

# Collaborative features in French public e-procurement

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**Abstract:** Public e-procurement is the use of electronic means for publishing, processing, exchanging and storing all the information related to institutional purchases and provisioning in public organizations. It requires complex technological tools which must comply with legal and organizational constraints. In this paper, we analyse cooperative aspects in public purchase processes through the detailed study and the modelling of a particular purchase procedure. The obtained model is used to identify all the stages and process steps likely to be virtualized<sup>1</sup> through the use of electronic collaborative tools. This analysis is then the basis of a critical evaluation of five major e-procurement platforms currently used in France.

## 1 Introduction

For several years, the development of information and communication technologies triggered numerous mutations in all private and public economic sectors. In this dynamic context, public organizations try to take into account these evolutions and implement e-government applications. E-government is a general term describing the application of e-commerce principles to administrative procedures and the use of the Internet network to interconnect information systems of administrations, local authorities, enterprises and citizen's homes. E-government applications can be classified into several categories depending on the implicated actors: G2C when it is about exchanges between government and citizens; G2B to when it is about exchanges between government and enterprises and G2G to when it is about exchanges between governmental structures.

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<sup>1</sup> We will use the term "virtualization" and the verb "to virtualize" to denote the process of moving an activity (or a set of activities) from a physical, paper based form to a computer and/or internet based form.

A key feature of e-government G2B applications is moving the public sector's procurement processes to electronic platforms [Ton03]. It means the use of electronic channels for publishing, processing, exchanging and storing all the information related to institutional purchases in public organizations. Public e-procurement is an important stage in the e-government development, and economic stakes are probably considerable. Public orders in the European Union (EU) - orders of supplies, services and public works - represented 16% of the European Union's GDP, or 1500 billions of euros in 2002 [EuP06]. Its importance varies meaningfully according to the state member and can be located between 11% and 20% of the national GDP. In France, it represents about 10% of the GDP, or about 180 billions of euros per year [JMS05].

Following the general trend of public services modernization and administrative procedure simplification, public e-procurement has been introduced in France in 2001, and is in application since January 1st, 2005 for all public purchases beyond certain amounts. The adoption of electronic means for public procurement is a fundamental organizational stake since it permits the evolution of governmental procedures and a reduction in their length, a higher degree of procedures transparency, and will contribute to the emergence of a European market [Lom04].

Public e-procurement platforms are similar to B2B marketplaces in the private sector; they can provide support for a certain form of collaborative work [Pap05, WW05]. Whereas the legal framework imposes only a minimum in term of electronic means use, the available platforms seem to allow much more. Does the use of electronic channels in public purchase makes it possible to gradually set up a collaborative workspace between the public services and its usual and potential suppliers? This is the basic question that our research tries to answer.

In this paper, we define first the general framework for public purchase and the different procedures of public contracts. Second, we propose to model a particular procedure – call for tenders – for a better identification of possible zones of virtualization. Using the obtained model, we analyze then the cooperative aspects of the procedure which are likely to be virtualized. Finally, in the light of this analysis, five major e-procurement platforms used in France are reviewed and evaluated.

## **2 Public purchase procedures**

In this section, we briefly present notions relative to public purchase procedures and a classification of all available types.

## **2.1 Definition of a public contract**

A public contract is a purchase and a provisioning transaction issued by a public organization. It is an exchange of assent between two parts; one is public whereas the other is private. The public contract is constrained by the public procurement contracts code, and can be realized by a private supplier, an individual or a corporate [CMP04]. The notion of public contract covers vast panoply of public purchase types. All economic fields are concerned: computing, telecommunication, restoration, office articles, furniture, car acquisition and renting, constructions, consulting, auditing, etc. There is however an important distinction between three categories of public contracts: public works contract, public services contract and public supplies contract.

## **2.2 Public procurement principles and conduct**

According to the public procurement contracts code (CMP, *Code des Marchés Publics*), the relationship between the two contracting parts concerned by a public purchase implies the signing of a contract and the transfer of a financial amount in accordance with certain rules. These rules are: (i) free of access to all information related to the public purchase order, (ii) equal processing of all received tenders, (iii) and the global transparency of the whole procedure.

The economically most advantageous offer will be selected. To be able to make the best choice, criteria's will be defined according to the nature of the purchase, notably the technical value of the tender, its innovating character, its cost of use, the execution delay, aesthetic and functional qualities, after-sales service and technical support, etc. These contract award criteria's are weighed and are clearly defined in the constituent part of the public order. They are defined in the public contract notice (AAPC, *Avis d'Appel Public à la Concurrence*), in the tender documents for companies (DCE, *Dossier de Consultation des Entreprises*), in the act of engagement, in the specifications of the order, etc. Thus, the best classified tender will be officially retained after production by the concerned company of all documents and justifications necessary to the attribution.

