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Requirements to an interoperable pan-European strategic public eSourcing system

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David Arnemann

Betreuer: *Daniel Schmidt*, Institut für Wirtschafts- und Verwaltungsinformatik, Fachbereich Informatik
Erstgutachter: *Prof. Dr. Maria A. Wimmer*, Institut für Wirtschafts- und Verwaltungsinformatik, Fachbereich Informatik
Zweitgutachter: *Daniel Schmidt*, Institut für Wirtschafts- und Verwaltungsinformatik Fachbereich Informatik

Koblenz, im Januar 2008

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Content

List of acronyms

BR	Business Register
BRITE	Business Register Interoperability Throughout Europe
CA	Contracting Authority
CPV	Common Procurement Vocabulary
CSP	Certificate Service Provider
DG	Directorate General
DGIM	Directorate General Internal Market and Services
DPS	Dynamic Purchasing System
DTD	Document Type Definition
EIF	European Interoperability Framework
EMAS	Eco-Management and Audit Scheme
ERP	Enterprise Resource Planning
GPA	Government Procurement Agreement
ICT	Information and Communications Technology
IOP	Interoperability
MS	Member States
OJEU	Official Journal of the European Union
PA	Public Administration
SIMAP	Système d´Information sur les MArchés Publics
SME	Small and Medium Enterprises
TED	Tenders Electronic Daily
UML	Unified Modelling Language
WTO	World Trade Organisation

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Abstract

Public electronic procurement (eProcurement), here electronic sourcing (eSourcing) in particular, is almost certainly on the agenda when eGovernment experts meet. Not surprisingly is eProcurement the first high-impact service to be addressed in the European Union's recent Action Plan. This is mainly dedicated to the fact that public procurement makes out almost 20% of Europe's GDP and therefore holds a huge saving potential. To some extent this potential lies in the common European market, since effective cross-boarder eSourcing solutions can open many doors, both for buyers and suppliers.

To achieve this, systems and processes and tools, need to be adoptable, transferable as well as be able to communicate with each other. In one word, they need to be interoperable. In many relevant domains, interoperability has reached a very positive level, standards have been established, workflows been put in place. In other domains however, there is still a long road ahead. As a consequence it is crucial to define requirements for such interoperable eSourcing systems and to identify the progress in research and practice.

Kurzbeschreibung

Öffentliche elektronische Beschaffung (eProcurement), bzw. strategischer elektronischer Einkauf (eSourcing), sind mit hoher Wahrscheinlichkeit Thema sobald eGovernment Experten aufeinander treffen. So ist es nicht überraschend, dass eProcurement im aktuellen Aktionsplan der EU als „high-impact service“ eingestuft wurde. Dies lässt sich zum Großteil durch den großen Einfluss vom öffentlichen Einkauf auf die Staatskasse erklären. So macht eProcurement in der Regel bis zu 20% des BIP aus und beherbergt somit ein enormes Einsparpotenzial. Dieses Potenzial liegt zum Teil im gemeinsamen Europäischen Wirtschaftsraum, da effizientes länderübergreifendes eSourcing neue Möglichkeiten für Einkäufer sowie Lieferanten eröffnen kann.

Um diese Möglichkeiten ausschöpfen zu können, müssen Prozesse und Tools in der Lage sein, miteinander zu kommunizieren, sich aufeinander abzustimmen oder transferierbar sein. In einem Wort, sie müssen interoperabel sein. In vielen wichtigen Bereichen ist Interoperabilität sehr weit fortgeschritten, in anderen hingegen muss noch viel verändert werden. Daher ist es von wesentlicher Bedeutung Interoperabilitätsanforderungen zu definieren, sowie den aktuellen Forschungs- und Entwicklungsstand zu evaluieren.

1 Introduction

Here the problems to be addressed by this thesis are presented. Furthermore the objectives and limitations and the general approach are outlined.

1.1 Problem definition and objectives

eProcurement, respectively eSourcing received a lot of attention during the last couple of years in many member states (MS) of the EU, and still does. However, this also had the effect that there is a large diversity of regulations, tools and institutions. A major challenge in the near future will be to align the different interests of all stakeholders in the field, create common standards, and define objectives, in order to balance the different goals of reducing procurement costs on the one hand, while considering the principles of equal treatment, non-discrimination and transparency on the other.

Due to the strictly defined regulatory procurement framework, public sourcing differs significantly from procurement in the open market. But still many rules and simple goals apply to the public sector.

So major questions are: What are the lessons learned? What can be adopted and what does not apply to the public sector?

The use of electronic tools in B2B procurement became standard in most of the private sector industries. Efficient and cost-effective sourcing can be a major competitive advantage. And that makes it the key difference: Corporations are responsible for their shareholder value in the first place. Hence saving costs is a primary goal in sourcing activities. In contrast, in the public sector the procurement principles described before are equal level goals.

Furthermore, despite of growing importance in the corporate sector also, social responsibility is an even bigger issue in public procurement. This does not only include the explicitly defined paradigm of equal treatment,

non-discrimination and transparency, but also aspects such as “green procurement” and consideration of small and medium enterprises (SME).

Additionally, while resourceful procurement in the private sector can function as a very effective profit lever, and therefore as a critical competitive advantage, contracting authorities in the public sector can increase market power and gain synergy effects with optimised cooperation in the field.

The lack of cooperation between the member states of the European Union leaves room for lots of improvements. This includes knowledge transfer and establishing Best Practices a large. But it also brings up questions such as:

- How can processes be simplified?
- How can synergies be identified and put into effect?
- How can demand be bundled to improve negotiation power and save costs?

Sir Peter Gershon *(2004)* for example, dedicated an important part of his efficiency review for the British government to public procurement, identifying a huge saving potential. For he roughly mentions the target areas that need to be addressed, in order to achieve his ambitious goals, more detailed requirements and objectives need to be defined. Furthermore, Gershon only takes a look at Britain as an isolated sector, while not considering the efficiency potential hidden in pan-European cooperation.

Answers to these implicit and explicit questions can at least to some extent be found with the help of the buzzword “interoperability”. It describes the way institutions, processes and systems interact on different levels.

This thesis strives to reveal the current interoperability strengths and weaknesses of public eSourcing by analyzing the state of the art,

examining the regulatory framework, identifying the stakeholders in the field, and reviewing current tools and processes.

Moreover, many players such as the EU, member states, private and public institutions currently run initiatives dealing with eSourcing and interoperability. Therefore, it is crucial to align the results and proceedings in order not to sabotage them, as these proceedings need to be applicable in a pan-European environment.

In this thesis, these initiatives and Best Practices are identified and evaluated to finally recommend future actions, standards and objectives for effective and interoperable eSourcing, compliant with the high level goals defined.

1.2 Limitations

As public eSourcing is both a very broad and complex field, several limitations of this thesis need to be defined:

Though in some parts overviews of EU member states appear, no complete analysis is carried out, but only selected member states are used as examples to illustrate certain aspects.

As it will be explained in chapter 2.2, this thesis only covers strategic eSourcing, i.e. it does not cover e.g. ordering or invoicing processes. Furthermore, its focus is on tendering procedures, where European law needs to be applied, national regulations (in parts applied for contracts under certain threshold) are negligible here.

1.3 Approach

A prerequisite for a detailed requirement analysis is a broad information basis. In order to acquire this information, the problem is approached from three different perspectives:

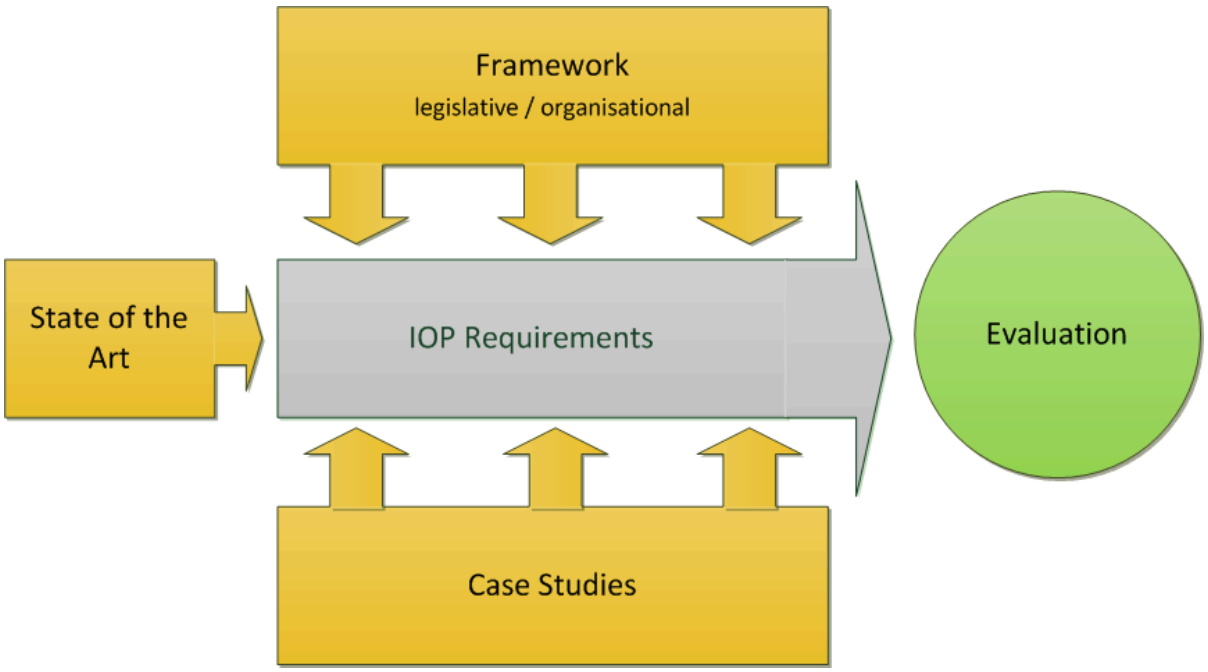

Figure 1: Approach

The framework analysis as a top-down approach mainly includes the legislative framework provided by the European Union with the latest procurement directives and national regulations, but also examines how the involved parties, such as the EU, its member states and institutions interact within the organisational framework.

Additionally, requirements identified in recent case studies function as a bottom-up basis.

Finally, in a state-of-the-art analysis, current technologies and initiatives are studied to identify their role in the public eSourcing process.

2 Terms and Classification

In this section the major domains of this thesis are defined. This is particularly relevant for the terms eSourcing and eProcurement, as they are often confused or used synonymously, depending on context, business sector, or professional background.

2.1 eGovernment

Simply put, the term eGovernment describes governance and public administration supported by information and communication technologies in a very general understanding.

	Citizens	Government	Business Sector	NGOs/ NPOs
Citizens	C2C	C2G	C2B	C2N
Government	G2C	G2G	G2B	G2N
Business Sector	B2C	B2G	B2B	B2N
NGO/NPO	N2C	N2G	N2B	N2N

Figure 2: eGovernment in the Speyer matrix

A very elaborate disquisition about eGovernment can be found in the definition of Speyer *(Lucke, Reinermann 2000)*. Here it is assumed that processes both within and between different institutions as well as between institutions and citizens and private organisations (see Figure 2) can be improved using ICT on three interaction levels:

- Information
- Communication
- Transaction

The Information layer (or “eInformation”) for example covers information systems for citizens and tourists, or internal information systems and knowledge databases. eCommunication then is about simple solutions such as IRC, eMail web-based discussions, but also about more complex systems such as video conferencing or collaboration tools.

The Transaction level finally handles issues such as eForms, i.e. standard documents and forms, eTransaction with workflow and groupware solutions or decision support, eService for processes such as licensing, admission issues, electronic service, product delivery and eCommerce.

Another definition, which is mainly popular in German-speaking areas, states: “*Electronic government refers to the implementation of processes of public participation, decision-making, and service provision in politics, government and administration with an intense usage of ICT*.” *(Gesellschaft für Informatik e.V. (GI) 2000 and Schmidt et al. 2007)*

The EU itself defines gives a more detailed specification of eGovernment:

“eGovernment is the use of information and communication technology, combined with organisational change and new skills to improve public services, increase democratic participation and enhance public policy making. Ideally, transformation should occur jointly at European, national, regional and local levels. The impact will depend not only on technology, but also on organisational resources and strategic vision”. *(European Commission 2005*)

There are ongoing research activities in various fields concerning eGovernment, for example secure eDemocracy, mobile services, user interaction or knowledge management.

Another major field of interest, also because of its significant impact on a state’s financial situation, is public eProcurement, respectively eSourcing. In the Speyer matrix, eSourcing could be found in the G2B, respectively B2G and the G2G fields.

	Citizens	Government	Business Sector	NGOs/ NPOs
Citizens	C2C	C2G	C2B	C2N
Government	G2C	G2G	G2B	G2N
Business Sector	B2C	B2G	B2B	B2N
NGO/NPO	N2C	N2G	N2B	N2N

Figure 3: eProcurement in the Speyer matrix

2.2 eProcurement and eSourcing

Professionals and scientists use many different terms in relation to sourcing, procurement or purchasing, and no definition can be called valid for all environments.

De Boer et al. provide a rather short while relatively wide one: "*Using Internet technology in the purchasing process*". *(Boer, Harink, Heijboer 2001)*

More suitable for this thesis' context seems to be the following definition by Schubert and Häusler (*2001*), which is slightly adopted here for the public procurement environment: *"eProcurement is the electronic support of procurement processes (purchasing) of a company or public institution via new media."* These processes cover all relevant procurement activities concerning both direct and indirect goods.

The term eSourcing can be defined as follows: *"eSourcing is the process that identifies new suppliers for a specific purchasing category, using Internet technology (usually the Internet itself). By identifying new suppliers a purchaser can increase the competitiveness during the tendering process for this purchasing category. eSourcing is also a way of decreasing the supply risk associated with this purchasing category." (Kraljic 1983)*

Hence eSourcing is the electronic support of procurement activities of a company or public institution concerning the early stages of the procurement processes. These processes range from determination of demand, tender specification and the actual tendering to award of contracts and contract management.

Interestingly, the term *eSourcing* is not very common among experts in the governmental research sphere, while it is a regular term in the private sector. More common in the public sector is the term “eTendering”. But since it does not cover all areas that are relevant for this paper, and furthermore is just a sub-part of eSourcing (as it is defined here), it is not sufficient in this context. Consequently, eSourcing here makes out a major subcategory of eProcurement, with eTendering forming a subcategory of eSourcing. Its context and different phases are visualised in the following figure.

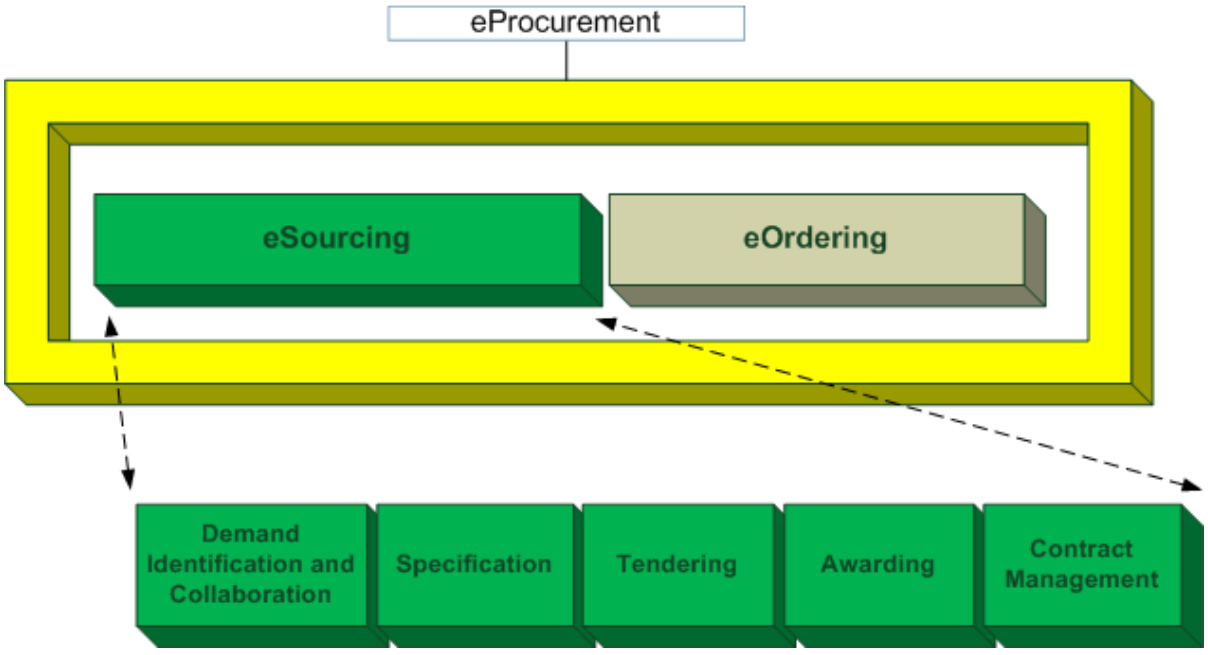

Figure 4: eSourcing in the context

Throughout this thesis it will be referred to these five phases of eSourcing, therefore they will be outlined here in detail.

