.96%), due to 1122 recognitions over 1207 units examined. In total, discriminant function recognised correctly the 89.33% of units. Even if the model presents a good overall performance, results suggest that variables considered in the model are more accurate for the classification of “non complainer” administrations.

This implies that there may exist some other factors/variables that could affect the probability of a complaint or reduce the significance of some variables considered. For example, the missing data problem; or other variables such as Reserve Price, which is the maximum unitary value each supplier could offer to participate or the average of bids submitted during the awarding process.<sup>8</sup>

The following two paragraphs list the more significant variables included in the discriminant function and their signs of the correlation with the dependent variable:

- a) Administration Typology, in orders: Regions, Municipalities, Hospital Companies and Local Health Agencies, Universities and Educational Institution, Districts. [+].
- b) Purchasing volume  $\tau$  for framework contract (in order of significance): Photocopiers 9 [+]; F Photocopiers 5 lot 3 [-]; Photocopiers 8 lot 1 [-]; Photocopiers 5 lot 4 [+]; Photocopiers 6 [-]; Photocopiers 8 lot 3 [+].

The above key variables and their coefficients of the Discriminant function are still not sufficient to exactly define the specific characters of a complainer administration. However, they will help us to make some considerations.

Regions and municipalities who joined in Photocopiers 9 contract are those administrations with the highest probability to raise a complaint. In terms of significance, they are followed by Regions and Municipalities who joined in lot 4 of Photocopiers 5 and lot 3 of Photocopiers 8. The primary contract object that links these three lots is the medium-high quality of the photocopiers.

However, this conclusion is not always safe. For example, Photocopiers 6, as a medium-high quality product, is significant but has a negative correlation with the probability of having a complaint: public bodies who joined in contract Photocopiers 6 are those ones with less

probability in complaining. In brief, all administrations who have joined in contracts described above could be a “complainer”, but with different levels of probability.

In particular, administrations joined in contracts Photocopiers 5 lot 3 and Photocopiers 8 lot 1 are those who complain less, and in these two cases the primary goods of the contracts are characterised by medium-low quality.

This is just an intuitive result and it supposes that in cases concerning lots with medium-low quality, any public employer could note the effective quality. Hence, inefficiencies could be easily highlighted, which could reduce suppliers’ incentives to deliver lower qualitative goods than those contracted.

This consideration is coherent with discussion on contractual instruments to sustain quality, because in the present scenario, first qualitative attribute of photocopiers is measured by number of copies per minute, which is not expensive for administrations to verify the performance level and to apply penalties. This may be a powerful deterrent for opportunistic behaviour. It is also important to note that this last consideration is also coherent with the interpretation from descriptive analysis.

### Poisson Regression

Poisson regression model is used for a second analysis purpose: the relationship between the frequency of complains raised by the same institution and those variables correlated statistically with complaint probability. The independent variables of the model:

1. **Area** indicates administrations’ geographical repartition:

$Area = 1 \equiv North$

$Area = 2 \equiv Center$

$Area = 3 \equiv South + MajorIslands$

2. **Body** which **refers** to the related administrative division: 1- State: central and peripheral administrations (*body.1*); 2- Local Entities (*body.2*); 3-Semi-Autonomous bodies: health and educational institutes and universities (*body.3*); 4-others, which includes Welfare and Research Institutions, Red Cross and other few ones (*body.4*).

3. **Ratio of obliged purchasing (ROP)**: built for discriminant analysis
4. **Supplier** defines the winning supplier for each specific lot. This variable is different from the one used for discriminant analysis: suppliers 3 and 4 are now merged into one single variable.  
Moreover, it has been excluded variable Supplier 1 for aliasing matters.
5. **Relative purchasing (RP)** indicates the ratio of purchasing volume related to a set of complaints, over the total purchasing volume of that specific lot.

$$RP = \frac{PA's\_contracted\_value\_on\_lot\_x_k}{tot\_contract\_value\_Lot\_x_k}$$

6. **Cumulated purchasing** for first three months of the framework contract activation. This continuous variable tries to detect a possible effect of orders congestion. In particular, this variable is built as cumulated purchasing volume for each administration in the first three months of contract activation, normalised by administration's total purchasing in the specific contract or lot. Formally:

$$cumulted\_value_{ik} = \frac{value_{iI}^{\circ}_k + value_{iII}^{\circ}_k + value_{iIII}^{\circ}_k}{value_{ik}}$$

This last variable has been introduced as *offset*. In this way it is possible to discount the frequency of complaints by each public body's purchasing without introducing an overestimation parameter's bias. In fact, results show that administrations that bought more products also have a higher probability to submit a complaint in the same range of time.