## **3 Typology of public procurement procedures**

To express his need, the public order issuer has two logics of purchase. For orders below the threshold fixed by the CMP, he can opt for an adapted procedure known as the (MAPA, *Marché A Procédure Adaptée*) procedure. Beyond the threshold, he must resort inevitably to a formalized procedure which offers a higher degree of legal safety. Thus, the choice of the ordering procedure depends on the amount of the purchase and on the nature of the ordered item. Certain procedures are for example reserved for software requirement engineering missions while others for the execution of public works, etc.

### 3.1 Adapted procedures (MAPA)

In this procedure, the person responsible for the order (PRM, *Personne Responsable du Marché*), according to the nature of the purchase and its characteristics, has a total liberty in fixing the specificities of the order and the methods of publicity and competition. It can concern all types of purchase. For services and supplies, this procedure is possible for purchase lower than 150k€ for a state agency and 230k€ for a local authority. For constructional works, this procedure is possible for all purchase lower than 230k€.

In an adapted procedure, the purchaser disposes of certain autonomy in fixing of the order modes, but it is by no means a free procedure. Indeed, he must be extremely heedful to respect the constraints imposed by the law, the penal risk is higher in this type of procedure.

### 3.2 Formalized procedures

Beyond the thresholds quoted previously, the formalized procedure becomes mandatory for the public purchaser. There are 5 different versions of the formalized procedure for expressing his needs:

- **The call for tenders:** According to the public procurement contracts code, a call for tenders is "the procedure by which the public person chooses the most economically advantageous offer, without negotiations, on the basis of objective criteria previously brought to the attention of the candidates ". The call for tenders can be an open tendering or a limited tendering. In open tendering, all candidates can submit a tender. In limited tendering, only selected candidates can submit a tender. In both cases, a call for tenders is systematically preceded by a public contract notice. The contract will be awarded by the person responsible for the order, after opinion of the commission for call for tenders.
- **The negotiated procedure:** It is a "procedure by which the public person chooses the holder of the order after discussing with potential candidates and negotiating the conditions of the order with one or several among them". The negotiated procedure can be passed with or without previous advertisement and with or without call for competition. After negotiation, the most advantageous tender will be selected on proposal of a specific commission.

- **The procedure of competitive dialogue:** The public purchaser can resort to this procedure when it is impossible for him to define the technical means which can satisfy the contract requirement, or when he is not able to define the legal and/or the financial specification of the project. According to this procedure, the public purchaser specifies a functional program including the desired results or the requirements to satisfy. This specification will then be subject to proposals from candidate enterprises. Preceded by a public contract notice, this procedure is conducted through a dialogue between the purchaser and the retained candidates. The candidates make proposals based on requirements specification. After classification of the tenders, the most advantageous one will be selected by the person responsible of the order after opinion from a specific commission.
- **The procedure of design & implementation:** According to the public procurement contracts code, the public purchaser can resort to this type of procedure only when the contract relates simultaneously on the design of a project and on the realization of a public works. Therefore, the public contracts passed according to this procedure are constructional works contracts. After selecting a list of potential candidates by a specific jury, the person responsible for the contract awards the contract to the most advantageous offer.
- **The contest procedure:** It is the procedure by which the public purchaser chooses a provider based on a jury's opinion in a prize-winning contest. This type of procedure is generally used in the domain of regional development, urbanism, architecture and engineering or data processing. Concretely, it is about selecting the best technical design offered. The procedure of contest can be open to all candidates or can be restrict to some selected candidates.

#### 4 Analysis of cooperative situations

The logic of effective cooperative work is closely related to the logic of business processes. The majority of business processes are normally collaborative work processes since they imply in general several actors. In the research work done at GET on the virtualization of public procurement [ABB06], we applied this point of view to the procedures of public purchase. In what follows we will present the application of this logic to the purchase procedure of call for tenders. It is a procedure which is very often used by public organizations and which by its nature offers several prospects for electronic cooperation.

To model this procedure, we will use the MeDICIS method and will use its model of coordination [Bou01]. This model is then the support for a very fine analysis of the collaborative and "virtualizable" situations according to an adapted version of the matrices proposed by MAIN method [Lev04].

#### 4.1 The Methodology for Designing Co-operative Information System MeDICIS

MeDICIS (Methodology for Designing Inter-enterprise Co-operative Information System [Bou01]) is a methodology for guiding the design of inter-agents cooperation mechanisms (human, group of humans and/or machines). The first step is to analyze then to model cooperative processes according to three levels of depth (communication, coordination and collective problem-solving). The second step is to specify computer-based tools adapted to the needs and the constraints of the cooperative process, in order to be able in the third step to manage the knowledge used and generated by this cooperation.

Two levels of modelling are identified by MeDICIS: a macro level corresponding to the general context of cooperation, and a micro level which deals with the course of cooperation itself. Several models are suggested at these two levels, at the macro level - which is of most interest for us here - we mention:

- The Agent Model which describes the different types of agents, their features and their relationship (for example, an agent can be artificial, actor, group of actors or an organizational entity (business unit), with its specific knowledge, its competencies, its qualifications, its roles, etc.)
- The coordination model that determines the course (progress) of coordination activities between agents, their roles, the necessary resources, entry and exit flows, etc.