Demand Identification and Collaboration

Different activities here set the foundation for successful strategic sourcing. Many of them are not directly linked to a specific tendering process or contract, but aim to improve the contracting authority's effectiveness in general. This affects for example processes such as interaction between different authorities or eInforming, whereas this form of eInforming is to be understood in a narrower sense than eInformation, as it is described in 2.1. Here it is related to internal and external communication and information processes related to the procurement system and can be defined as "*a form of electronic procurement that is not directly associated with a contract or a transaction, whereas the others are. eInforming is the process of gathering and distributing purchasing information both from and to internal and external parties, using Internet technology. For example, publishing purchasing management information on an extranet that can be accessed by internal clients and suppliers is a way of eInforming*." *(Boer, Harink, Heijboer 2001)*

However, this definition by Boer et al. refers to eInforming in the private sector. It needs to be remarked that information processes within the public sector are in most cases strictly regulated, especially when communicating with potential suppliers, and thus closely linked to the procurement processes. So in this case external processes usually do not include potential suppliers, but for example cooperating parties on the buy side.

This phase does also function as a kind of interface to other internal processes. Demand identification for example can be closely linked to statistical data, possibly produced with tools such as ERP (Enterprise Resource Planning) or management information systems. This way the eSourcing process as a whole can be integrated into the institution's value chain.

Specification

Not only in public procurement suppliers need to be informed about new contract possibilities in order to take part. But in the public sector this phase is more sophisticated, for contracting authorities (CA) need to provide fair, transparent and equal possibilities for all. Therefore legislation provides accurate definitions and structures of what needs to be specified in contract notices. This includes information about nature of the contract, application conditions and award criteria. Due to the strict regulation by the EU, workflow tools and standard templates play a significant role in the specification process.

Tendering

The actual tendering has a similar strict legal framework as tender specification. It defines procedures and requirements related to communication or security. Within this framework CAs can implement eSourcing systems according to both, their own as well as their suppliers' needs. Typical actions within the tender process are for example accessing of tender documents and placing bids, or documented communication. De Boer, Harink, Heijboer *(2001)* define eTendering as follows:

"eTendering is the process of sending Requests for Information (RFI) and Request for Proposals (RFP) to suppliers and receiving the responses of suppliers, using Internet technology. Sometimes within e-tendering the analysis and comparison of responses is also supported. E-tendering does not include closing the deal with a supplier."

Awarding

In the awarding process the candidates are evaluated against predefined criteria, which have been published in advance. Furthermore, the CA needs to follow a specific workflow, depending on the type of procedure, when assessing the suppliers and announcing the winner. A rejected supplier has the right object the decision. In this case certain actions need to be started to revise the awarding process. One awarding form is

eAuction and with the latest amendment of the EU procurement policy it is now a legitimate awarding procedure.

During an electronic auction (eAuction), the suppliers bid on a goods or service contract tendered by the buying institution using an internet tool. The eAuction takes places during a predefined and relatively short time-frame. Admitted buyers are usually pre-selected in the earlier tendering process. The bidding parameter in an eAuction usually is price only. But the contracting authority might also define a point-system in advance, which allows to award based on other features, too. The winner of the reverse auction is awarded a contract.

Contract management

Several processes can be part of this phase. Buyers (and also suppliers) can track the compliance with contracts, respectively so called service level agreements (SLA). It includes document management and to some extent supplier management, though this matter needs to be handled carefully in the public sector, due to the restrictive legislation.

To conclude, it can be seen that all three eGovernment interaction levels of information, communication and transaction also apply to the five eSourcing phases, which can be visualised in an eProcurement lifecycle as follows:

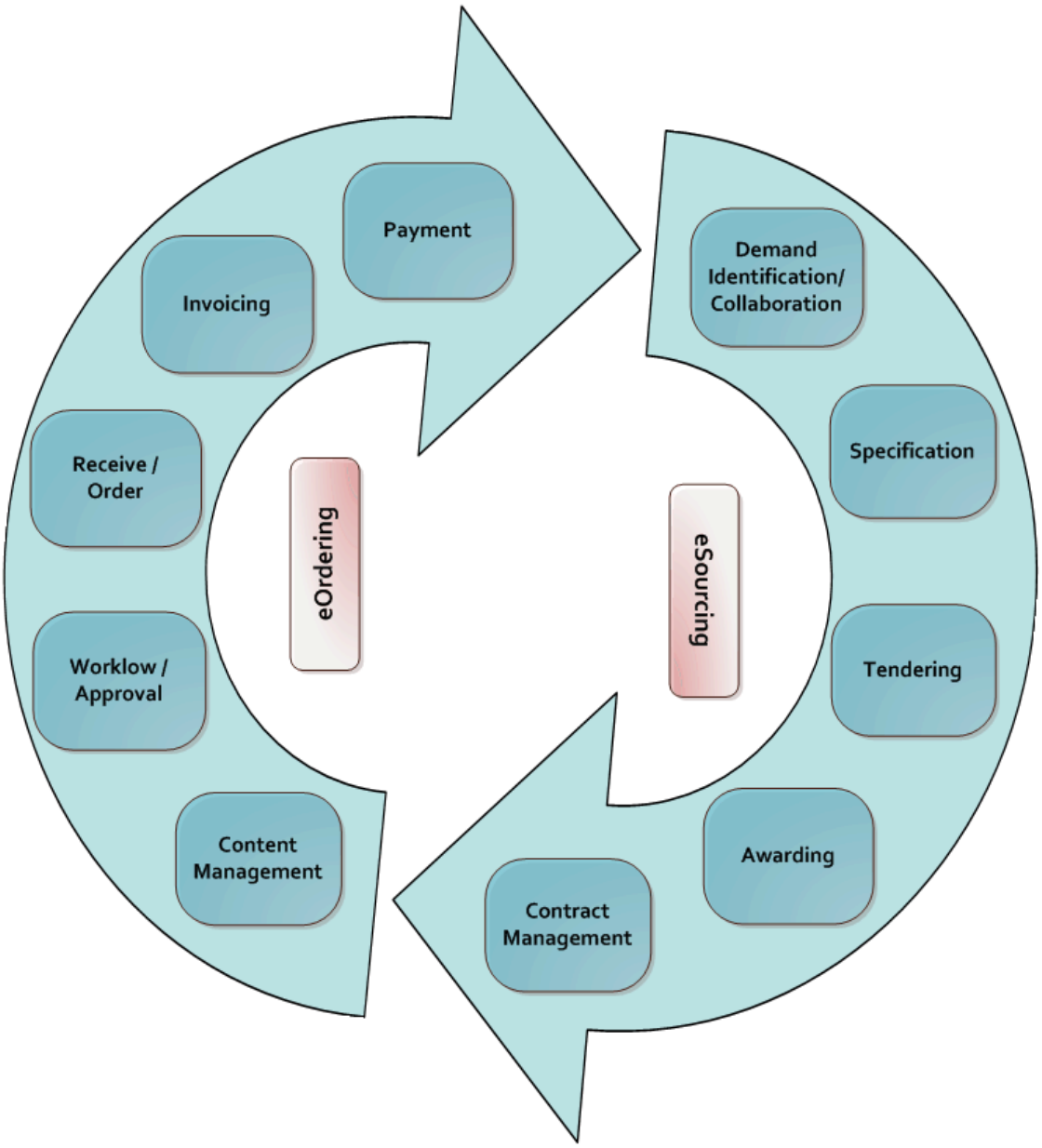

Figure 5: eProcurement lifecycle

The other major subcategory of eProcurement you can see here, eOrdering, covers processes such as handling of framework agreements or billing and invoicing processes. Often, especially in the private sector, the term ePurchasing is used synonymously for the phrase eOrdering. The difference between eSourcing and eOrdering lies in the nature of their processes, with eSourcing handling contractual, and eOrdering covering transactional processes. So whenever the term “eProcurement” is mentioned in this thesis it also includes both eSourcing and eOrdering.

2.2.1 Public eSourcing today

eProcurement, respectively eSourcing in the public sector today is constantly evolving and big efforts are made in order to improve existing processes. Especially the EU is strongly supporting and funding research and improvement programs in this area.

In the i2010 eGovernment Action Plan *(European Commission 2006)* of the EU 3 out of 5 objectives are directly or indirectly related to public procurement, which stresses the importance of this topic:

- Making efficiency and effectiveness a reality – significantly contributing, by 2010, to high user satisfaction, transparency and accountability, a lighter administrative burden and efficiency gains
- Implementing high-impact key services for citizens and businesses - by 2010, 100% of public procurement will be available electronically, with 50% actual usage, with agreement on cooperation on further high-impact online citizen services
- Putting key enablers in place - enabling citizens and businesses to benefit, by 2010, from convenient, secure and interoperable authenticated access across Europe to public services

Based on this the following milestones were formulated:

Year	Goal / Milestone
2006	Agree with Member States on a roadmap setting measurable objectives and milestones and achieving 100% availability of public eProcurement and 50% take-up of eProcurement by 2010.
2007	Based on existing or under development Member States solutions, accelerate common specifications of key elements for cross border public eProcurement and launch implementation pilots.
2009	Assess pilots deployments and disseminate results across the EU.
2010	Review of progress of cross border public eProcurement applications in the Member States.

Table 1: i2010 eGovernment Action Plan goals

2.3 Interoperability

A primary concern in recent EU research activities of various fields, including eGovernment in general and eProcurement in particular, is interoperability (IOP). In a recent report of the EU's R4eGov project it is pointed out that interoperability can be achieved through two different approaches: integration and interoperation. However, it is also stressed that integration of the vast number of different organisations across the many member states of the EU is hardly achievable, not least due to different legacy systems. *(Schmidt et al. 2007)*

The Institute of Electrical and Electronics Engineers (IEEE, *1990*) defines interoperability as follows: *"Interoperability is the ability of two or more systems or components to exchange information and to use the information that has been exchanged."*

But since this definition is a rather narrow and technical one, the following by Sturm is more appropriate in the context of this thesis: *"Interoperability describes the capability of independent, heterogeneous information and communication systems to operate together in a way that is as seamless and media consistent as possible. Systems that are interoperable with each other are also referred to as being compatible." (Sturm 2007)*

The EU itself provides an interoperability framework (EIF, *European Commission 2004b*) with three different dimensions:

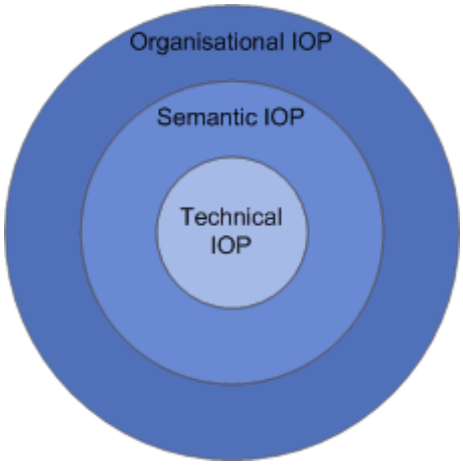

Figure 6: IOP layers

Technical interoperability aims to build a common technical ground by establishing standards.

- Semantic interoperability targets to establish common meanings for exchanged data, processes and process models, or procedures used.

- Organisational interoperability covers IOP issues of business processes and information architecture cutting across different administrations and institutions.

Though each level targets different issues, all levels need to be addressed to achieve interoperability among systems and services.

The EIF defines all in all 20 different public services for citizens and businesses, with public procurement, the topic of this thesis, being on of them.

Naturally, the EIF is not the only IOP framework there is, but seems to be the most appropriate one here. Not only as it was developed for this context, but it also is based on other approved frameworks, which can for example be found in *(Schmidt et al. 2007)*. However, in order to be able to analyse interoperability in a more sophisticated manner, it is necessary to access a deeper granularity than provided by the three levels of the EIF. Therefore, Wimmer et al developed a more detailed framework based on the EIF, with the following levels *(Wimmer 2006)*:

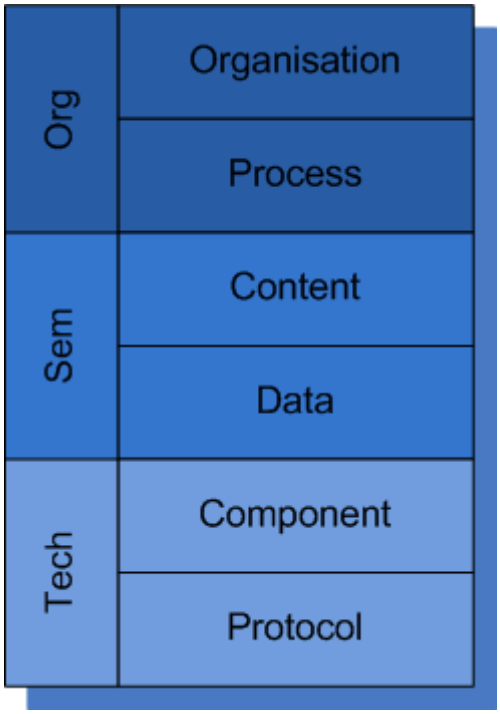

Figure 7: Detailed IOP layers

- Organisation: cover common agreements and policies, compliance to laws, organisational structures enabling interoperability
- Process: explains common agreements and understanding on cross-organisational processes and service flows
- Content: illustrates semantics of data that need to be agreed upon
- Data: Is about standardised data formats and schema structures that need to be developed.
- Component: handles for example (semantic) Web Services, Modules for online applications (MOA) etc
- Protocol: covers for example commonly agreed-upon protocols such as SOAP, HTTP or different messaging formats

Furthermore, IOP analysis can be applied on three levels in a geographical dimension *(Wimmer 2006)*:

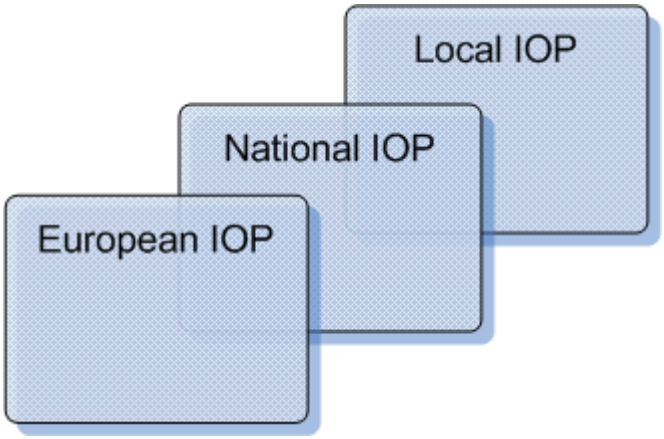

Figure 8: Geographical IOP dimensions

Although this theses targets pan-European IOP, still lessons can be learned from Best Practices in national projects. Generally, there are many different international initiatives and projects dealing with interoperability, the most important of them being presented in 3.2. Also many member states (MS) have their own IOP initiative, but due to overview reasons and as this thesis targets a macro-, i.e. pan-European IOP approach, they will not be presented here in detail.

3 Regulatory Framework

In this section the regulatory framework is examined. This mainly comprises of EU legislation, but is also affected by national and global rules.

3.1 European Public Procurement Law

In order to ensure the free movement of goods and services within the EU, the European public procurement law comes with several regulations for purchases by public institutions and certain utilities. Wherever the purchasing value is above a specific threshold, these rules apply directly.

The recent amendment in the European public procurement law came along with two new Directives, 2004/18/EC and 2004/17/EC, which bundled and replaced their predecessors.

This new legislative package provides a framework for conducting procurement activities using new technologies, while respecting the paradigm of an open, fair, transparent non-discriminatory and competitive procurement process.

The two directives mainly have the same content, but target different sectors: 2004/18/EC targets “the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts” *(The European Parliament and the Council of the European Union 2004b)* and is sometimes referred to as “public sector directive”, while 2004/17/EC (also known as “utilities directive”) is “coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors“ *(The European Parliament and the Council of the European Union 2004a)*.

For simplicity reasons, Articles referred to are invariable from Directive 2004/18/EC. Main regulations addressed in this Directive will be presented in detail.

For collecting the identified IOP requirements a table format is used, where each requirement is assigned both to eSourcing phases and IOP levels. In each table the source of the requirements is given. In case a number is given (for example “45(7)a)”), this refers to a paragraph in Directive 2004/18/EC. If it is only referred to “Directive”, then the requirement is deducted from the Directive statements in that very context. The requirements table format will be applied throughout this thesis.

3.1.1 Communication

Electronic Means

In the Directives it is emphasized that electronic means need to be available to everybody and “must not restrict economic operators' access to the tendering procedure” [Article 42 (2)]. Though not explicitly stated, nowadays only the internet and email technology fulfil this “free availability” criteria.

Generally, the new Directives now allow electronic means to take the same role in the procurement process as “traditional” means do – as long as principles of equal treatment, non-discrimination and transparency are taken into account [Article 1 (12)]. It is up to the contracting authority what techniques and means of communication, respectively which combinations of both are used in the procurement process [Article 42 (1)].