### **Results**

First of all, it is useful to understand whether the model is appropriate. To do this, the residual deviance, which takes into account data's deviation from the model, has to be examined: the higher the deviation, the less the model is appropriate. The deviation considered is

**TABLE 2**  
**Poisson Regression Results**

Number of Complaints (for each administration)	$\beta$	SE	Z
Constant	-0,632	0,4189	0,131
Supplier~2	0,038	0,208	0,18
Suplier~3	-57,035	0,371	-153,8
Area_2	-0,22	0,318	0,69
Area_3	0,1	0,31	0,32
Semi-Autonomous Entities	0,977	0,408	2,40
Local Entities	0,544	0,38	1,43
Ratio of obliged purchasing	11,553	1,7	6,79
Relative purchasing value	5,142	1,261	4,08
Cumulative purchasing value	Offset	-	-
Observations	86		
LR chi2(8)	13318,07		
Prob>chi2	0,000		
$\alpha$	5%		

tested using a  $\chi^2$  distribution with 8 degrees of freedom (number of regressors included in the model), under the null hypothesis that the model is appropriated. The results show that the p-value associated is equal to zero, so the model is adequate.

In Poisson Regression, since the coefficient associated with the i-th regressor highlights the logarithm of dependent variable (count of number of complaints) expected variation for each unitary variation in regressor value, so this implies that each variation is expressed in terms of elasticity.

The results for the flowing variables statistically significant at 95%:

- Ratio of obliged purchasing (+)
- Relative purchasing value (+)
- A\_T=Semi- Autonomous bodies (+)
- Supplier.3 (-).

Considering coefficients' versus, firstly, results highlight that the frequency of complaints depends positively and consistently on purchasing volume: the more an administration buys, the higher the probability that the same administration carries out more than one complaint. This result confirms just an intuitive phenomenon: more orders implies an higher probability to receive bad (defective) products, or better knowledge on product characteristics, but this last interpretation must be considered with the procurer's effective needs.<sup>9</sup>

Secondly, the probability of a large number of complaints depends positively on obliged purchasing volume. This result induces to present again those conclusions discussed above referring to obliged purchasing: specific needs should not be considered as been satisfied from the moment that in framework contracts goods/services are standardised; on the other hand, one should always remember that the suppliers, knowing that some public administrations are obliged to buy in framework contracts, tend to move opportunistically, without respecting qualitative levels of primary object of the contracts and those related to accessory services. The latter hypothesis seems to be rejected by the same results, since the results show that variables related to suppliers are not statistically significant except one, which identified a negative correlation between the presence of a particular supplier and the probability of a high number of complaints.

However, looking simultaneously at the frequency of complaints and their contents, it is evident that contents referred to primary good quality is just 10% of all analysed cases. This implies that frequency of complaints explained by compulsory regime is not justified by the fact that standardised goods/services do not satisfy specific administrations' needs. Following this argument, it is possible that obliged administrations are less prone to buy but simply want to express their dissent, while voluntary procurers buy because they require the specific good/service at that price.

Reader could easily note that similar behaviours of obliged administrations are useless: using complaints instrument (such as a customer satisfaction index) to manifest their dissents to government, measures only the ineffectiveness of Consip's activities. In fact, Consip develops its projects also considering the performances monitoring results).

Confronting the results of descriptive analysis and of the Poisson regression, the issue on suppliers' opportunistic behaviour seems to be reasonable in both aspects: looking simultaneously at complaints' frequency and contents, it is evident that in most of cases complaints are related to accessory services (characterised by non-contractible quality) included in the procurement contracts, rather than the primary object of the contract. This allows us to assert that suppliers tend to make low price offers in the bidding phase, however, later on deliver also lower quality services than contracted.