#### 4.2 Modelling of the purchase procedure "open call for tender"

The complete modelling of this procedure is presented in appendix 1 [Kha05]. It is a sequential succession of elementary activities. However, at various times of the procedure, several alternatives can be available:

- After publishing the call for tender and putting the corresponding documents for companies online (DCE, *Dossier de Consultation des Entreprises*) on line (activity n°4): if the procedure is urgent and the call for tender relates to a constructional works contract lower than 5.9M€, then the withdrawal period before recording and opening of the folds is 15 days; if there was pre-information or the call for tender relates to a constructional works contract higher than 5.9M€, then the withdrawal period before recording and opening of the folds is of 22 days; otherwise, the delay is 52 days.
- After reception of the folds (activity n°5): If the contract emanates from a local authority, then the recording, the opening of the folds and the drafting of the report are made by the board of the call for tender, if not (contract issued by the state) it is done by the person who is responsible for the contract (PRM: *Personne Responsable du Marché*).

- After recording and opening of the folds (activity n°7) and possible completion of the proposition file (activity n°8): the selection of candidates is done differently according to whether it acts of a local authorities contract or a state contract; in this last case, the board of the call for tender the person who is responsible for the contract have to give their opinion on the candidates before their selection.
- After examination of the offers (activity n°14): the contract can be declared unfruitful if there is no acceptable proposal.
- After classification of the offers (activity n°16): according to whether the contract emanates from a local authority or from the state, the evaluation of the offers and the choice of the most advantageous one are done differently.
- After requesting the tax and social certificate from the selected candidate (activity n°20): if the requested documents do not arrive in time, the contract is awarded to the following candidate according to the classification carried out earlier.

The last activity of the procedure (to pay the candidate who gained the contract after having carried out the requested work) is not detailed because it is related to a complementary aspect of the procedure which exceeds the framework of this study.

#### **4.3 Analyze cooperative situations**

In the previously modelled procedure, several activities are of cooperative nature and can thus be virtualized if the adequate tools are available. Each of these activities corresponds to a particular working and interacting situation which has to be studied and analyzed so that to provide adequate collaborative tools according to the corresponding requirements and constraints. To carry out this analysis, we use an adapted version of the matrices of collaborative situations analysis (Figure 1), initially proposed by MAIN methodology [Lev04].

Using these two matrices, it is possible to check on one hand if an activity is distributed or synergic with strong or weak interdependences between the actors (through the matrix of work); and on the other hand, to check if the practices are marked by coherence or cohesion with weak or strong interactions between the actors (through the matrix of communication). In the model presented in appendix 1, all "virtualizable" activities are numbered. To make our analysis the finest possible, certain activities have been broken up into elementary activities. These decomposable activities are visible in the table of appendix 2.

Using this analysis, we can now select the most adequate cooperative tools for the identified situations. This is done according to the typology of collaborative work tools proposed in [BoK05] which identifies three main tools categories:

- Tools for communication: e-Mail, Chat, Audio/Visio/Web Conference, Mailing lists, Forum, EDI, Blog, Electronic repository...

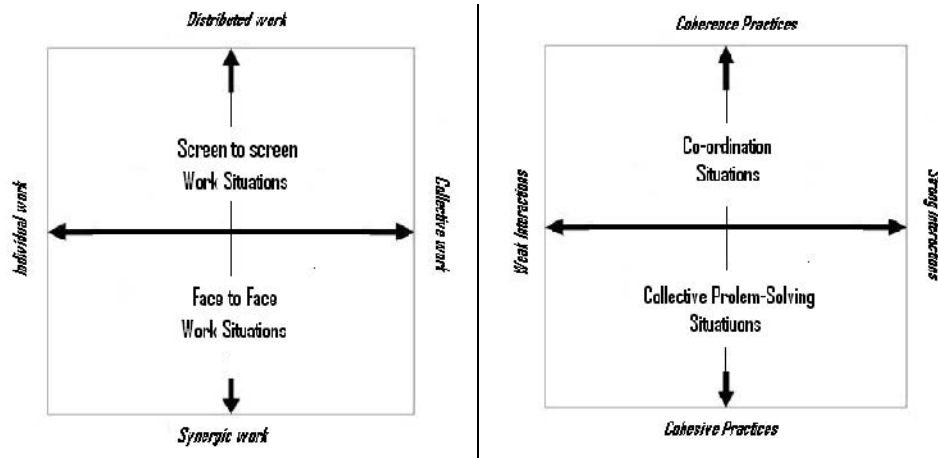


Figure 1: The two matrices of collaborative situations analysis (matrix of work on the left and matrix of communication on the right)

- Tools for coordination: Workflow, Shared calendar, Project management, Content management, File sharing, Wiki, Library...
- Tools for Collective Problem-Solving:
  - Tools of Knowledge sharing: White table, Shared Application, FAQ, Cartography of Competences...
  - Tools of Knowledge access: Search engine, GDSS, Ontology, Survey...