Nevertheless, there are several limitations to this right of freely selecting the means of communication:

- according to Article 42(5)d traditional processes still apply to those documents, certificates and declarations that are not available in electronic format
- as its name indicates, an electronic auction tool is solely based on electronic means [Article 1(7)]
- traditional means should be put in use if electronic means can not fulfil requirements stated in Article 42(3)

Tools

The Directives have explicit regulations for all tools used in the eSourcing process. The basic requirement for communication tools is stated in Article 42(5): "*The tools to be used for communicating by electronic means, as well as their technical characteristics, must be non-discriminatory, generally available and interoperable with the information and communication technology products in general use.*" The mentioning of the IOP requirement is of course trivial in this context, but also again stresses its importance.

Integrity and Security

Article 42(3) emphasises that integrity of data and the confidentiality of tenders and requests to participate need to be preserved generally wherever information is involved. Furthermore the time limits for opening tenders need to be considered. This way a fair competition is ensured, as all suppliers have the same time window.

Additionally, Article 42(5) defines rules related to the usage of tools and integrity and security of data by referring to the requirements devices need to conform to [Annex X]:

- electronic signatures relating to tenders, requests to participate and the forwarding of plans and projects comply with national provisions adopted pursuant to Directive 1999/93/EC;
- the exact time and date of the receipt of tenders, requests to participate and the submission of plans and projects can be determined precisely;
- it may be reasonably ensured that, before the time limits laid down, no one can have access to data transmitted under these requirements;
- if that access prohibition is infringed, it may be reasonably ensured that the infringement is clearly detectable;

- only authorised persons may set or change the dates for opening data received;
- during the different stages of the contract award procedure or of the contest access to all data submitted, or to part thereof, must be possible only through simultaneous action by authorised persons;
- simultaneous action by authorised persons must give access to data transmitted only after the prescribed date;
- data received and opened in accordance with these requirements must remain accessible only to persons authorised to acquaint themselves therewith.

Traceability

According to Article 43 contracting authorities need to log specific information to ensure traceability. This is possible by the use of electronic means. The following information needs to be stored:

- name and address of contraction authority
- subject-matter of value of contract
- names of accepted candidates / tenderers plus reasons for their selection
- names of rejected candidates / tenderers plus reasons for their rejection
- the reasons for the rejection of tenders found to be abnormally low
- name of the successful tenderer plus reason for his award
- if known, share of contract intended to subcontract to third parties
- for negotiated procedures, the circumstances referred to in Articles 30 and 31 which justify the use of these procedures
- as far as the competitive dialogue is concerned, the circumstances as laid down in Article 29 justifying the use of this procedure

- o if necessary, the reasons why the contracting authority has decided not to award a contract or framework agreement

The following table collects all the IOP requirements mentioned before:

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		tech	
		Demand	Specification	Tendering	Awarding	Contract M	organsation	process	content	data	components	protocols
Free availablity of the procurement system	42(2)						x	x				
Where **analog docs** are still needed, traditional processes remain required	42(5)d		x	x				x				
The use of **electronic means** need to fulfill specific requirements	42(3)		x	x	x				x		x	x
The CA has the **option** whether to use **eAuction** as an award procedure	42 (1)		x		x		x	x			x	
eProcurement systems need to be **non-discriminatory**	42(5)		x	x	x		x	x				
eProcurement systems need to be **freely available**	42(5)		x	x	x		x	x			x	x
eProcurement systems need to be **interoperable**	42(5)		x	x	x		x	x	x	x	x	x
eSourcing devices need to meet specific **minimum technological requirements**	42(5)		x	x	x						x	x
CAs may use **advanced electronic signature** mechanism	42(5)b		x	x	x		x	x				
Electronic signatures need to comply with Directive 1999/93/EC	42(5)							x			x	
Electronic reception **tools** need to have a **time stamp functionality**	Annex X			x	x			x			x	
Electronic reception tools need to have a **time lock functionality**	Annex X			x	x			x			x	
Infringement needs to be **detectable**	Annex X			x	x			x	x		x	x
Availability of **different persona / authorisation levels** is required	Annex X		x	x	x		x	x	x		x	
The **4 eyes principle** needs to be considered	Annex X			x	x			x			x	
Specified **information** need to be **stored** (traceability)	43		x	x	x	x		x	x	x	x	x

Table 2: Legal framework requirements - communication

3.1.2 Notices and access to documents

Submission

According to Article 36(3) procurement notices need to be published on the EU electronic publication board, Tenders Electronic Daily (TED) within 5 days. The standard forms available are to be used for this purpose, as indicated in Article 35(1). Furthermore, it is necessary to make use of the Common Procurement Vocabulary (CPV) [Article 35 (1)a and 1(14)].

The Directives also explicitly encourage to introduce a so called “buyer profile”, in order to for example collect and display information and documents [Article 35(1)].

Access

Two ways of providing access to tender documents are possible:

- make documents available
- send documents

There is a time limit defined concerning the tender reception, as indicated in Article 38(1) and 38(3). However it is possible to reduce this time limitation, in case “unrestricted and full direct access by electronic means” is provided [Article 38(6)]. Details to this requirement are presented in Annex XIII:

- notices need to be published in a specific format as defined in Directive 2001/78/EC *(The European Parliament and the Council of the European Union)*
- correct publication needs to be confirmed by the Office for Official Publication

Formats and procedures can be and are to be accessed via the SIMAP website (http://simap.europa.eu).

Electronic Reception

Electronic reception means the sending and receiving of the candidates' bids. Here the same rules apply as for communication as listed in Article 42(5). See 3.1.1 for details.

Additionally, Directive 2004/18/EC here also refers to the defined requirements to electronic reception devices in Annex X, which was referred to before (see 3.1.1).

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organsation	process	content	data	components	protocols
Tenders notices above a specific threshold need to be published in **TED**	36(3)		x					x	x			
When publishing **notices, standard forms** are to be used	35(1)		x	x				x	x			
for defined terms and categories **CPV** is to be applied	35(1)		x	x						x		
CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x			x	x		x	
Unrestricted and full direct access to the eProcurement system	38(6)			x	x		x	x			x	x
Electronic signatures need to comply with Directive 1999/93/EC	42(5)							x			x	
Electronic reception **tools** need to have a **time stamp functionality**	Annex X			x	x			x			x	
Electronic reception tools need to have a **time lock functionality**	Annex X			x	x			x			x	
Infringement needs to be **detectable**	Annex X			x	x			x	x		x	x
Availability of different persona / authorisation levels is required	Annex X		x	x	x		x	x	x		x	
The **4 eyes principle** needs to be considered	Annex X			x	x			x			x	

Table 3: Legal framework requirements – notices and documents

3.1.3 Procurement procedures

Both EU Directives mention several procurement procedures that can be used. However, there are several restrictions and procedures cannot be chosen freely.

Wherever the estimated contract value is above a certain threshold, EU procurement procedures need to be applied. These thresholds are set by the European Commission, updated usually every two years. The latest values, which came into force 01 January 2008 *(European Commission 2007)*, are as follows:

Type of Contract	Supplies and Services	Works
Certain government bodies subject to the WTO GPA	EUR 133,000	EUR 5,150,000
Other public sector CA	EUR 206,000	EUR 5,150,000
Contracts with Indicative Notices	EUR 750,000	EUR 5,150,000
Small Lots	EUR 80,000	EUR 1,000,000

Table 4: Thresholds for EU-wide procedures

The first threshold given applies to certain government bodies referred to on Article 7(a) of Directive 2004/18/EC. Contracts, where a prior information notice (PIN) is published, are also subject to a specific threshold, as defined in Article 35. This PIN is usually being made use of, when contract values are extremely high.

Furthermore, Article 8(5) grants the option to waive the application of EU procedures, in case lots do not exceed a certain value. Usually, the procedures applied below and above the threshold, e.g. the national and the EU procedures, are very similar. However, the interoperability requirements are more sophisticated, due to different standards and additional parties involved. On EU level the procedures applicable within the range of the public sector directive are according to Article 28ff:

- open procedure
- restricted procedure

- competitive dialogue
- negotiated procedure
- accelerated procedure
- dynamic purchasing systems
- design contest [Article 66ff]

The open and restricted procedure will be examined here carefully as they are most commonly used, while the other procedures and processes will be explained here shortly only, as the conditions which allow their usage are very limited.

The open procedure

Here all interested parties are allowed to participate in the tendering process, which is announced in the TED. The Directive accurately defines the process order and the different timeframes. Together with the restricted procedure it is most commonly used.

The open procedure, and also the restricted procedure, can be divided into two major process steps:

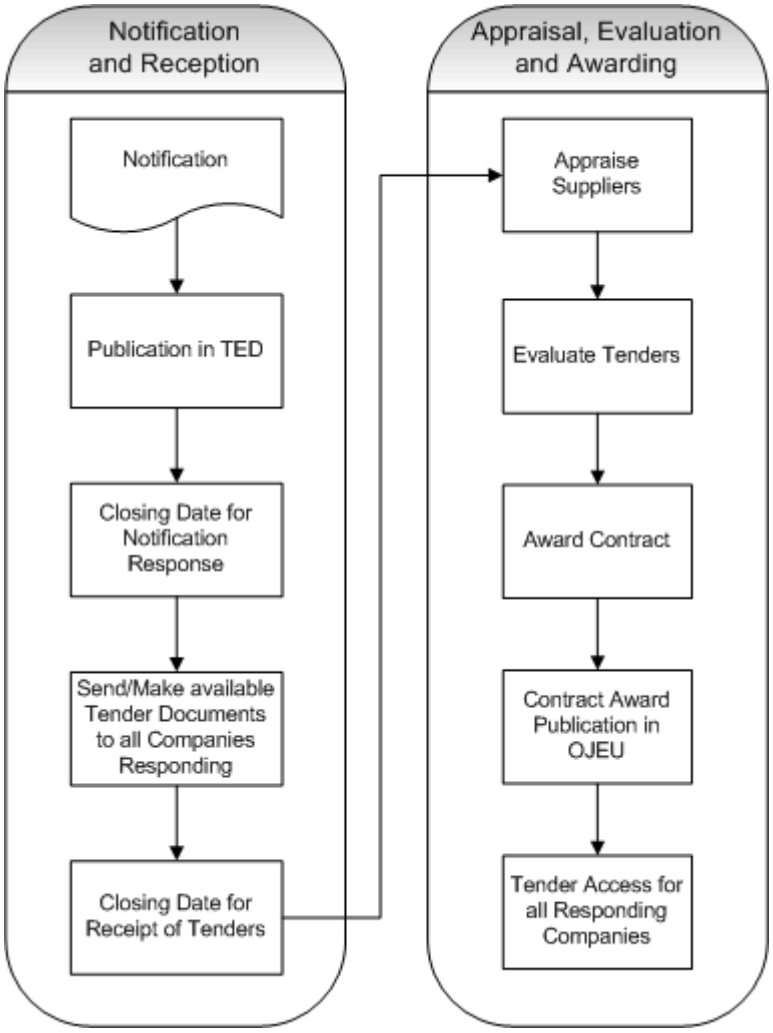

Figure 9: Open and restricted procedure

In the notification and reception process, candidates are informed about the tendering process and its participation conditions. Additionally, tenders are received and checked for formal correctness and completeness.

In the second phase, the supplier appraisal and awarding process, candidates are evaluated according to a predefined workflow. The supplier's financial and legal preferences are checked for conformity with the tendering conditions and the supplier's tender is compared with the competitors' tenders according to the scheme predefined in the notification.

Very important in each public procurement process are the time limits to be considered at certain stages. The EU Directives come with several variations of the open procedure that affect its timescale. These variations are visualised in the following figures:

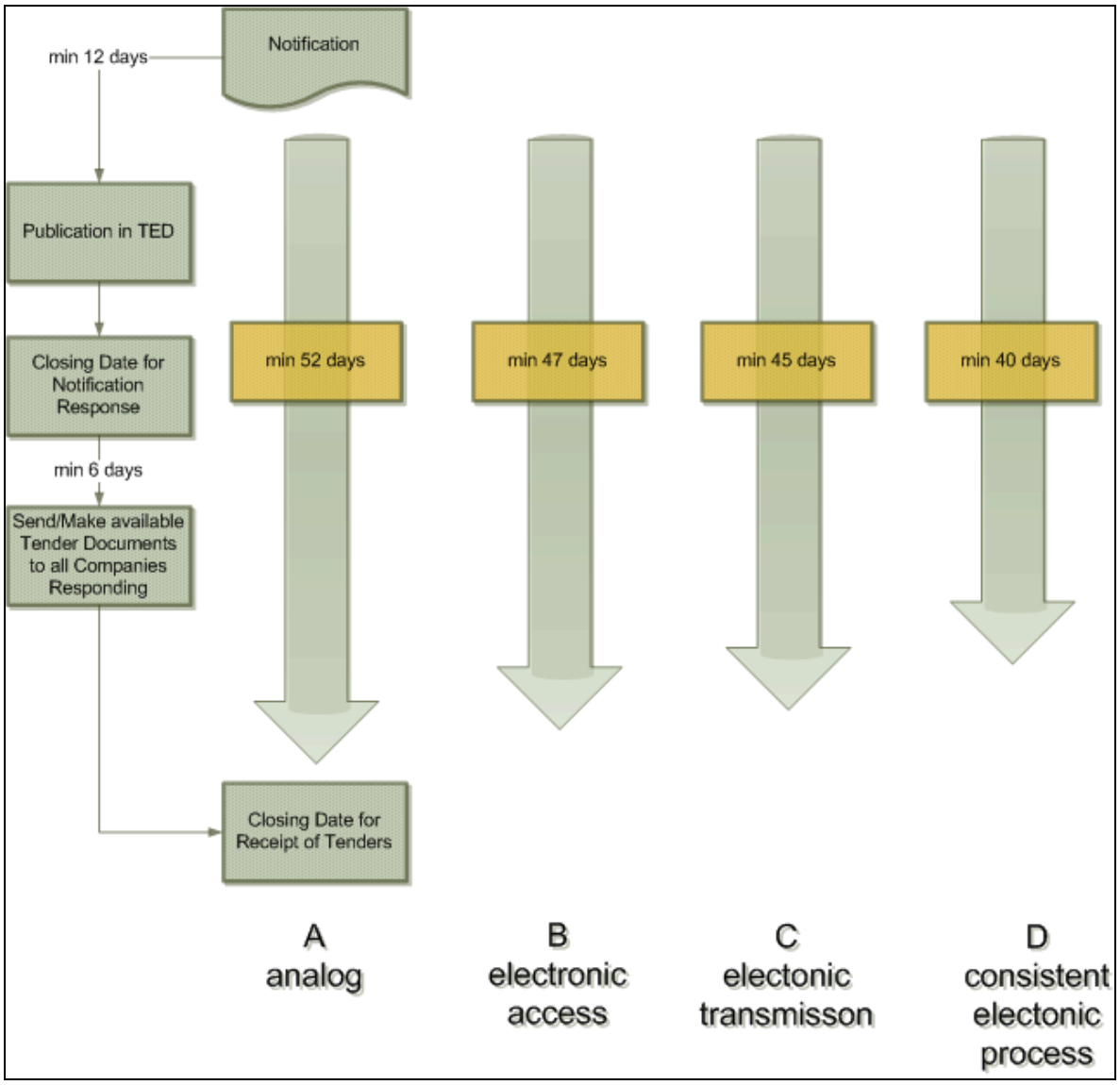

Figure 10: Open procedure schedule

(A) This traditional variant needs 52 days minimum for the entire procedure. All sub processes are laid out for the use of analogous communication. [Article 38(2)]

(B) When "unrestricted and full direct" access to documents is provided electronically, the overall time limit can be reduced by 5 days. [Article 38(6)]

(C) Where notices are transmitted electronically, time limit may be reduced by 7 days. [Article 38(5)]

(D) As both variants B and C can be combined, a consistent electronic procedure can lead to a reduction of up to 12 days of the original 52 day time limit [Article 38(6)II].

In case a so called Prior Information Notice (PIN) is published, the open procedure can be shortened by 16 days regularly, but should under no circumstances be shorter than 22 days.