Moreover, results emerge that Semi-Autonomous Entities, Universities, Educational and Health Bodies, are those administrations who complain more, and in particular they complain with double intensity with respect to Local Entities.

The last result could be examined into more depth to understand if the frequency of complaints could be effectively interpreted as an administrations' efficiency indicator in the management of contracts. This would imply that contestations, carried out to point out inefficiencies in the contract's execution, are due to an inefficient management of the contract. If this is true, administrations should use penalties as compensations for unsatisfied services received. The application of penalties could be use to highlight how contracts are managed with the purpose of using penalties as a deterrent instrument for suppliers' opportunistic behaviours.<sup>10</sup>

In the present study, analysis on penalties, together with complaints evidences, should allow us to rank administration typologies by a complete efficiency index for contractual and execution phase of procurement contracts. Unfortunately, only three Framework Contracts have been subjected to inspections (Photocopiers 5, Photocopiers 6 and Photocopiers 8) over a total number of 330 cases of non conformity (administrations) examined.

Data show that penalties have been applied only twice in front of the verification of deliveries' non-conformities (330) and this result implies that none administration could be considered more efficient than others. In particular, the evidence that public entities do not apply penalties, induce more critical conclusions on the degree of efficiency of Italian administrative apparatus. In fact, it can be asserted, even if proved, other than some sporadic cases, but in the case of disservices supported, public

bodies prefer to renegotiate privately with suppliers rather than apply penalties included in the contract.

There are different kinds of private renegotiations of contractual terms that administrations could use in the place of penalties:

- To obtain an incremental quantity of goods/services and it is not necessary that these goods/services are the same of those procured;
- Public official, in charge of procurement activities, should elude contractual clauses for private gains (rent-seeking behaviour);

Anyway these hypotheses are realistic, but they are derive from information emerged from procurer declarations, such as Inspections' reports.

Available data on fines levied by public administrations are meagre, so it is impossible to rank administrations definitively on an efficiency/virtuousness index, in other words, it is impossible to exclude some of them from the vicious circle of Italian public apparatus. Moreover, it is important to underline that penalty is a more trustworthy tool than complaints because complaints could be expressed by all public employees (final users) and this characteristic implies that there is an intrinsically margin of unreliability, which could due to the incapability of using the machine and /or the lack of knowledge of contractual terms. Whereas fines could only be applied upon the demand of the public official who is in charge of procurement and is obliged to know contractual terms constraining "his" administration.

In brief, it seems that inefficiencies exist and they are more relevant than expected, because, today, public procurement is a hybrid model, and most of public employees clearly lack of professionalism and, often they are prone to rent-seeking activities.

## **CONCLUSION**

It is clear that the reform of the Italian public procurement system is incomplete. In fact, Consip and the legislator have improved their operations to meet the requirements of the public administrations by involving the same entities in the reforming process, adopting better solutions (contractual and tendering strategies) for an ex-ante monitoring and at last creating a Monitoring Unit to evaluate performances.

However, results fail to satisfy expectations for two main reasons: suppliers' opportunistic behaviour, as discussed before, and the pervasive inefficiencies of the Italian Administrative System.

It seems that the first need of the Rationalisation of Public Spending Programme is the collaboration of professional figures convinced that transparency and efficiency are key elements of all activities performed. This point is well related with the idea that monitoring is always a costly activity, so it is not efficient to spend lots of resources on monitoring tools, and thus a large part of benefits gained from the new system will be lost and at the same time net benefits cannot be evaluated.

It is also desirable that each P.A. develops an internal monitoring system to collect information about performances in the most efficient and trustworthy way and then, after a preliminary analysis of their contents, the same information could be sent to Consip in the right form. This practice should avoid bias in data. In this way the Monitoring Unit could first correctly analyse all this information and then develop new operative solutions. At the same time the Monitoring Unit should develop an efficient collecting system to allow an efficient and effective analysis of the monitoring results.