The table in appendix 2 presents the result of the analysis of each cooperative and "virtualizable" situation identified in the call for tender purchase procedure.

## 5. Evaluation of electronic platforms for public procurement

We have studied all available electronic platforms which support the public procurement process in France [San05]. We present here only five platforms, those that seem to be the most significant:

1. **www.ixarm.com**: this platform is specifically designed for the DGA (General Delegation of the Army), and is devoted to the purchase of the weapons, ammunition and weaponries. It was developed by France Télécoms, E-Business and Cape Gemini Ernst & Young using open software technologies (SPIPE, Php/MySQL).
2. **www.achats.defense.gouv.fr**: This platform for all other purchases of the ministry of the defence also developed with open source software (Spipe, Apache, Php/MySQL).



3. **www.achatpublic.com**: this platform has been adopted by all ministries. It has been developed using the J2EE standard (JSP + Servlets) by the UGAP (General Union for Public Purchases, *Union Générale des Achats Publiques*) in collaboration with the CDC (Governmental Treasure Agency, *Caisse des Dépôts et des Consignations*), France Telecom, Dexia and The Monitor.

4. **www.e-bourgogne.com**: "E-Bourgogne Marchés Publics" is an electronic platform specifically developed for the region of Bourgogne using the Php/MySQL tools.

5. **Adema Marchés Publics**: is a customizable platform developed by the Adesium/Comètris society. The Adesium platform is actually used by some local authorities (Val d'Orge, Ville d'Orsay) and regional councils ([www.adema-mp.com/cg91](http://www.adema-mp.com/cg91) for the Essonne region).

The following criteria's have been used to evaluate the presented platforms. These criteria's have been derived by analyzing general requirements for each public purchase procedure (presented in section 2 and 3), and by interviewing some public e-procurement stakeholders [Bou05]:

- Functional perspective
  - Support of all types of public contracts
  - Support for the whole public order procedure
  - Downloading calls for participation and calls for tenders
  - Sending proposals and replies to call for tenders
  - Support for reverse bidding
- User centred perspective
  - Ergonomics and simplicity of graphical interface
  - Editorial content
  - Online help
  - Collaborative tools availability
- Technical perspective
  - Security mechanisms implemented
  - Software tools used for the development of the platform

Table 1 presents the result of the evaluation for the five platforms. The study is based on online product documentation, and complementary information available in various websites (zdnet, 01informatique, etc.). We have also gathered some precious data through tests and trials achieved directly on the platform (when it was possible).

Criteria					
Support of all types of public contracts	++	++	++	++	++
Support for the whole public order procedure	++	++	++	++	++
Downloading calls for participation and calls for tenders	++	++	++	++	?
Sending proposals and replies to call for tenders	+	+	+	+	?
Support for reverse bidding	++	++	++		
Ergonomics and simplicity of the graphic interface	++	+	+	++	++
Editorial content (news, FAQ...)	++	++	++	++	
Online help	++	++	++	++	++
Collaborative tools availability			+	+	
Security mechanisms implemented	++	++	++	++	++
1					
2					
3					
4					
5					

Table 1: comparison and evaluation of 5 public e-procurement electronic platforms

On the basis of this comparative study, the following can be concluded:

- Even if there are many different types of public contracts (depending on the nature of the ordered product and on the total amount of the order), they seem to be supported by all the studied platforms.
- Reverse bidding is not always supported, whereas getting the lowest price is often an important issue for public institutions.
- Main web technologies are present, but open source software seem to prevail.

- All studied platforms have been developed by external software providers.
- Most studied platforms do not provide collaborative tools (chat, shared agenda, electronic mail, forum, etc.).

## 6. Conclusion

Public e-procurement is a strategic goal in the development of e-government applications in France and in the European Community [Ton02, Lom04]. The work presented in this paper is a result of a research project conducted at the GET<sup>2</sup> research labs and dedicated to the study of public e-procurement processes and tools in France [ABB05].

In this paper, we have studied public procurement procedures, and we have modelled the call for tender purchase procedure using the coordination model proposed by the MeDICIS methodology. The obtained models helped us in identifying and in analysing all the collaborative situations that occur in this particular procedure. This analysis shows that the collaborative dimension is fundamental in public purchase procedures. And like some other authors [WW05], we tend to believe that there are still many possibilities for introducing electronic collaborative tools in the public e-procurement processes. The evaluation of main electronic platforms actually deployed in France to support these processes consolidates this opinion. This evaluation shows also that many platforms have been developed, but for the moment, there seem to be no technological standard and no general pattern for the supported processes. To have another perspective on the public e-procurement evolution, we are actually empirically investigating the usage perspective through an online survey [BB06].