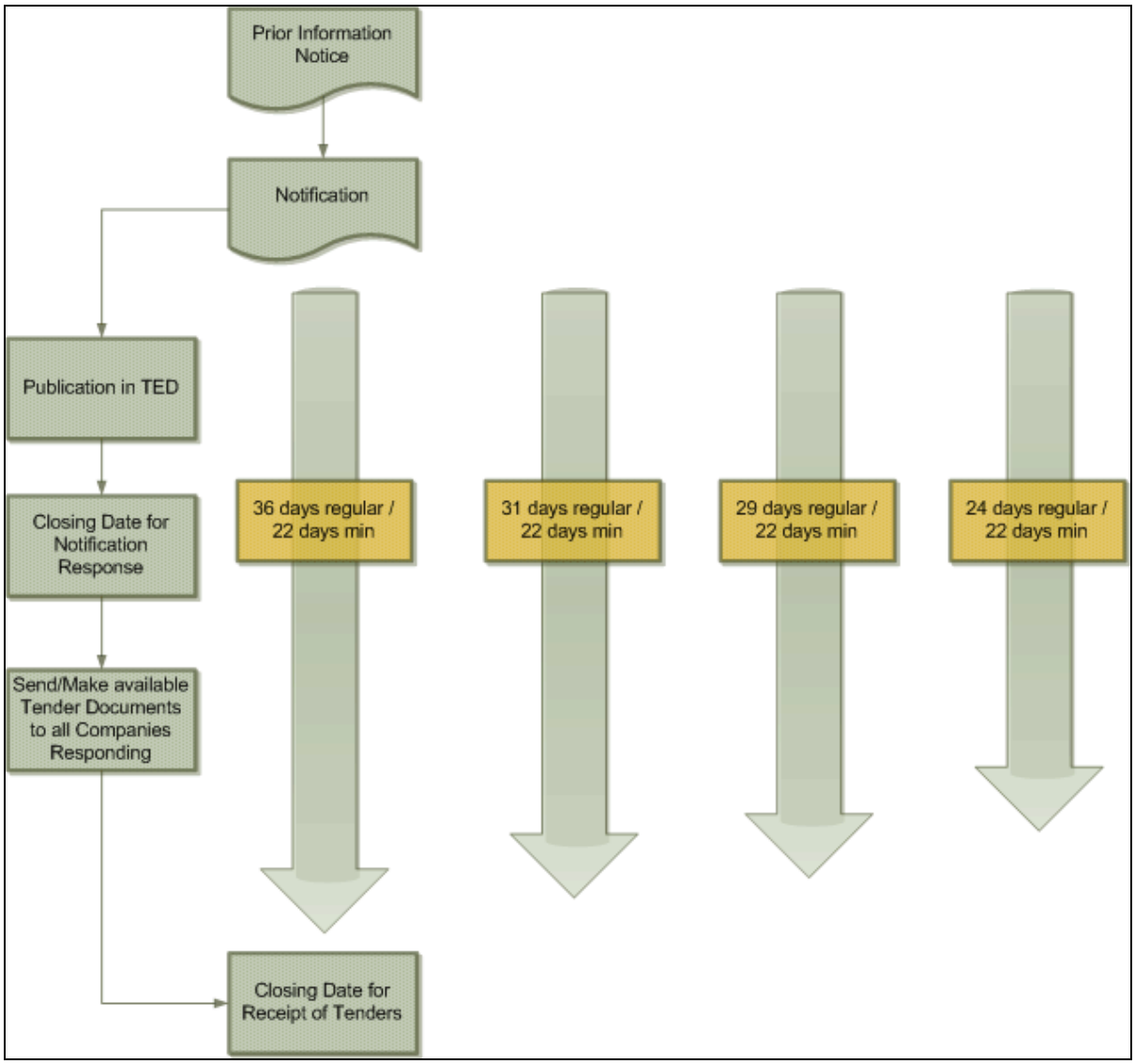

Figure 11: Open procedure (with PIN) schedule

Restricted procedure

The tender is published in TED as well, but suppliers need to request participation and only companies invited by the contracting authority are allowed to submit tenders. Else the restricted procedure is identical to the open one.

A detailed process flow of the open, respectively restricted procedure can be found in chapter 6.

Dynamic purchasing system (DPS)

In Article 1(6) of Directive 2004/18/EC a DPS is defined as:

'*A completely electronic process for making commonly used purchases, the characteristics of which, as generally available on the market, meet the requirements of the contracting authority, which is limited in duration and open throughout its validity to any economic operator which satisfies the selection criteria and has submitted an indicative tender that complies with the specification*'.

Here in the beginning the same procedures need to be followed as in the open procedure. Then all suppliers that placed (indicative) bids meeting the requirements are allowed to enter the DPS. Throughout the announced validity time of the DPS tenderers can change their bids.

Design contest

This procedure is usually applied where a creative process is involved and award criteria are hardly quantifiable. For instance, this is usually the case in architecture and city planning, but also in certain IT assignments. Here, the CA assigns a jury to select a winner under predefined rules of competition.

As this procedure involves entirely different roles and processes than the more common open or restricted procedure, a separate requirement analysis is needed. Under very specific and rare conditions, which are carefully regulated in the Directives, the CA may also make use of one of the following procedures:

Negotiated procedure

Here the CA does not necessarily follow any formal tendering procedure. The CA simply chooses potential suppliers with whom to negotiate with.

Two different types of negotiated procedures are possible:

- negotiated procedure with advertisement: the CA must advertise in TED to find suitable contractors to negotiate with
- negotiated procedure without advertisement: the CA is allowed to freely choose the contractors to negotiate with

Competitive dialogue

This procedure can sometimes be followed for a rather complex contract. Potential contractors respond to a TED-notice, but only a few are admitted. These parties then, together with the CA, try to develop solutions for the given problem in a dialogue. The result then is the basis for a tendering process, where the admitted potential suppliers can then take part in.

Accelerated procedure

In urgency case the CA is allowed to make use of an accelerated version of the restricted procedure. Here the time limits are reduced to 12 days.

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organsation	process	content	data	components	protocols
In case of **collaboration** - **type of procedure** needs to be **agreed** on	Directive		x	x	x		x	x				
Workflow support for tendering procedures is needed	Directive		x	x	x			x			x	
Plausibility and verification **tools** for **different procedures** are required	Directive		x	x	x			x	x	x	x	

Table 5: Legal framework requirements – tendering procedures

In most cases the type of procedure is more or less automatically chosen, due to the contract preferences. However, under some conditions the CA

can select a procedure and in this case common terms with collaborating authorities are important.

3.1.4 Supplier selection criteria

The CA is supposed to check the candidates abilities against the requirements defined in the contract notice. To ensure a fair competition this supplier check needs to be based on, if not quantifiable, then comparable data. Therefore, the EU Directives list several methods how and where to gather the required information.

In order to be admitted to the tendering processes, suppliers need to prove that they fulfilled obligations related to social services and taxes. This can be done in 2 different ways:

- production of a “judicial record”, issued by the responsible authority in the supplier’s country, proofing the conformity with the requirements
- production of certificates from the relevant authorities, i.e. the social service and tax authorities

Also, suppliers may need to proof their enrolment in their countries trade register or other relevant organisations in order to proof their legitimacy.

Additionally, to confirm his economical capability, the supplier can use one or more of the following as evidence:

- bank statement
- balance sheets, wherever publication is required by law anyway (e.g. Aktiengesellschaft in Germany)
- turnover statement

Furthermore, depending on the type of the service or product tendered by the CA, the candidate may be required so validate his technical and/or professional abilities. These different ways of validation are described in Article 48.

In case the CA requires certain quality assurance or certificates, it should be referred to the relevant European standard. Equivalent standards from Member States need to be accepted.

Same is valid for verification of conformity with environmental requirements. Here the Directive explicitly mentions the Community Eco-Management and Audit Scheme (EMAS) to refer to.

Issue	Source	Phases					IOP Level					
		1 Demand	2 Specification	3 Tendering	4 Awarding	5 Contract M	org organisation	org process	sem content	sem data	tech components	tech protocols
Suppliers need to **inform** about their **personal situation** (with info from tax or social service authorities)	45		x	x	x	x	x	x	x	x	x	x
Suppliers need to **prove** their **suitability** for the desired professional activity (trade register)	46		x	x	x	x	x	x	x	x	x	x
Suppliers need to **inform** about their **financial situation** (bank statements)	47		x	x	x	x	x	x	x	x	x	x
Suppliers need to **prove** their **technical / professional abilities**	48		x	x	x	x	x	x	x	x	x	x
Suppliers need to prove **fulfillment of QA standards** (certificates)	49		x	x	x	x	x	x	x	x	x	x
Suppliers need to prove **fulfillment of environmental management standards** (certificates)	50		x	x	x	x	x	x	x	x	x	x

Table 6: Legal framework requirements – supplier selection

3.1.5 eAuctions

Generally, according to Article 54(1), the member states of the EU are free to choose whether they allow eAuctions or not. In case national law allows eAuctions, contracting authorities are bound to the following EU restrictions:

- According to 1(7) eAuctions are not to be used for certain work and service contracts, where intellectual performances are the matter of subject
- Contracting authorities can decide whether to base the eAuction solely on prices, on other defined parameters, or a combination of prices and parameters [Article 54(2)]
- It is required to state in the contract notice, if an eAuctions is planned, including all relevant information, as indicated in Article 54(3).

Furthermore, there are several regulations, accurately providing a framework for conducting eAuctions. According to Article 54(4) ff the following requirements are mandatory:

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
Full initial evaluation of eAuction participants is required	54(4)				x			x				
Simulataneous invitation of eAuction participants required	54(4)				x			x				
Provide necessary **information** in invitation: - access - schedule - candidates evalutation result in case of “economically most advantageous” award procedure - mathematical formula(s)	54(4)				x			x	x			
Start of auction shall **not** take place **sooner** than 2 days after invitation (time locks)	54(4)				x			x				
Display of relevant auction **rankings** at any time	54(6)				x			x	x		x	
The CA has the **options** of - single auction or - predefined number of **phases**	54(4)				x			x			x	

Regarding **information** communication **during the auction** the CA, the CA can choose to display either one or both of the following: - prices / values - number of participants	54(6)		x	x x
The CA has the following options for **auction closing conditions**: a) fixed date and time b) missing new values c) completed number of fixed phases	54(7)		x	x x

Table 7: Legal framework requirements - eAuctions

3.1.6 National regulations

There are several legal matters regarding public eSourcing that are handled differently in the 27 countries of the European Union. Most importantly these matters are eAuctioning and eSignatures.

The EU explicitly does not require the integration of an eAuction option in the tendering procedure, but admits it. This leads to the effect that by now, some member states have implemented such a solution while others don't. This affects the supplier awareness of such an awarding procedure, as some tenderer are used to it, while other are not. An overview about eAuction applications can be found in chapter 4.2.

The legal basis for the use of eSignatures is the EU Directive 1999/93/EC. However, partly because it is a bit out of date and to some extent very vague, legal implementations in the member states differ significantly. This mainly affects the technical preferences of these national solutions. Now this has a negative effect on many cross-boarder processes, including public eSourcing.

3.1.7 WTO Government Procurement Agreement

The Government Procurement Agreement (GPA) of the World Trade Organization (WTO) entered into force on January 1st, 1996 *(The European Parliament and the Council of the European Union 1999)* Though it is a multilateral agreement, it was ratified by the European Community

on behalf of all its member states and furthermore was adapted into European law with Directive 97/52/EC *(The European Parliament and the Council of the European Union 1997)* on October 13th, 1997. As it is therefore also embodied in the new Directives, presented before, it will not be discussed in detail here.

3.2 Organisational Framework

In this paragraph the different players and their role in the eSourcing field are presented. Though not necessarily through legal force, again the EU is very active in this field.

3.2.1 European Union

Several bodies of the EU act in the eProcurement and eSourcing environment.

DG (Directorate General) Internal Market and Services

This Directorate (DGIM, *2008*) is directly responsible for designing law proposals related to EU Internal Market issues and monitoring its implementation. The DGIM developed the proposal for the latest procurement regulations amendment which was realized through the Directives 2004/17/EC and 2004/18/EC.

Publications Office

The Office for Official Publications of the European Communities, or Publications Office is the publishing institution of the EU. Via online-services it provides for example information on EU law, EU research activities and, most importantly to mention in this context, about EU public procurement issues. The following terms need to be mentioned when talking about the Publications Office, which are also referred to in the procurement Directives: SIMAP and TED.

SIMAP (Système d´Information sur les MArchés Publics) provides up-to-date information about legislation, codes and standards to be applied in the public procurement process. Furthermore, it provides the latest

standard forms (called eNotices) to be used for publishing notices in the Supplement of the OJEU (Official Journal of the European Union) of the Publications Office. Via a service called eSenders it is also possible for dedicated organisations to send XML notices directly.
All public tenders above a specific threshold need to be published in this supplement, which is often referred to as S series or OJ S (Official Journal S). It is published daily in all 23 official languages of the EU.

Moreover, SIMAP informs about standards that are to be used when applicable. These can be found in the following table.

Standard	Full title	Apply for	Created by
CPV	Common Procurement Vocabulary	Subject of procurement contract	
NUTS	Nomenclature of Territorial Units for Statistics	Region ID	Eurostat
CPC	Central Product Classification	Goods and services classification	
ISO 4217		Currency ID	ISO
ISO 3166		Country ID	ISO

Table 8: Standards in use on SIMAP

TED (Tenders Electronic Daily) is the most commonly used representation form of the OJ S: via the TED website (http://ted.europa.eu) suppliers can search for relevant tenders. It is possible to save a personal search profile or set notification through RSS (Really Simple Syndication) news feed.

DG Information Society and Media

This DG (DGISM) is very active in the field of technology and communication. Its Mission Statement illustrates, that eSourcing is a focal point of interest as it states: “Encourage the widespread availability and accessibility of ICT-based services, especially those that have the greatest impact on the quality of life of the citizens.” *(European Commission (DG Information Society and Media) n.d.)* Therefore, it funds various programs (see for example BRITE in 4.1) and supports practical research (see case studies 5.2 and 5.3) related to this matter.

IDABC

The IDABC (Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens) is a programme managed by the DG Informatics of the EU. It aims to improve collaboration between administrations and to create an environment for cross-border public sector services for citizens and enterprises.

A major research field of IDABC is eProcurement. So far it has carried out several background studies and developed functional requirements for electronic procurement. Furthermore, based on these requirements, a software demonstrator was designed, which can be accessed under a public license. Also improvements of the CPV standard and eProcurement-related XML-schemata could be achieved.

SOLVIT

In case of problems related to misapplications of Internal Market rules, citizens and enterprises can turn to SOLVIT, which then tries to help solving the case, without taking any legal actions. Fields where problems might arise are for example driving licenses or voting rights on the citizen side and taxation or public procurement issues on enterprise side.

3.2.2 Member states

Though the European Union does provide the legal basis, many different regulations exist among the member states. This affects topics such as tendering processes, electronic signature or the use of eAuctions.

Furthermore, most of the members states have launched own research activities on eSourcing and started web-based eTendering platforms. This on the one hand has positive effects, as it helps fostering eSourcing in the large and leads to Best Practices. On the other hand, as different processes or architectures are in use, it also leads to new barriers through establishing different standards.

Hence not only is it important to identify the existing efforts, but also to integrate Best Practices in a pan-European approach.

4 State of the Art

As indicated here before, public eSourcing is a major research field in eGovernment today. Many initiatives have been launched to facilitate eSourcing development. However, different parties, though working in the same field of interest, might, due to diverse view points, create different results. This again, yet of course with a positive intend, can lead to even more barriers within a pan-European eSourcing environment. Hence, it is of crucial importance to identify and align the different endeavours.

4.1 Initiatives

Beside the European bodies operationally involved in the eProcurement process, as presented in the organisational framework, there are some other initiatives acting in this field.

CEN ISSS

The CEN (European Committee for Standardization) was founded in 1961 by national standard bodies in European countries. Though not directly associated with the EU, its workshop and research results and standards suggestions are often directly implemented into EU legislations, respectively legislation of its member states.

Today, there are several committees or focus groups directly or indirectly contributing technical standards to the field of public eSourcing. These initiatives are settled in the ISSS (Information Society and Standardization System) division of CEN.

The eBES (eBusiness Board for European Standardization) Workshop contributes to traditional B2B electronic data interchange (EDI) standardization issues and fosters development of ebXML (electronic business using XML). ebXML is defined as “a modular suite of specifications that enables enterprises of any size and in any geographical location to conduct business over the Internet.” *(OASIS 2008)* The ebXML initiative was jointly founded by OASIS and UN/CEFACT in 1999. It is to be understood as an XML framework architecture for business processes.

However, current libraries in use, as for example UBL 2.0 (Universal Business Language), are mostly focused on the eOrdering part of the eProcurement lifecycle. This can partly be explained with the fact that these eOrdering processes usually are very common (e.g. billing or invoicing), while eSourcing processes may vary a lot, depending on industry, strategy or schedule.

Nevertheless, though ebXML originally was started as a B2B initiative, XML standards for the tendering phase in public procurement might be easier to be agreed on, as procedures are carefully defined. In the private sector it is almost solely up to the buying institution to define the set up of the tendering process, hence, countless different scenarios are possible.

IDABC

This programme, as introduced before, covers all the relevant issues relevant for interoperable cross-border public sector services. The IDABC coordinates and finances research activities. Some of these activities are directly or indirectly linked to eProcurement and can be found in the recent IDABC work plan *(European Commission (IDABC) 2007b)*.

Being a major player in this matter, their efforts in eProcurement led to many important findings and results, most of them also used in this thesis, among them state of the art reports and technical specifications.

But also other issues, crucial for effective eProcurement have made significant progress with the help of the IDABC. One of these issues is a common basis for Europe-wide handling of electronic signatures (eSignatures) *(European Commission (IDABC) 2007a)*. First of all it needs to be delineated what is actually meant by the term “eSignatures”.