Public officials (among others) in charge of procurement must be responsible, transparent and prone to innovations, otherwise it will be impossible to work up to the new e-procurement system and tools, which are the real goals of public sector reform.

To conclude, we believe that ambitious goals cannot be reached without a deep reform in the administrative culture of the Italian public sector.

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### **NOTES**

1. Framework contracts could be defined as a specific case of framework agreements in which there is only a supplier and all elements are specified.

2. Italian rules on Public Contracts is now based on the new Public Contracts Code, which acknowledge UE 18/2004 Directives on contracts of goods, services and works, but also Ue 17/2004 Directive on “special” sector. Moreover, the new Code works an organic and complete re-organization of Contracts rules.
3. Most of the studies on public bodies’ efficiency/professionalism do not give exhaustive results because, often, they do not take into account all aspects related to efficient management of processes. Considering, for example, “Active and Passive waste in government spending” (Bandiera-Prat-Valletti), where authors demonstrate that in procurements processes the most efficient bodies are the Semi-autonomous entities, public bodies have been analysed with regards to their behaviour in two different procurement systems: before Consip and after Consip’s institution. This analysis considers only monetary savings as efficiency indicator, so it does not consider savings effectively gained after contract execution (ex-post quality). Therefore, it seems that the model provided by Bandiera-Valletti-Prat, also if empirically grounded, cannot be generalised. In fact, a particular administration could be considered efficient if and only if it successfully manages both monetary aspects and the correct execution of the contract, looking at all clauses included. This consideration derives from the conviction that monetary savings do not necessarily imply an improvement in net benefits: if price/quality ratio decreases during the contract execution, maybe it is necessary to sustain other costs and so savings obtained in the awarding phase could be either partially or fully absorbed by the costs mentioned before. For this reason, in the present study we do not discriminate among different public body typologies.
4. May be, compulsory regime is adequate to satisfy specific needs in terms of primary object of the contract, but it is not operative to satisfy the specific needs on accessory services.
5. The choice to consider just these suppliers depends on the fact that these ones awarded eight on the eleven lots totally considered.
6. Probably, during the bidding phase competing suppliers consider the time of credits collection and the potential delay related. At the same time, it is more efficient for suppliers to consider just an average of these delays and just if delays deviate from the estimated mean, suppliers could discount them on quality supplied.

7. For example, from the current data it is not possible to determine the exact geographic location of Entities for Educational Right, so we should attribute this first information with a less trustworthy degree, because it isn't reasonable to believe that an Administration from the North joins in Consip contracts with higher probability than one from the South. In each case, if we know the geographic location, we should also define the purchasing volume, calculate an average on all Entities for Educational Right's purchasing, and repeat this methodology for all Framework Contracts here considered and at last, attribute for all bodies belonging to the same category the average of this last for each different Agreement. In this way, model does not increase its "accuracy": however there are few observations on which average is calculated, therefore data significance is reduced, because it does not take into account variance among data.
8. These variables allow us to calculate, for each contract/lot, the tick offered and so ratio between tick and total contract value, could be included as predictor in the model, to characterise bidders' behaviour. An interpretative hypothesis on the effect caused by the new predictor highlights if greater tricks are significant in the determination of the probability to obtain a complaint for beaches of contractual terms. And so if lower prices are associated with low quality performances perceived.
9. From a normative point of view, bigger purchases driven by a more acknowledgement of product is not always efficient in terms of resource (current budget) allocation. Public Official in charge of procurement activities who knows the good/service of the procurement contract as the one useful for its PA, could decide to aggregate and satisfy its own intertemporal demand of that good/service by joining only in that specific contract. By doing so, the agent constrains public administration to a big purchase not efficient neither in the short nor in the long time, especially if the product contracted is characterised by a process of fast obsolescence. In this case, in the short term, a big purchase could cause problems in stock and clearance; in the long term, goods bought before may not able to satisfy the current needs of PA, so PA should sustain new purchases losing value on money spent "today".
10. But the levying of fines implies acknowledgement of contractual terms allowing us to believe in trustworthy of complaint contents.

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