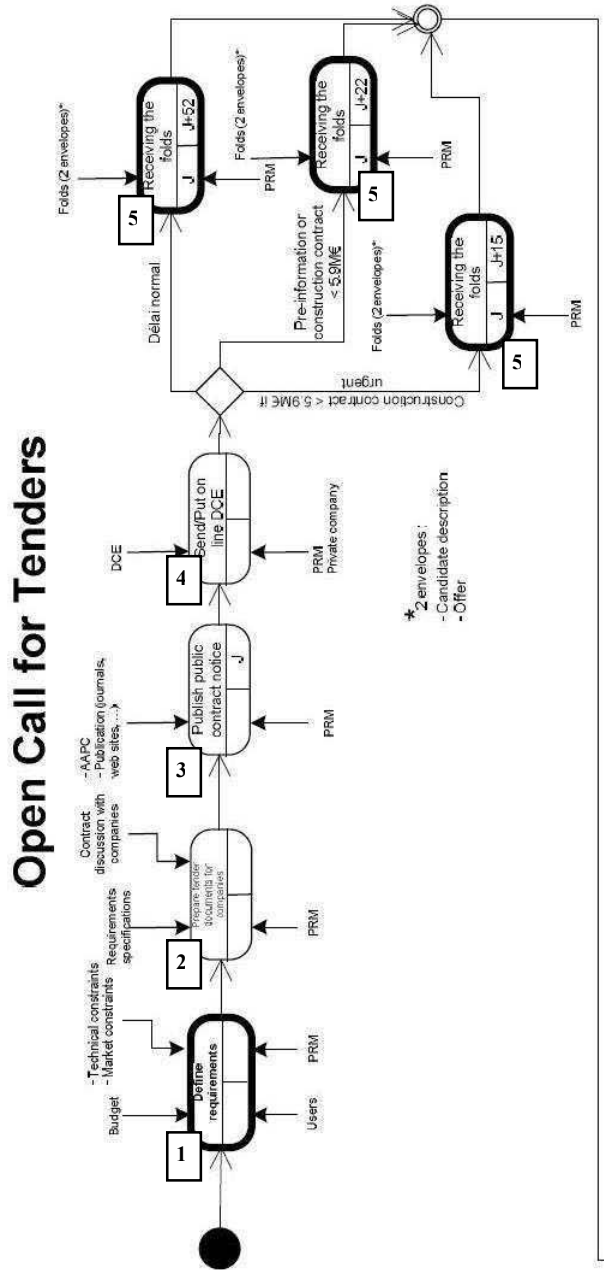
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<sup>2</sup> Groupe des Ecoles des Télécommunications, <http://www.get-telecom.fr>

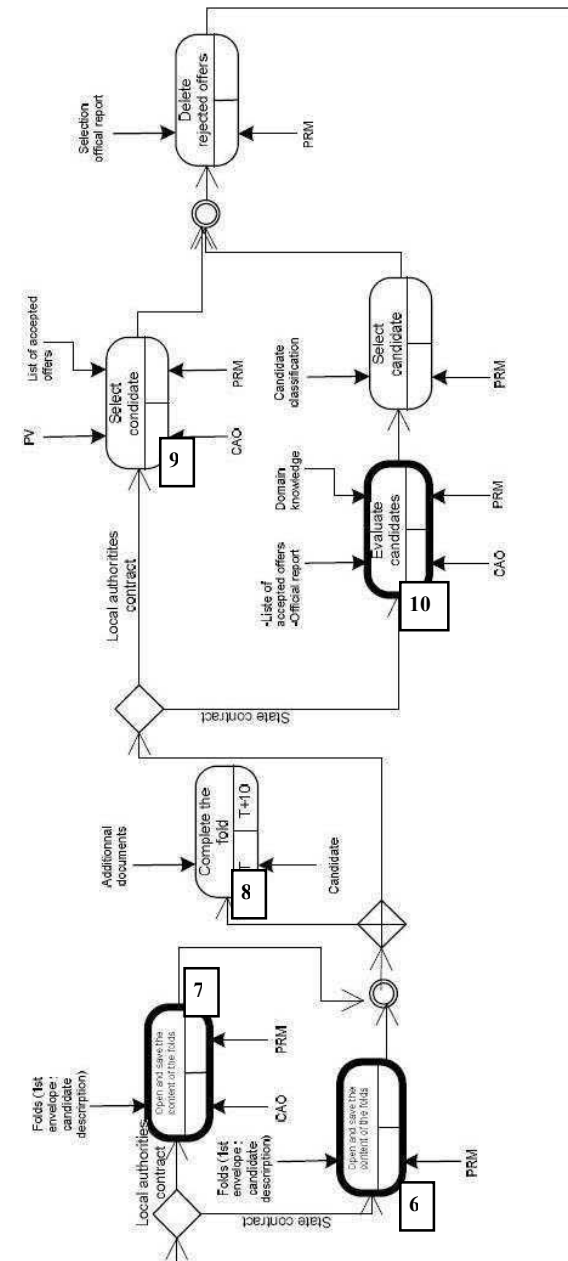
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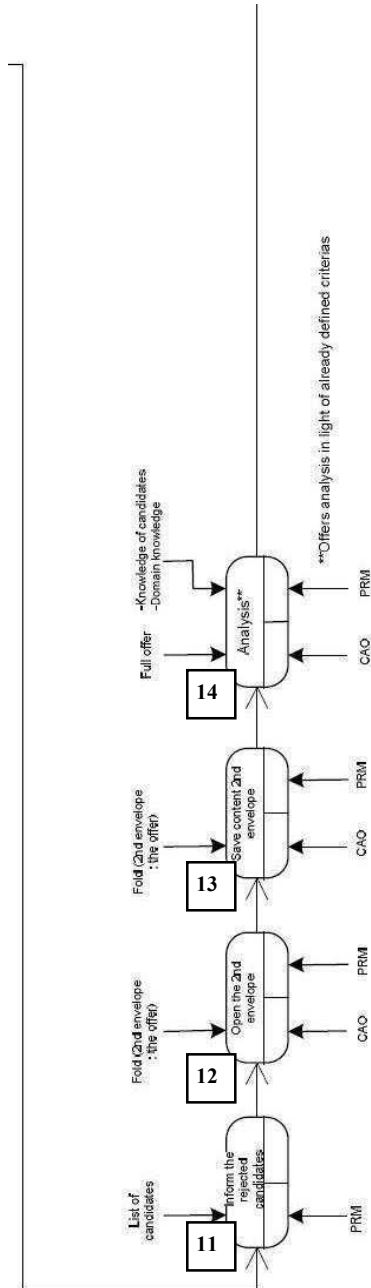
## Appendix 1: "Call for tenders" procedure modelling