It is originally a legal term, as it comes from the “eSignatures Directive” *(The European Parliament and the Council of the European Union 1999)*, which defines it as “*data in electronic form which are attached to or logically associated with other electronic data and which serve as a method of authentication*”. Though one of the goals of this Directive was to base a common ground for eSignatures, it leaves much room for

interpretation. There are different variations of eSignatures possible, presented here shortly.

An advanced signature is by Directive definition *(The European Parliament and the Council of the European Union 1999)*, Article 2(2)) an electronic signature which meets the following requirements:

- it is uniquely linked to the signatory (person who signs the document);
- it is capable of identifying the signatory;
- it is created using means that the signatory can maintain
- under his sole control; and
- it is linked to the data to which it relates in such a manner that any subsequent change of the data is detectable;

“A ‘certificate’ means an electronic attestation which links signature-verification data to a person and confirms the identity of that person”, (*(The European Parliament and the Council of the European Union 1999)*, Article 2(9)) where signature-verification data for example is represented by a public cryptographic key. For a qualified certificate technical requirements defined in the Directive need to be met and the certificate needs to be provided by a certificate-service provider (CSP) who also fulfils specific requirements. (*(The European Parliament and the Council of the European Union 1999)*, Article 2(10)) A qualified signature then represents a qualified certificate in combination with smart card, i.e. a hardware device.

This correlation can be visualised as follows:

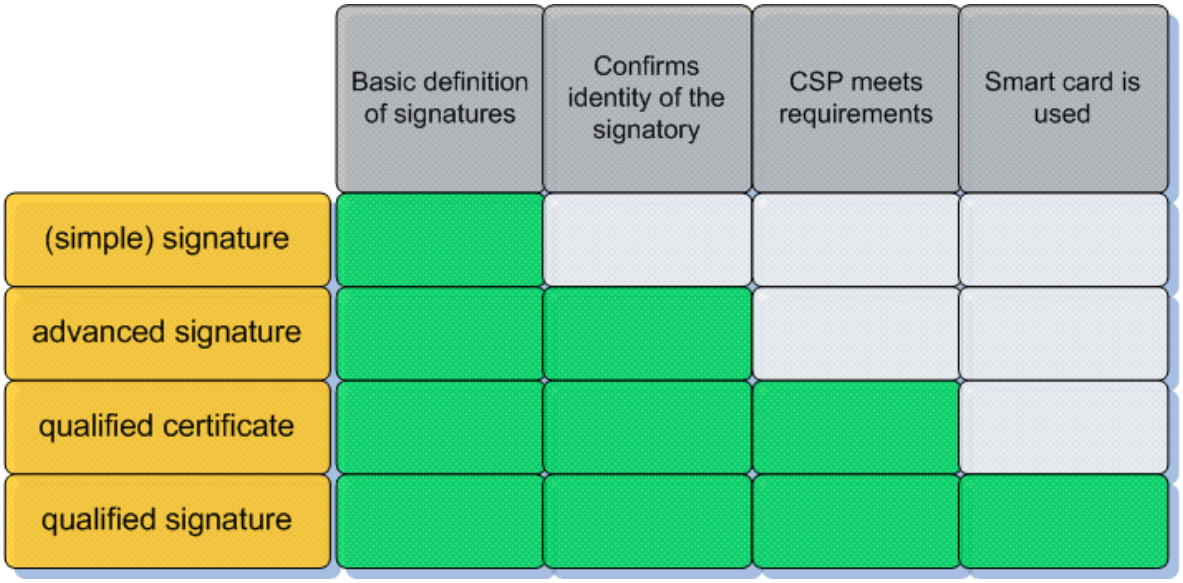

Figure 12: Electronic signature types

This brings up two major IOP problems: Firstly, it is not defined when which signature, respectively certificate is required. Secondly, it is not clear when exactly a CSP meets the requirements defined by the Directive.

Because of the first problem, there are many different types of signatures in use. A study from November 2007 *(*Table 9*, European Commission (IDABC) 2007a)* on the use of eSignatures in public eProcurement applications shows precisely this diversification.

Hence suppliers are forced to adapt to different systems when tendering in different member states. This can lead to additional costs for hardware/software or process costs.

The second problem mentioned earlier leads to the current situation that authorities from different MS do not accept the same CSPs, since they for example have a different accreditation system.

Country	Signature in use
Austria	qualified signature
Belgium	qualified signature
Bulgaria	qualified certificate
Croatia	qualified certificate
Cyprus	none yet
Czech Republic	advanced signature with qualified certificate
Denmark	advanced signature
Estonia	no signatures required
Finland	authentication; no signature
France	advanced signature
Germany	qualified signature and advanced signature
Greece	none yet
Hungary	none yet
Ireland	none yet
Italy	qualified signature
Latvia	none yet
Lithuania	none yet
Luxembourg	none yet
Malta	none yet
Netherlands	qualified signature
Poland	qualified signature
Portugal	none yet
Romania	qualified certificate and advanced signature
Slovakia	advanced signature
Slovenia	none yet
Spain	none yet
Sweden	unknown
Turkey	none yet
United Kingdom	none yet

Table 9: Electronic signature types in use

OASIS

The Organization for the Advancement of Structured Information Standards is a large consortium of more than 5000 organizations and a driving force in standardization issues concerning for example e-business and public sector applications, security aspects or document exchange. Founded in 1993, today it is a major initiative with different subcommittees, many of them concerning touching eSourcing topics. One of them, ebXML was named before. Another is about security matters such as eSignatures or Public Key Infrastructures.

BRITE

BRITE (Business Register Interoperability Throughout Europe) is a consortium of public and private organisations, funded by the DG

Information Society and Media of the European Commission. It aims to develop an interoperability model for business registers (BRs) in Europe. *(Elst et al. 2006)* Business registers have an important role in the tendering process, as certified information is needed by the supplier to prove legitimacy and suitability to the CA. Detailed information can be found in the case study of 5.2.

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		tech	
		Demand	Specification	Tendering	Awarding	Contract M	organsation	process	content	data	components	protocols
Align different **eSignature approaches** of the eProcurement plaforms	Initiatives			x	x		x	x				
More **precise legislation** on the use of **eSignatures** is needed	Initiatives			x	x		x					
Pan-European **accredetation system for CPS** required	Initiatives			x	x		x	x	x	x	x	x
Standard forms (e.g. XML) for **various processes** are needed, for instance eAuctions, buyer-supplier communications, supplier evidences	Initiatives		x	x	x	x	x	x	x	x		

Table 10: IOP requirements - initiatives

4.2 Member States

Though there are many EU-wide projects, research and implementation levels of eProcurement among the different MS are very different. To illustrate this, we can make use of different data available.

One important key figure is the eProcurement progress in relation to the EU Action Plan, presented before in 2.2.1. To recall, targets where to reach 100% availability and 50% take-up of eProcurement in 2010. The following table shows this progress (in the last two columns) of each country of the EU and additional countries closely related to in terms of trade, due to bilateral and multilateral agreements. The information you

can see is mainly based on a status report of September 2007 *(European Commission (DG Information Society and Media) 2007)* published by the DG Information Science and Media.

In the table a "100% availability" means that every public institution, whether national, regional or local, are integrated in the electronic procurement process. "50% use" then means, that half of these institutions actively use these electronic channels.

Country	National platform	Phase	100% availability target	50% use target
Austria	no	2	0-25%	0-25%
Belgium	yes	2	51-75%	26-50%
Bulgaria	n/a	2	0-25%	0-25%
Cyprus	no	1	0-25%	0-25%
Czech Republic	yes	2	0-25%	0-25%
Denmark	yes	1	0-25%	76-100%
Estonia	yes	2	76-100%	0-25%
Finland	yes	1	0-25%	76-100%
France	yes	3	76-100%	26-50%
Germany	yes	3	100%	n/a
Greece	yes	1	0-25%	0-25%
Hungary	no	1	26-50%	0-25%
Iceland	n/a	1	0-25%	0-25%
Ireland	yes	3	n/a	n/a
Italy	yes	2	76-100%	0-25%
Latvia	yes	3	100%	10%
Lithuania	yes	2	26-50%	26-50%
Luxembourg	yes	2	100%	76-100%
Malta	yes	1	0-25%	0-25%
Netherlands	yes	2	0-25%	0-25%
Norway	yes	n/a	26-50%	0-25%
Poland	yes	1	n/a	0-25%
Portugal	yes	2	76-100%	76-100%
Romania	yes	n/a	26-50%	26-50%
(Scotland)	yes	3	100%	>50%
Slovakia	no	1	n/a	n/a
Slovenia	yes	2	26-50%	0-25%
Spain	no	n/a	n/a	n/a
Sweden	n/a	n/a	n/a	n/a
Switzerland	no	n/a	n/a	n/a
Turkey	n/a	n/a	0-25%	0-25%
United Kingdom	yes	n/a	26-50%	26-50%

Table 11: eSourcing platforms deployment level and target reach

A noticeable aspect of the numbers is the fact, that most of the MS either have made a significant (75-100%) or very little progress (0-25%) towards the Action Plan goals, with some few exceptions, as for example Romania, Lithuania or Belgium. This can partly be explained by the

different schedules of eProcurement programs in the countries. Some have started years ago, while others are just entering this field. Furthermore some countries do not have established a platform for eProcurement yet, as can be seen in the first column. The second column shows the progress phase of electronic pre-awarding processes, where “1” indicates that a system is under development, “2” means it is currently in implementation phase a “3” shows that the system is in full use.

Another point of view, this time focused on the type and status of eSourcing platforms implementation in selected countries can be found in the following figure. The information you can find is partly based on a study of Ramboll Management *(European Commission 2004a)*, partly on a survey *(Arnemann 2007)* carried out for this thesis (see Appendix A) and partly on information that could be obtained from the platform websites. For the survey 14 platform operators were contacted via eMail of which 5 replied.

Country	Source	supported eSourcing phases					
		Preparation of Notice	Publication of Notice	Tendering	Awarding	eAuction	Contract Managem.
Belgium	(1)	JEEP		eTendering			
Denmark	(2)	SKI					
Germany	(1)(3)	eVergabe					
Ireland	(2)(3)	eTenders					
Italy	(1)						
Luxembourg	(2)	Portail des marchés		publics			
Romania	(3)	e-Licitatie					
Spain (Basque)	(1)	eContraction					
UK (Scotland)	(1)(2)(3)	DTC					
UK	(1)(2)(3)	eSourcing Services					
EU	(1)		EPSS				
	(1)	Syslog Market					
Norway	(1)	eHandel					

(1) Study (2) Survey (3) Website information

Table 12: eSourcing platforms

A very interesting statistical feature can be access on the TED website (*TED 2008*). It provides numbers of cross-boarder award of contracts, i.e. how many contracts of authorities in country A were awarded to suppliers in country B, and vice versa. Unfortunately only recent data has been

collected, so dynamical information can not be displayed. The table available in Appendix C shows data from the last quarter of 2007.

Not surprisingly most contracts were awarded to suppliers in the same country, indicated by the diagonal from top left to bottom right. However some significant cooperation numbers can be found at neighbour states speaking the same language, as for example Belgium and France or Germany and Austria. But also other relations are quite strong like cross-boarder contracts between Austria and Czech Republic.

5 Case Studies

In this chapter experiences from case studies related to a specific aspect or eSourcing in general will be used to deduct IOP requirements.

5.1 GTCP

In the GTCP (Greffe du Tribunal de Commerce de Paris) case (*Diedrich et al. 2007*, pp. 37-43) a cross-boarder eProcurement scenario is analyzed, focussing on identifying interoperability issues.

In the eProcurement environment the GTCP can take two different roles:

- electronic certification department
- registration authority

This specific case study relates to three different workflows, which can be assigned to the tendering stage of the eSourcing lifecycle:

- electronic certification
- dissemination of company data
- call for tenders

Since the IOP framework used in the GTCP case is the same as the one used here, the identified IOP issues and parameters can be migrated to the table format applied before.

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organsation	process	content	data	components	protocols
Provide **cross-organisational** and **cross-national procedures** to support national public tenders at an European scale.	GTCP		x	x	x		x	x	x			
Achieve a **common understanding** on what distinguishes certain types of companies and related terms.	GTCP			x	x				x			

Provide acceptable **data formats for bids** to be implemented on a European level.	GTCP			x	x					x		
Provide **advanced signature mechanisms** to foster the implementation of the European Directive on electronic signatures.	GTCP		x	x	x					x	x	x
Provide an implementation of elaborated **timestamp mechanisms** to secure correct bidding processes due to differing time zones in the European Union	GTCP			x	x						x	x
Avoid the disruption of **electronic unity**	GTCP	x	x	x	x	x		x	x	x		
Collaboration partners have to agree on **common level of trust in legal document exchange** and put means in place to support this	GTCP	x	x	x	x		x				x	
Common agreement on **data types and formats** for cross-organisational **document exchange**	GTCP	x	x	x	x					x		
Description and **linkage of internal processes and external processes** is needed	GTCP	x	x	x	x	x		x	x			
Different implementations in pubic administrations need to be **connected**	GTCP	x	x								x	x
European **certification architectures** need a **common basis** or links between different national architectures to allow cross-border exchange of certified documents	GTCP		x	x	x		x	x			x	x
For quality management and service improvement, **monitoring of cross-administrative workflows** is needed	GTCP	x	x	x	x		x	x			x	
Means to **automatically verify the compliance** of workflow and data exchange **with legal obligations** are needed	GTCP		x	x	x		x	x		x	x	
Means to **electronically sign documents in cross-border setups** are needed	GTCP	x	x	x	x		x			x	x	x
On a user level, **multi-lingual interfaces** and content display is required	GTCP	x	x	x	x	x	x		x			
Provide **guidelines** for participation in cross-organisational **collaborations**	GTCP	x	x	x	x	x	x					

Transformation of paper documents to electronic formats **(XML standards)**	GTCP	x x x x	x x x

Table 13: IOP requirements - GTCP

5.2 Common Business Dossier

A critical process when dealing with interoperability in eProcurement is the gathering and evaluation of supplier data such as for example legal, financial or social responsibility information. Collecting this information is required by law, as stated before in 3.1.4.

Usually this is a sophisticated challenge by itself, but gets even more complex, when crossing MS boarders for accessing supplier information.

This does affect for example different standards, languages or handling of security aspects.

A traditional process of obtaining such a certificate may look as follows.

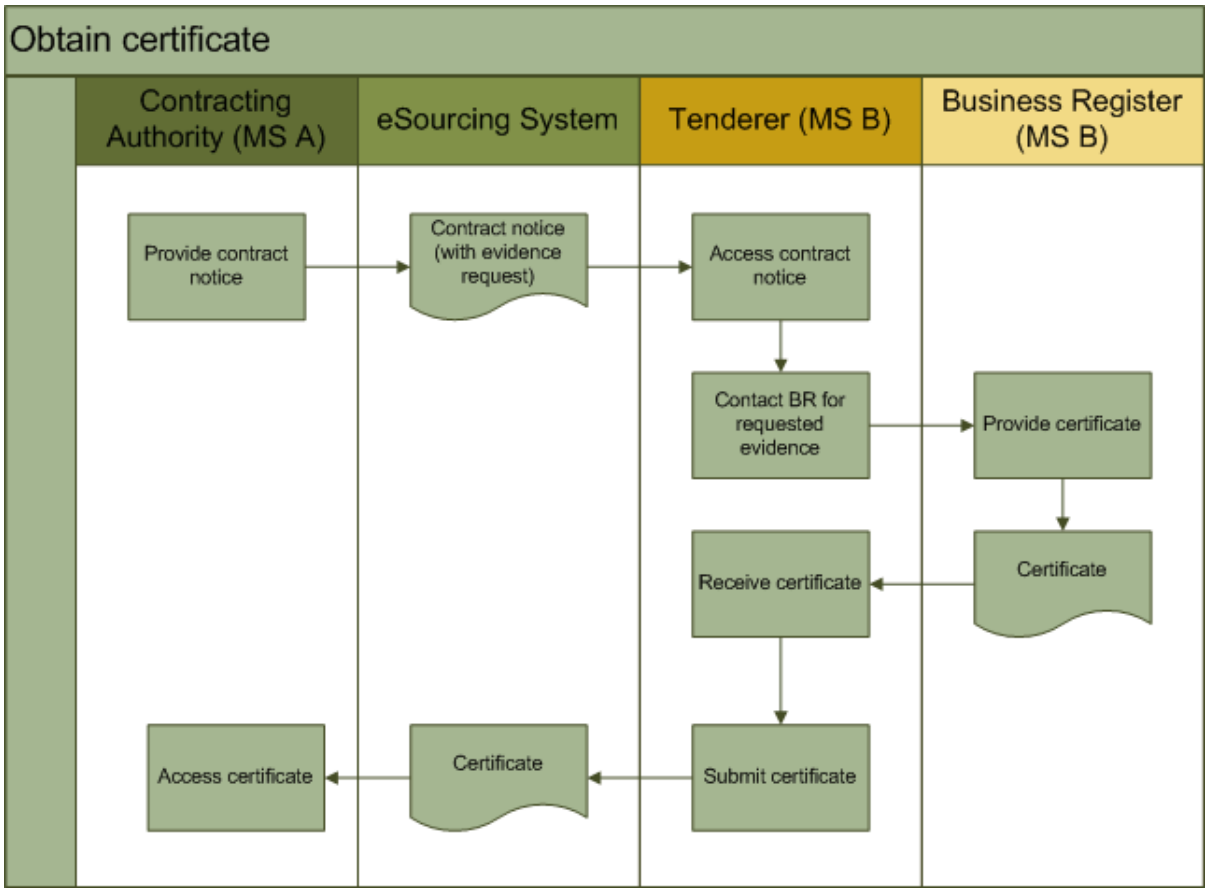

Figure 13: "Obtain certificate" process

This process usually has to be repeated for different certificates with different registers or authorities.

As presented earlier in 4.1, the BRITE consortium tries to simplify this procedure. The central approach is to map the “traditional” process to the new technological abilities: Using analogue mail and paper documents, tenderers often produced an “envelope” with all the required documents to send them at once. Now the idea of BRITE is to represent this envelope via a digital company business dossier *(Milani, Mondorf 2007)*.

On a rather abstract level, this approach can be visualised as in the following UML (Unified Modelling Language) use case:

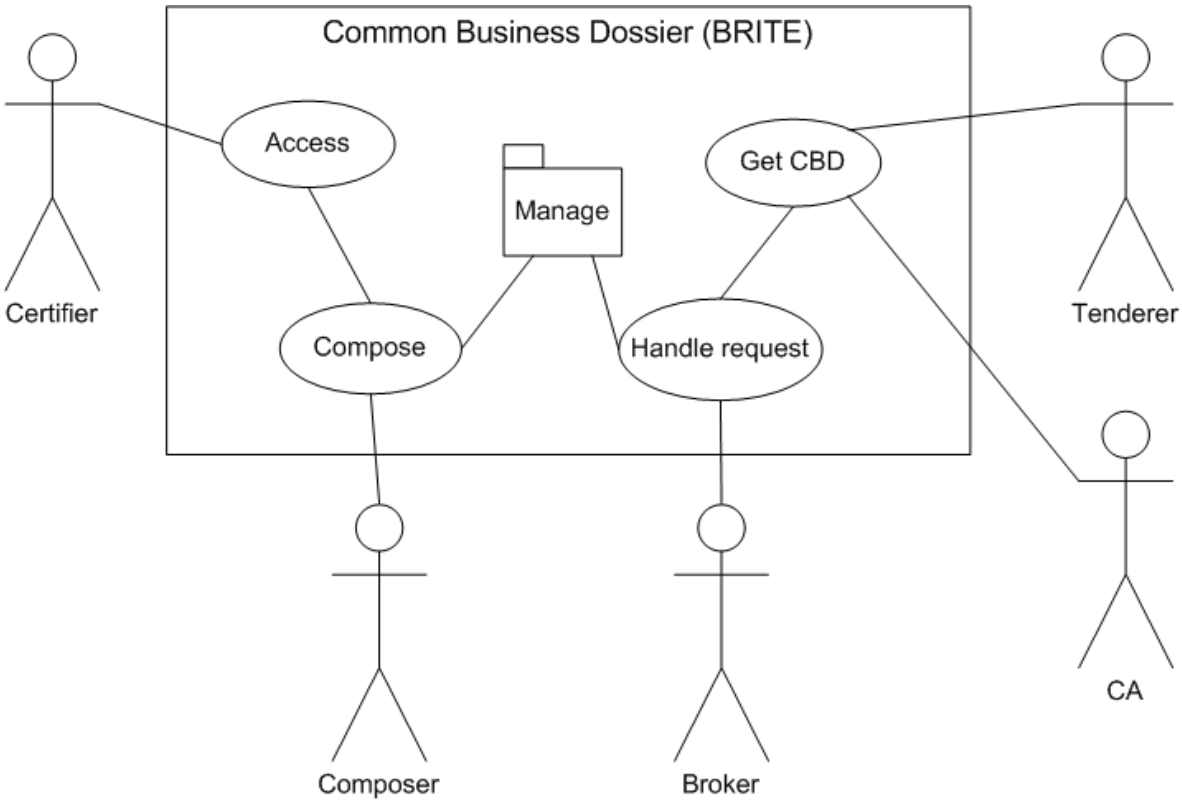

Figure 14: CBD use case

In this scenario, two new roles (called “actors” in UML vocabulary) have been created. The “Composer” acts as an agent between the certifiers and other information sources and the CBD system, while the “Broker” functions as an agent between the CA or tenderer and the CBD systems. The Composer then for example collects certifications and bundles them, whereas the Broker handles requests and their legitimateness.

To achieve a successful implementation of such an approach, several requirements need to be considered.

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		tech	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
Single access point for certificates is needed	CBD			x	x	x	x	x				
Addressee (CA) needs to be considered (legislation, language etc)	CBD			x	x	x		x	x	x	x	
Level of trust is important (through electronic signatures)	CBD			x	x	x		x			x	
Legal certainty and uniformity about whether to translate certificates or not	CBD			x	x	x	x	x				
Standard forms for common and repetitive data in certification process	CBD			x	x	x			x	x		
Certifying power needs to remain with the certifiers	CBD			x	x	x	x	x				
As certification is part of the tendering process, the same rules regarding **integrity and authority** apply as to other tools	CBD			x	x	x					x	x
As many different actors are involved, **access rights** are important	CBD			x	x	x		x			x	x

Table 14: IOP requirements – Common Business Dossier

5.3 e – Bourgogne (PROCURE)

e – Bourgogne *(European Commission (DG Information Society and Media) 2006)* is an initiative for a shared regional eGovernment platform for the Burgundy area in France. Within this initiative also a program for common eProcurement, called PROCURE, was launched. On the platform http://www.e-bourgogne.fr, which was launched in January 2005, all public institutions of the burgundy should be able to carry out their purchases. Another main target was to provide a single contact point especially for SME. For the implementation of this interoperable platform several key factors had to be considered:

- Shared vision and values between all regional public entities
- A strong commitment from key regional political entities, convinced that e-Bourgogne is one of the key factors, to ensure attractiveness and competitiveness of the region
- Significant support from national government entities
- Comprehensive education plan and educational tools
- Continuous communication plan and actions; broad involvement of regional council members
- Procurement process optimisation
- Open source software for reusability
- Open standards and alignment with European directives

During the PROCURE project several requirements for IOP were identified. Some are explicitly mentioned in the case description, others are here derived from the experiences described in the case.

Additionally, two remarkable concepts, helping to improve the eSourcing process, are described in the case: A so called purchasing tutorial should ensure the equal treatment of SME by providing a “coaching and education” program for them.

Furthermore, a “purchase observatory” should function as a statistical database. However, no details are mentioned, and more importantly it is not described how these concepts comply with the EU directives and its paradigm of equal treatment in particular.

Moreover, software reusability is identified as a critical factor to ensure IOP between different regions in Europe. It is emphasized that, due to the provision of open source code under GNU public license, the platform can be and actually is used in other regions.

Consequently, in the case it is distinguished between “Intra regional IOP”, i.e. sharing a single procurement platform for the region, and “Inter regional IOP”, i.e. usage of open semantic standards and public licenses.

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		tech	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
Maintain **electronic unity between different stages** of the tendering process	e-Bourgogne		x	x	x		x	x	x	x	x	x
Maintain **electronic unity between public entitie**s	e-Bourgogne		x	x	x		x	x	x	x	x	x
Centralisation of services fulfilment while maintaining autonomy of service provision through local authorities and local legal entities	e-Bourgogne		x	x	x		x	x				
Equal access possibilities, independent from company size	e-Bourgogne		x	x			x	x				
Simplification of the tendering process	e-Bourgogne			x			x	x	x			
Effective user authentication through electronic signature	e-Bourgogne			x	x			x			x	x
Software reusability to enable transferability	e-Bourgogne	x	x	x	x	x			x	x		
Workflows for supplier coaching are needed	e-Bourgogne			x			x	x				

Table 15: IOP requirements – e-Bourgogne

6 Interoperable eSourcing Process

In this chapter the findings so far will be presented and the requirements consolidated. In order to be able to deal with the large number of requirements, categories are introduced. In this chapter the correlation between these requirement categories and the five eSourcing phases is explained.

6.1 eSourcing IOP requirement categories

Based on the number and relevance of requirements related to certain matters, seven categories are introduced here:

- o general IOP requirements
- o platform technology
- o procedural requirements
- o eAuction
- o eSignatures
- o supplier evidences
- o standards and forms

In the following paragraph these categories will be presented shortly. A full list of these requirements can be found in Appendix B.

6.1.1 General IOP requirements

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
Free availability of the procurement system	42(2)		x	x	x		x	x	x	x	x	x
eProcurement systems need to be **non-discriminatory**	42(5) e-Bourgogne		x	x	x		x	x				
eProcurement systems need to be **interoperable**	42(5)		x	x	x		x	x	x	x	x	x

Provide **cross-organisational** and **cross-national procedures** to support national public tenders at a European scale.	GTCP			x	x	x			x	x	x						
Avoid the disruption of **electronic unity (between public entities and between eSourcing phases)**	GTCP e-Bourgogne	x	x	x	x	x			x	x	x	x	x	x			
Different implementations in pubic administrations need to be **connected**	GTCP	x	x										x	x			
For quality management and service improvement, **monitoring of cross-administrative workflows** is needed	GTCP	x	x	x	x				x	x			x				
Provide **guidelines** for participation in cross-organisational **collaborations**	GTCP	x	x	x	x	x			x								
Simplification of the tendering process	e-Bourgogne			x					x	x	x						
Centralisation of services fulfilment while maintaining autonomy of service provision through local authorities and local legal entities	e-Bourgogne		x	x	x				x	x							
Workflows for supplier coaching are needed	e-Bourgogne			x					x	x							
On a user level, **multi-lingual interfaces** and content display is required	GTCP	x	x	x	x	x			x		x						
Unrestricted and full direct access to the eProcurement system	38(6)			x	x				x	x			x	x			
CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x					x	x		x				
Unrestricted and full direct access to the eProcurement system	38(6)			x	x				x	x			x	x			
CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x					x	x		x				

Table 16: General IOP requirements

Though some requirements here might appear trivial, most of them involve much organisational or technical effort. Furthermore, a “global” view on IOP is necessary to be able to understand more detailed requirements in the context. Fair competition is one of the major issues

here, where it not only includes equal access possibilities through technical implementation, but also for example efficient and low-cost coaching of suppliers as well as a simplified tendering process.

Another important topic is collaboration of public institutions and contracting authorities. IOP concerns here are on the one hand cooperation and workflow guidelines, on the other technical frameworks and interfaces for connecting different systems and modules.

6.1.2 Platform technology

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		tech	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
The use of **electronic means** need to fulfil specific requirements	42(3)		x	x	x				x		x	x
eSourcing devices need to meet specific **minimum technological requirements**	42(5)		x	x	x						x	x
Electronic reception and eAuction tools need to have a **time lock functionality**	Annex X and 54(4)			x	x			x			x	
Infringement needs to be **detectable**	Annex X			x	x			x	x		x	x
Availability of **different persona / authorisation levels** is required	Annex X and CBD		x	x	x		x	x	x		x	
The **4 eyes principle** needs to be considered	Annex X			x	x			x			x	
Specified **information** need to be **stored** (traceability)	43		x	x	x	x		x	x	x	x	x
Simultaneous invitation of eAuction participants required	54(4)				x			x				
Means to **automatically verify the compliance** of workflow and data exchange **with legal obligations** are needed	GTCP and Annex X		x	x	x			x	x	x	x	
Software reusability to enable transferability	e-Bourgogne	x	x	x	x	x			x	x		
Provide an implementation of elaborated **timestamp mechanisms** to secure correct bidding processes due to differing time zones in the European Union	GTCP and Annex X			x	x						x	x

Regarding **information** communication **during the auction** the CA, the CA can choose to display either one or both of the following: - prices / values - number of participants	54(6)					x				x			x				
Display of relevant auction **rankings** at any time	54(6)					x			x	x			x				
Unrestricted and full direct access to the eProcurement system	38(6)			x	x			x	x				x	x			
CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x				x	x			x				

Table 17: IOP requirements – platform technology

The key phrase here was stated in the e-Bourgogne case: Software needs to be designed with respect to reusability. This way eSourcing modules or even entire systems can be transferred to other regions or even countries. Why re-invent the wheel? Especially in eTendering applications is not much room for process innovations anyway, as EU legislation provides a tight framework. But this very framework is not that precise concerning the technical implementation. Hence it is crucial to find a common baseline and make use of open source technologies.

6.1.3 Procedural requirements

Issue	**Source**	**Phases**					**IOP Level**										
		1	**2**	**3**	**4**	**5**	**org**		**sem**			**tech**					
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	Components	protocols					
Where **analogue docs** are still needed, traditional processes remain required	42(5)d		x	x				x									
Tenders notices above a specific threshold need to be published in **TED**	36(3)		x					x	x								
In case of **collaboration** - **type of procedure** needs to be **agreed** on	Directive		x	x	x		x	x									
Workflow support for tendering procedures is needed	Directive		x	x	x			x			x						
Workflows for supplier coaching are needed	e-Bourgogne			x	x		x	x									

Transformation of paper documents to electronic formats **(XML standards)**	GTCP	x	x	x	x		x			x	x			
Description and **linkage of internal processes and external processes** is needed	GTCP	x	x	x	x	x			x	x				

Table 18: IOP requirements – procedures and processes

As emphasized, the process-related EU regulation is very specific. But as a consequence it is easier to stick to these regulations and implement workflow tools. Many eSourcing platforms already support this.

Nonetheless, there are still some processes not directly influenced by European law. This is mainly the case, where no direct involvement of suppliers in the actual tendering process is concerned. Here collaboration procedures should be mentioned, where also similar mechanisms as in the actual tendering process need to be put in place.

In some cases the EU Directives require a certain process, but do not specify how it should look like. One example is the publication of tender notices in TED. However, here the eSenders application now is a major success and widely accepted.

6.1.4 eAuctions

Issue	**Source**	**Phases**					**IOP Level**					
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**tech**	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	Components	protocols
The CA has the **option** whether to use **eAuction** as an award procedure	42 (1)		x		x		x	x			x	
The CA has the following **options** for **auction closing conditions**: a) fixed date and time b) missing new values c) completed number of fixed phases	54(7)				x			x			x	

Regarding **information** communication **during the auction** the CA, the CA can choose to display either one or both of the following: - prices / values - number of participants	54(6)					x						x			x		
Full initial evaluation of eAuction participants is required	54(4)					x					x						
Workflows for supplier coaching are needed	e-Bourgogne			x	x					x	x						

Table 19: IOP requirements - eAuctions

One might argue to file this category under the previous one, as eAuctions just represent another awarding process. Yet the eAuction is relatively new to public eSourcing. As a consequence still many uncertainties remain. This does affect more the organisational, respectively legal than the technical implementation of eAuctions, because here Best Practices from the private sector can be applied. However, as was illustrated earlier, not all MS by now allow its use and only very few systems already have such a tool.

6.1.5 eSignatures

Issue	**Source**	**Phases**					**IOP Level**						
		1	**2**	**3**	**4**	**5**	**org**		**sem**		**Tech**		
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	Components	protocols	
Electronic signatures need to comply with Directive 1999/93/EC	42(5)		x	x	x			x			X		
Provide **advanced signature mechanisms** to foster the implementation of the European Directive on electronic signatures.	42(5)b GTCP		x	x	x		x	x		x	X	x	
Collaboration partners have to agree on **common level of trust in legal document exchange** and put means in place to support this	GTCP and CBD	x	x	x	x		x	x			X		

European **certification architectures** need a **common basis** or links between different national architectures to allow cross-border exchange of certified documents	GTCP			x	x	x		x	x			X	x
Means to **electronically sign documents in cross-border setups** are needed	GTCP	x	x	x	x			x			x	X	X
Align different **eSignature approaches** of the eProcurement platforms	Initiatives				x	x		x	x				
More **precise legislation** on the use of **eSignatures** is needed	Initiatives				x	x		x					
Single access point for certificates is needed	CBD				x	x	x	x	x				
Legal certainty and uniformity about whether to translate certificates or not	CBD				x	x	x	x	x				
Effective user authentication through electronic signature	e-Bourgogne				x	x			x			X	X
Standard forms for common and repetitive data in certification process	CBD				x	x	x			x	x		
Pan-European **accreditation system for CPS** required	Initiatives				x	x		x	x	x	x	X	X

Table 20: IOP requirements – eSignatures

eSignatures are of major IOP concern in eGovernment in general, but eProcurement is a central application field. Because of Directive 1999/93/EC *(The European Parliament and the Council of the European Union 1999)* now in theory the electronic signature should have the same effect as an “analogue” one. Still the real situation looks different. Most of the EU member states and eSourcing platform operators have different perceptions of eSignatures. Even more importantly, most countries accept specific certifiers only, what causes key problems in cross-boarder activities.