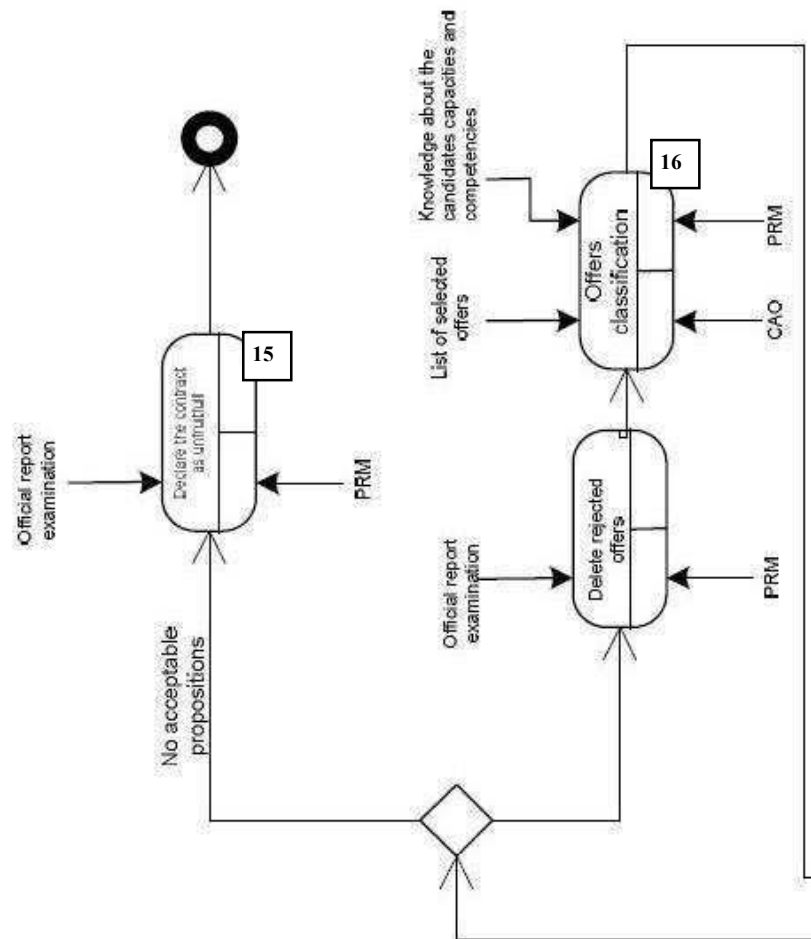
## Appendix 1: (continued)