6.1.6 Supplier evidences

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		Tech	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	Protocols
Suppliers need to **inform** about their **personal situation** (with info from tax or social service authorities)	45		x	x	x	x	x	x	x	x	x	X
Suppliers need to **prove** their **suitability** for the desired professional activity (trade register)	46		x	x	x	x	x	x	x	x	x	X
Suppliers need to **inform** about their **financial situation** (bank statements)	47		x	x	x	x	x	x	x	x	x	X
Suppliers need to **prove** their **technical / professional abilities**	48		x	x	x	x	x	x	x	x	x	X
Suppliers need to prove **fulfilment of QA standards** (certificates)	49		x	x	x	x	x	x	x	x	x	X
Suppliers need to prove **fulfilment of environmental management standards** (certificates)	50		x	x	x	x	x	x	x	x	x	X
Addressee (CA) needs to be considered (legislation, language etc)	CBD			x	x	x		x	x	x	x	
Certifying power needs to remain with the certifiers	CBD			x	x	x	x	x				
Standard forms for common and repetitive data in certification process	CBD			x	x	x			x	x		
As certification is part of the tendering process, the same rules regarding **integrity and security** apply as to other tools	CBD			x	x	x		x			x	X

Table 21: IOP requirements – supplier evidences

Another critical IOP aspect is collecting and submitting certificates, which need to be provided by a supplier to take part in the tendering process. This process involves lots of communication activities that require secure workflows. So far no standards have been established, thus this process still often is handled manually and as a consequence disrupts electronic unity.

6.1.7 Standards and forms

Issue	Source	Phases					IOP Level					
		1	2	3	4	5	org		sem		Tech	
		Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	Protocols
When publishing **notices, standard forms** are to be used	35(1)		X	x				x	x			
For defined terms and categories **CPV** is to be applied	35(1)		X	x						x		
Provide necessary **information** in invitation: - access - schedule - candidates evaluation result in case of "economically most advantageous" award procedure - mathematical formula(s)	54(4)				x			x	x			
Achieve a **common understanding** on what distinguishes certain types of companies and related terms.	GTCP			x	x				x			
Provide acceptable **data formats for bids** to be implemented on a European level.	GTCP			x	x					x		
Common agreement on **data types and formats** for cross-organisational **document exchange**	GTCP	x	X	x	x					x		
On a user level, **multi-lingual interfaces** and content display is required	GTCP	x	X	x	x	x	x		x			
Standard forms (e.g. XML) for **various processes** are needed, for instance eAuctions, buyer-supplier communications, supplier evidences	Initiatives		X	x	x	x	x	x	x	x		
Standard forms for common and repetitive data in certification process	CBD			x	x	x			x	x		
Transformation of paper documents to electronic formats **(XML standards)**	GTCP	x	X	x	x		x		x	x		

Table 22: IOP requirements – standards and forms

Established standards and use of e.g. XML forms can ease a lot of work both for buyers and suppliers. In many areas these standards have been set up, often through EU legislation (e.g. use of CPV codes) or with the

help of initiatives. Nonetheless there are still many processes, which could be simplified using such standards.

6.2 eSourcing phases

In this section the IOP requirements and findings, respectively the related IOP categories, are presented and examined.

6.2.1 Demand Identification and Collaboration

Collaboration in a pan-European sense is reduced to few areas. It mainly is recognisable in the research field and when creating common technologies member states cooperate. A positive example here is the e-Bourgogne case, where due to the use of open-source technology the solution could be installed in other countries, too. Also in the survey *(Arnemann 2007)* executed for this thesis, some interesting answers have been provided. There is for example the case of the UK platform, closely collaborating and exchanging experiences with the Scottish solution provider. Similar experiences have been described by the Luxembourg service provider. The UK provider also emphasised the possibilities for buy-side collaboration with his tools and the fact that this is made use of very often.

On the contrary, cross-boarder collaboration on the buy-side, i.e. cross-boarder set up of contracts, does in fact not take place at all. Mainly this is caused by legal and technical uncertainties. Therefore, clear guidelines need to be provided by the European Union.

Another important topic here is the integration of ERP (Enterprise Resource Planning) into the eSourcing process. These systems are somewhat new to the public sector, thus strategies and Best Practices are still emerging.

6.2.2 Specification

The three middle eSourcing phases “Specification”, “Tendering” and “Awarding” can be visualised as a flowchart, since their processes are

mainly straightforward. The charts will be used to illustrate the related IOP issues identified.

One could argue that also the other eSourcing phases could be docked to this flowchart. But it will be shown that the processes of these phases do not necessarily follow any chronological order.

However, in this phase the flowchart will be used to illustrate the collected requirements. Two parties with each two different roles can be found. On the one hand there is the buy side. Processes that take place “analogously”, i.e. through discussions, paper work etc. and more precisely can not be executed in the eSourcing system, are assigned to the general role “Contracting Authority”. Those tasks that can be and are performed with the help of the eSourcing systems are assigned to this role. Here it is referred to as “back-office” as the tenderer does not have access to it. The sell side has similar roles, with the difference that the tenderer operates in the “front-office” only. Since a pan-European eSourcing system is subject of this thesis, tenderer and CA are from different member states.

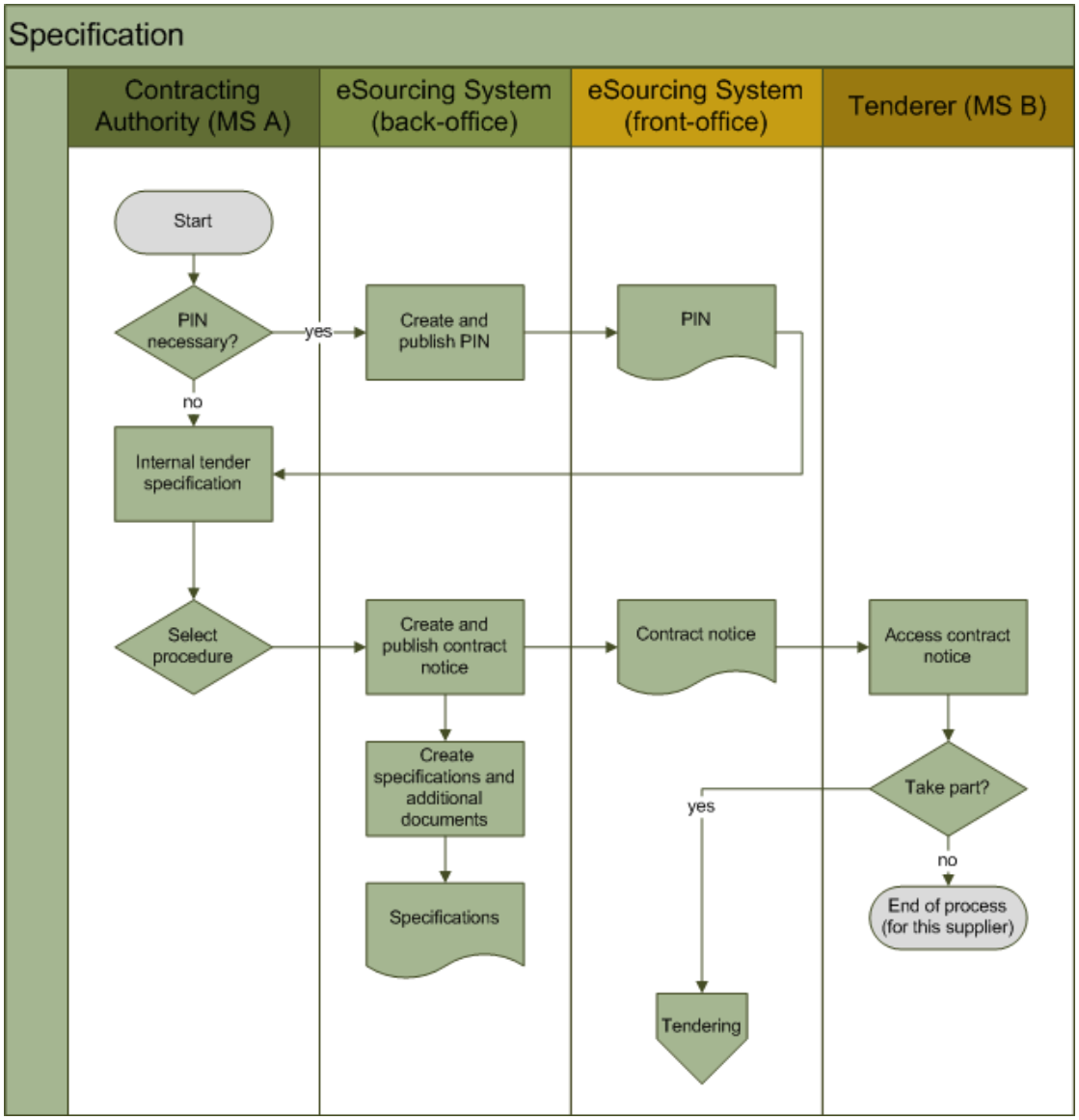

Figure 15: Specification process (flow)

The specification and publication of tender notices is surely the most advanced phase in the eSourcing lifecycle, considering interoperability. To a great extent this is dedicated to EU legislation which defines several obligations and therefore standards the same time. To be able to locate the actual process described here, an additional table is introduced, which further explains and identifies the processes in the flowchart.

#	Process	Type	Pre-decessor	Successor	Details
1	PIN necessary?	Decision	n/a	1/4	Based on EU threshold the CA needs to decide whether to publish a PIN or not
2	Create and publish PIN	Process	1	3	(y) PIN is specified and published on the eSourcing platform and TED

3	PIN	Document	2	4	
4	Internal tender specification	Process	1/3	5	The tender, respectively contact details are specified internally
5	Select procedure	Decision	4	6	Based on EU regulations and nature of contract the CA selects a tendering procedure
6	Create and publish contract notice	Process	5	7	The information are published in the format required by the EU
7	Contract Notice	Document	6	8	
8	Create specifications and additional documents	Process	7	9	Additional specifications such as technical documentation is filed in the eSourcing system
9	Specifications	Document	8	10	
10	Access contract notice	Process	9	11	
11	Take part?	Decision	10	12/13	Based on the given information a supplier decides whether to take part or not
12	Tendering	Reference	(y) 11	next phase	
13	End of process (for this supplier)	End	(n) 11	n/a	

Table 23: Specification process (table)

Most importantly authorities need to publish their tenders (if the value is above a defined threshold) EU-wide on the TED website (#2). For this purpose it also defines SIMAP as the access points for forms that can be used for the specification of these tender notices. Here XML forms became very popular, so that notices can easily be applied or adopted for various purposes. Furthermore CPV was established as a standard for common terms. All this has many positive effects for both sides, buyers and suppliers.

On most platforms suppliers have their own profile and can create and save detailed search criteria for tender notices matching their interests. Usually it is possible to directly access information on past contracts or track deadlines of currently running ones.

As XML allows choosing a display format independent from the content it is possible to present the most important information in an official EU-language, as it happens on TED.

6.2.3 Tendering

In this tendering phase there is an additional role, the certifier. He provides for example certificates and proofs about the supplier's legal status or financial situation. These evidences are required in the tendering process by Directive definition. Important to mention is, that it can be more than one certifier, as usually diverse proofs from different authorities need to be provided.

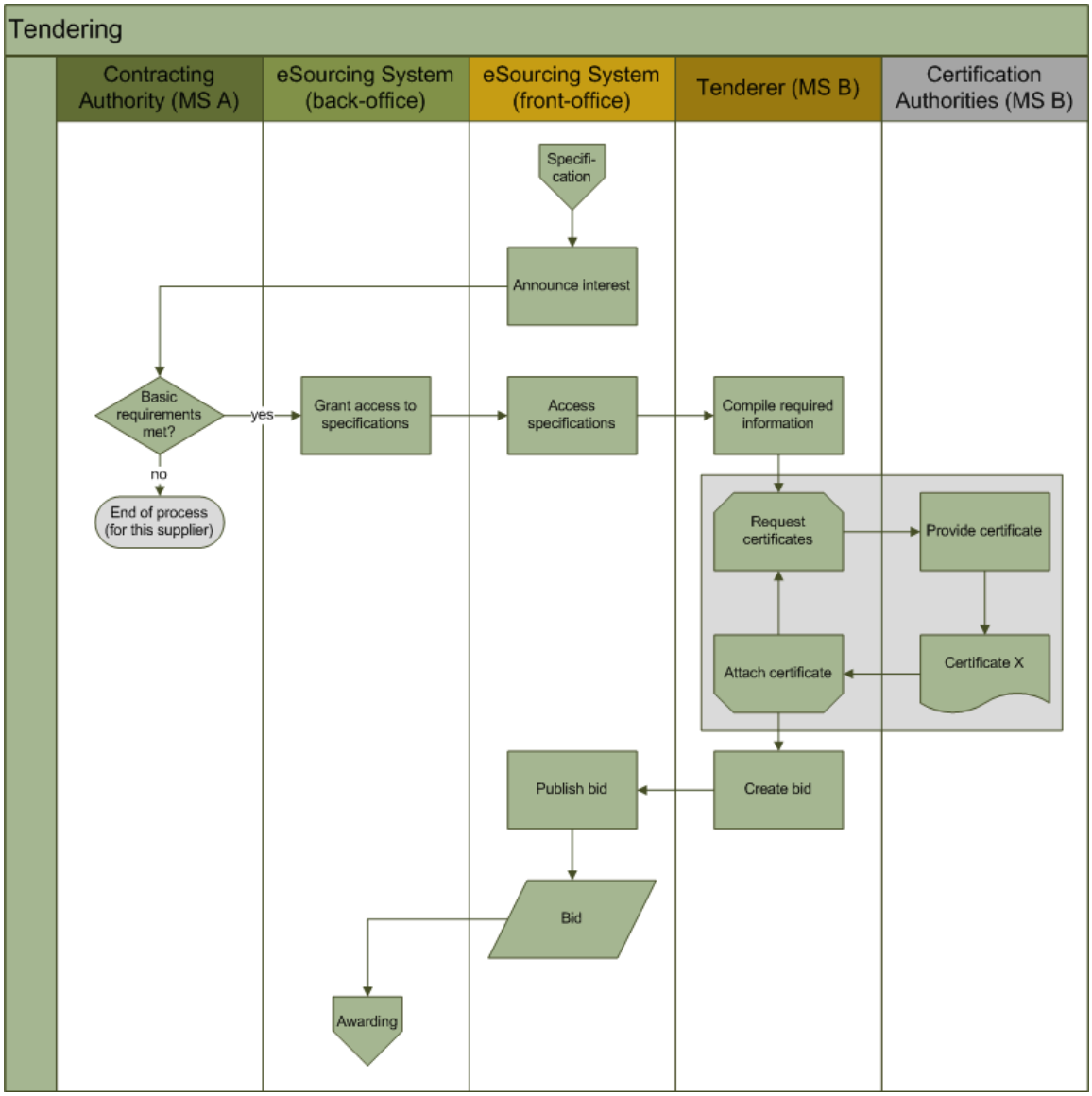

Figure 16: Tendering process (flow)

Especially the European Union has been very active during the last years, pushing many initiatives that were related to eTendering.

When analyzing the IOP requirements listed here, key IOP categories of eTendering are supplier evidences and tendering procedures.