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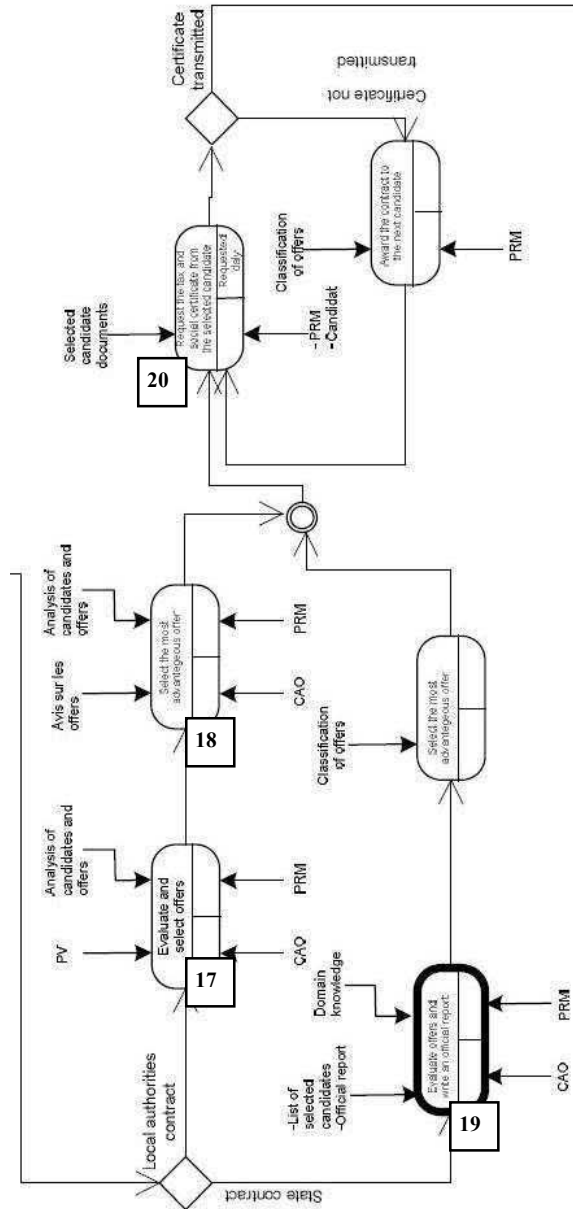


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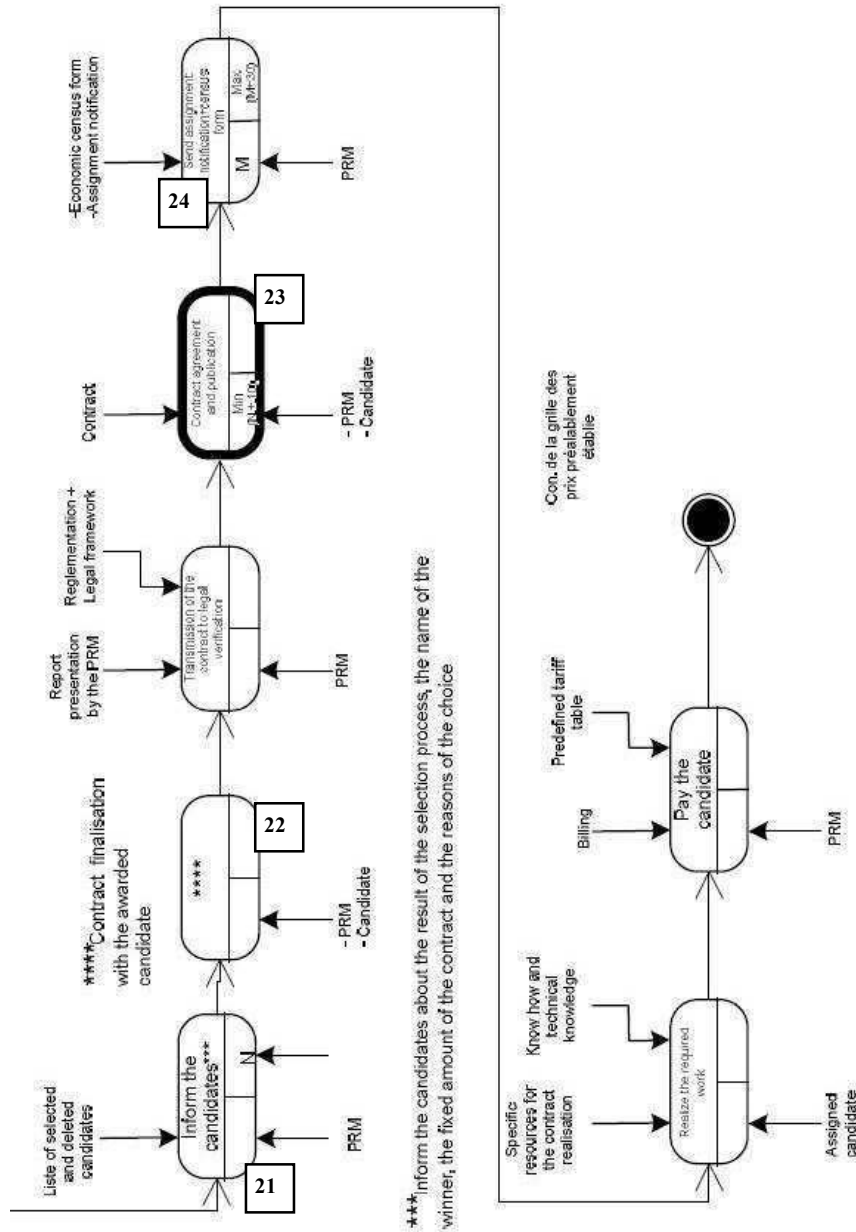




## Appendix 1: (continue)



## Appendix 1: (continue)



## Appendix 2: Collaborative tools selection table

(\*): These activities have an important aspect related to security management. For all these activities, it is necessary to use solutions which combine collaborative and secured features (electronic signatures, secured connections etc.).

<u>Action</u>		<u>Working situation</u>	<u>Communicating situation</u>	<u>Tools</u>
A1: Requirements definition		Collective X Distributed	Strong interactions X Coherence practices	Audio/Visio/Web Conference, Chat, Content management, White board, Peer to Peer, Awareness, Shared edition, Instantaneous messenger, Wiki, Library, Mail, Workflow
A2: Prepare tender documents for companies		Individual X Distributed	Weak interactions X Coherence practices	Library, Mail, Instantaneous messenger
A3 : Publish public contract notice				Library, Diffusion list, Mail, File sharing, Electronic directory
A4	A4.1 : End/Put on-line DCE			Library, Mail, File sharing, Electronic directory
	A4.2 : Receive/Download DCE			Library, Mail, Awareness, File sharing
A5	A5.1 : Send the folds (*)			Library, Mail, File sharing
	A5.2 : Receiving the folds (*)			Library, Mail, Awareness, File sharing
A6 (State contract)	A6.2 : Save the content of the folds (*)			Library, Instantaneous messenger
	A6.3 : Write an official report			Library, Instantaneous messenger
A7 (Local authorities contract)	A7.1 : Opening of the folds (*)	Individual X Distributed	Strong interactions X Coherence practices	Audio/Visio/Web Conference
	A7.2 : Save the content of the folds (*)			Audio/Visio/Web Conference, White board, Shared edition, Chat, Instantaneous messenger, Library
	A7.3 : Write an official report			Shared edition, White board, Audio/Visio/Web Conference, Library, File sharing,
A8 : Complete the fold (*)		Individual X Distributed	Weak interactions X Coherence practices	Mail, Library, Awareness, Chat, Instantaneous messenger

A9 : Select candidate (CAO)		Collective X Synergic	Strong interactions X Coherence practices	Audio/Visio/Web Conference, GDSS, Chat, Survey, Search engine, Competences cartography
A10	A10.1 : Evaluate candidates (CAO)			Audio/Visio/Web Conference, GDSS, Chat, Survey
	A10.2 : Write an official report			Shared edition, White board, Audio/Visio/Web Conference, Library, File sharing
A11 : Inform the rejected candidates		Individual X Distributed	Weak interactions X Coherence practices	Mail, Diffusion list, Awareness
A12 : Open the 2 <sup>ed</sup> envelope (*)		Collective X Synergic	Strong interactions X Cohesive practices	Audio/Visio/Web Conference
A13 : Save content 2 <sup>nd</sup> envelope (*)				Audio/Visio/Web Conference, White board, Shared edition, Chat, Instantaneous messenger, Library
A14 : Offers examination according to selection criteria's previously published				Audio/Visio/Web Conference, GDSS, Chat, Instantaneous messenger, Survey, White board, Library
A15 : Declare the contract as unfruitful		Individual X Distributed	Weak interactions X Coherence practices	Mail, Diffusion list, Awareness, Library
A16 : Classify the offers		Collective X Synergic	Strong interactions X Cohesive practices	Audio/Visio/Web Conference, GDSS, Chat, Survey, White board, Shared edition, Library, Instantaneous messenger, Electronic directory
A17 : Evaluate and select offers (CAO)				Audio/Visio/Web Conference, White board, GDSS, Library, Chat, Survey,
A18 : Select the most advantageous offer (CAO)				Audio/Visio/Web Conference, GDSS, Library, Chat, Survey,
A19	A19.1 : Evaluate the offers			Audio/Visio/Web Conference, GDSS, Chat, Survey, Library
	A19.2 : Write an official report			Shared edition, White board, Audio/Visio/Web Conference, Library, File sharing
A20: Request the tax and social certificate from the selected candidate. (*)		Collective X Distributed	Weak interactions X Coherence practices	Mail, Library, Awareness, Chat, Instantaneous messenger

<b>A21</b> : Inform the candidates		Individual <b>X</b> Distributed	Weak interactions <b>X</b> Coherence practices	Mail, Diffusion list, Awareness
<b>A22</b> : Contract development with the selected candidate		Collective <b>X</b> Synergic	Strong interactions <b>X</b> Cohesive practices	Audio/Visio/Web Conference, White board
<b>A23</b>	<b>A23.1</b> : Sign the contract agreement (*)	Collective <b>X</b> Synergic	Strong interactions <b>X</b> Coherence practices	Audio/Visio/Web Conference, Library
	<b>A23.2</b> : Publish contract attribution	Individual <b>X</b> Distributed	Weak interactions <b>X</b> Coherence practices	Mail, Awareness, Diffusion list, Library
<b>A24</b> : Send assignment notification + census form		Individual <b>X</b> Distributed	Weak interactions <b>X</b> Coherence practices	Mail, Awareness, Diffusion list, Library