#	Issue	Type	Successor	Details
1	Announce interest	Process	2	Supplier indicates his interest in participation. Accessing the contract notice with the supplier account e.g. would be sufficient
2	Basic requirements met?	Decision	(n)3/(y)4	CA checks supplier for basic requirements
3	End of process (for this supplier)	End	n/a	
4	Grant access to specifications	Process	5	CA provides additional information for supplier, e.g. through access rights
5	Access specifications	Process	6	Supplier accesses information
6	Compile required information	Process	7	Supplier internally collects required information
7	Request certificate	Process (loop start)	8	Supplier requests certificate at the responsible authority
8	Provide certificate	Process	9	If conditions are fulfilled the certification authority provides the certificate
9	Certificate X	Document	10	
10	Attach certificate	Process (loop end)	7/11	Supplier attaches certificate to the collected information
11	Create bid	Process	12	Supplier creates bid in the requested format
12	Publish bid	Process	13	Supplier publishes bid in the eSourcing system
13	Bid	Data	14	
14	Awarding	Reference	next phase	

Table 24: Tendering – process (table)

As emphasized by the two case GTCP and CBD providing supplier evidences, respectively obtaining the appropriate certificates (#7-10), is a sophisticated process. The following table give an overview of the information to be provided by the candidates:

Issue	Institution / Authority involved	Documents	Standards
Personal situation	social services tax authority	judicial records certificates	
Suitability to pursue the professional activity	business register	excerpts / certificates	
Economic and financial standing	bank	bank statement balance sheets turnover statement	
Technical and/or professional ability		lists	n/a
Quality assurance standards	QA certifiers	certificate	(European Standards)
Environmental management standards	certifiers	certificate	EMAS

Table 25: Types of evidences

6.2.4 Awarding

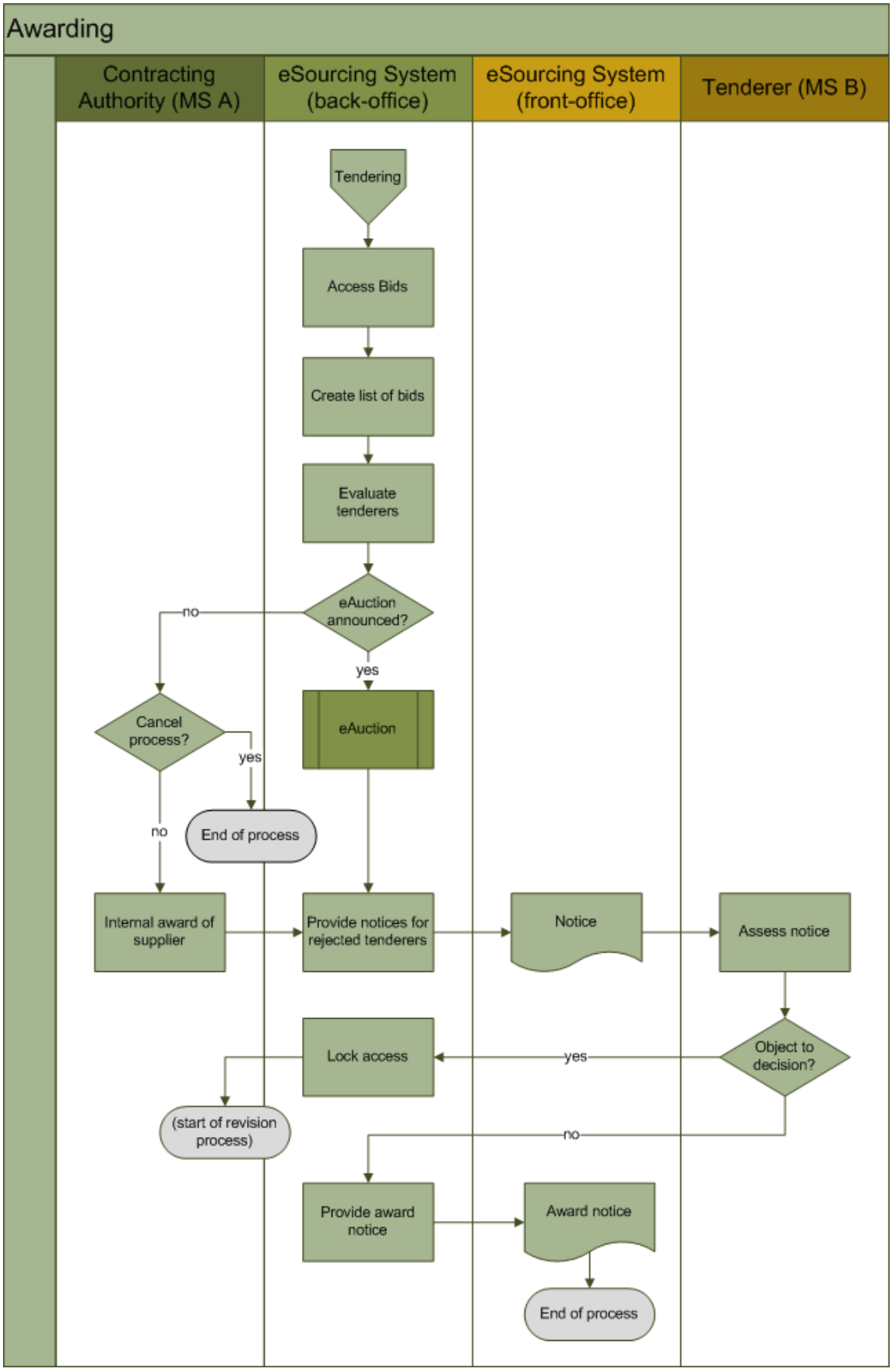

Figure 17: Awarding process (flow)

Though this stage is developing quickly, many issues today hold lots of room for improvement. First of all, the possibility of running eAuctions as an award procedure is relatively new to public buyers. Therefore, here much can be learned from the private sector, where eAuctions already are an established instrument.

#	Process	Type	Successor	Details
1	Access Bids	Process	2	CA inspects bids
2	Create list of bids	Process	3	To be able to compare the bids, lists (e.g. based on quantifiable values) are created with the help of the eSourcing system
3	Evaluate tenderers	Process	4	According to these lists the tenderers and their bids are evaluated
4	eAuction announced?	Decision	(y)5/(n)6	In case an eAuction is planned, it has been announced in the contract notice
5	eAuction	Process (module)	9	eAuction takes place. This is a rather complex procedure and type of processes depend on the setup of the eAuction
6	Cancel process?	Decision	(y)7/(n)8	It might occur that no supplier has submitted a satisfactory bid
7	End		n/a	
8	Internal award of supplier	Process	9	CA selects its favourite supplier
9	Provide notices for rejected tenderers	Process	10	CA send notices to rejected suppliers
10	Notice		11	
11	Assess notice	Process	12	Supplier checks the rejection notice
12	Object to decision?	Decision	(y)13/(n)15	In case the supplier believes the CA decision was unjustified, he can object
13	Lock access	Process	14	Access to all data is locked till the awarding procedure is revised by the appropriate instances
14	End (start of revision process)		15	
15	Provide award notice	Process	16	CA publishes award notice and announces winner of contract
16	Award notice	Document		

Table 26: Awarding process (table)

However, eAuctions can have different looks and countless setup possibilities. The fact that it is so cost-effective and as result usually way more liked by buyers than by suppliers adds up to the complexity. Hence especially in the public sector, where tenders are supposed to take place fair and transparent, not only awarding institutions, but more importantly the EU as the legislative part here, need to handle these tools very

carefully. Consequently, on the organisational IOP level, this is something to work on in the short run.

In case of eAuction notification one possible approach is at hand. Section IV.2.2 of the standard XML form for contract notice is where information about eAuctions is to be provided. However, so far this information is rather limited. A “classic” XML template, which can be obtained on request on CIRCA *(2008)*, a EU collaboration platform, looks like the following.

----------{start of XML code}----------

```
<?xml version="1.0" encoding="UTF-8"?>
<DOC>
	<TABLE>
		{...}
		<ROW>
			<CELL ColumnIndex="1">
			<P>
				TransUnit Id="placeholder1" bold="y">
				    lang lv="EN">IV.2.2) An electronic auction will be used</lang>
				</TransUnit>
				TransUnit Id="placeholder2" bold="y">
				    lang lv="EN">yes</lang>
				</TransUnit>
				TransUnit Id="placeholder3" bold="y">
				    lang lv="EN">no</lang>
				</TransUnit>
			</P>
			</CELL>
		</ROW>
		<ROW>
			<CELL ColumnIndex="1">
			<P>
				<TransUnit Id="placeholder4" bold="y">
				    <lang lv="EN">If yes,</lang>
				</TransUnit>
				<TransUnit Id="placeholder5">
				    <lang lv="EN">additional information about electronic auction</lang>
				</TransUnit>
			</P>
			</CELL>
		</ROW>
		{...}
	</TABLE>
</DOC>
```

----------{end of XML code}----------

This of course is only a significantly shortened version of the real XML file. Many sections are missing and usually there are value tags for each of the 23 official EU languages. As indicated before, this only represents that part relevant for eAuction information. Now the marked part with “placeholder5” could for example be subject to a change, as new fields could be added, such as type of eAuction closing or else.

Anyhow these XML, respectively DTD (Document Type Definition) are under constant development through CIRCA.

6.2.5 Contract Management

One might argue, contract management should be considered a post-awarding phase. To some extent this is of course true. Especially when talking about framework agreements, which often are the result of the eSourcing phases described before. In that case framework agreements are the basis for other processes and tools, as for example eCatalogue ordering.

But on the buyer side it is also important to have consistent access to “one-off” contracts. Though, due to the strict regulation, contracting authorities need to handle supplier information very carefully, it is crucial to track the compliance with the terms agreed on, e.g. a service level agreement (SLA). It can also proof useful to be able to access information of an earlier contract on a specific service or goods package.

Apparently this subject did not yet receive the attention as for example eTendering did.

Good practices can certainly be found in the private sector, yet their non-critical application is problematic, as the supplier role in private and public sector procurement is hardly comparable in this context. In order not to jeopardize the contract itself, the rights of the supplier and his competitors need to be considered carefully. As this process hardly can be carried out over and over again for each contract, fool- and more importantly legislation-proof workflows need to be established. Only then tools can be of any help in public contract management.

7 Evaluation and Outlook

In this thesis it becomes clear that public eSourcing is a very sophisticated process. The range of IOP requirements is huge and spans over all five eSourcing defined here. To be able to get hold of this problem, these requirements need to be put in some kind of order. For this purpose seven categories have been defined. Meeting the requirements of these categories supports the eSourcing process as a whole. This correlation can be visualised with the help of Porter's value chain *(Porter 1985)*. Here the eSourcing phases represent the primary activities, where the requirements categories (respectively meeting these requirements) stand for the supporting activities.

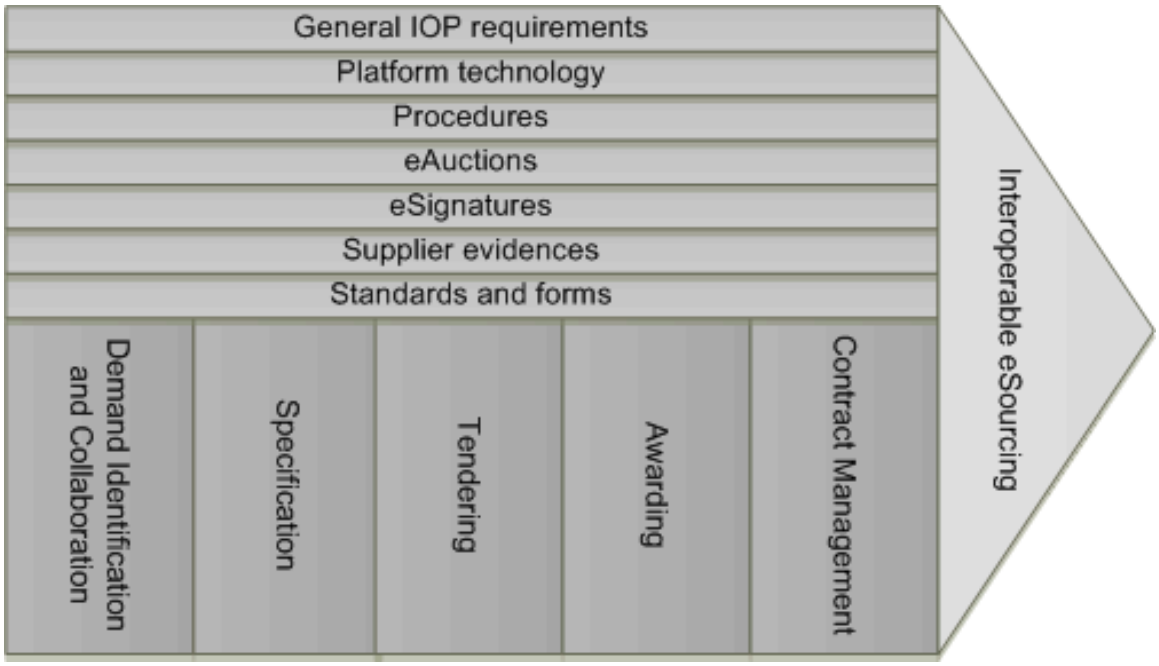

Figure 18: eSourcing IOP value chain

Public electronic Sourcing, especially within the European Union, is a highly regulated matter. There are countless rules, regulations and definitions on tendering procedures and technical, and security requirements in particular.

The EU aims to level the chances for all suppliers in the common market.

To some point this helps fostering IOP, as consistent processes ease work for suppliers in the tendering procedures. Some would argue that even

more regulations are required. This is in fact true for some IOP barriers. Language for example is still a problem. In many member states eSourcing platforms are only available in the domestic language. It would be a quantum leap if at least one common language would be introduced in the large.

Another major barrier is the use of eSignatures. Though Directive 1999/93/EC, as its title says, originally was designed for a “community framework for electronic signatures”, its legal advice apparently was too vague, leaving too much room for interpretations. Furthermore, by now the Directive is more than 8 years old, and security technology has developed fast. Hence an amendment is overdue.

On the other hand this heavy legislative package is often an IOP barrier itself. Throughout the full eSourcing process there are lots of possible interfaces available to connect additional tools as support, to design eSourcing even more effective.

Under normal (private sector) conditions sourcing can function as a cost saving lever, but, keeping the figurative talk, when you can not fully move this lever, huge potentials remains unexploited.

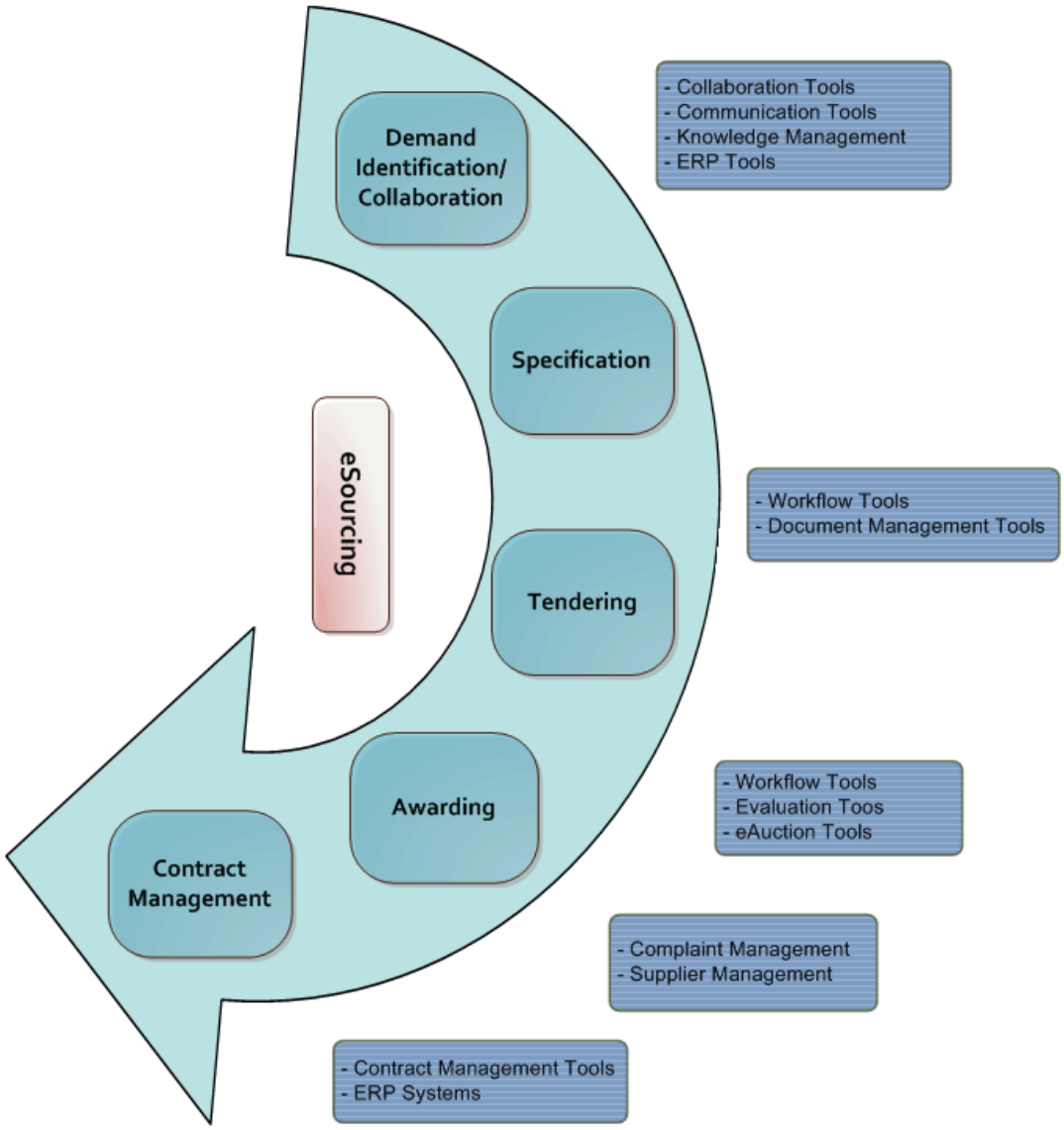

Figure 19: eSourcing tools

Of course some of these tools shown in figure 19 already have been integrated into eSourcing platforms. But, especially those dealing with suppliers in some way are almost impossible to deploy. There is always the danger a rejected tenderer might find a reason to object to awarding decisions, because of careless handling of supplier data. Therefore, today it is impracticable to integrate supplier management tools of any type into public eSourcing platforms.

To conclude, what was so far stated implicitly only, is visualized on a simple level with the following figure.

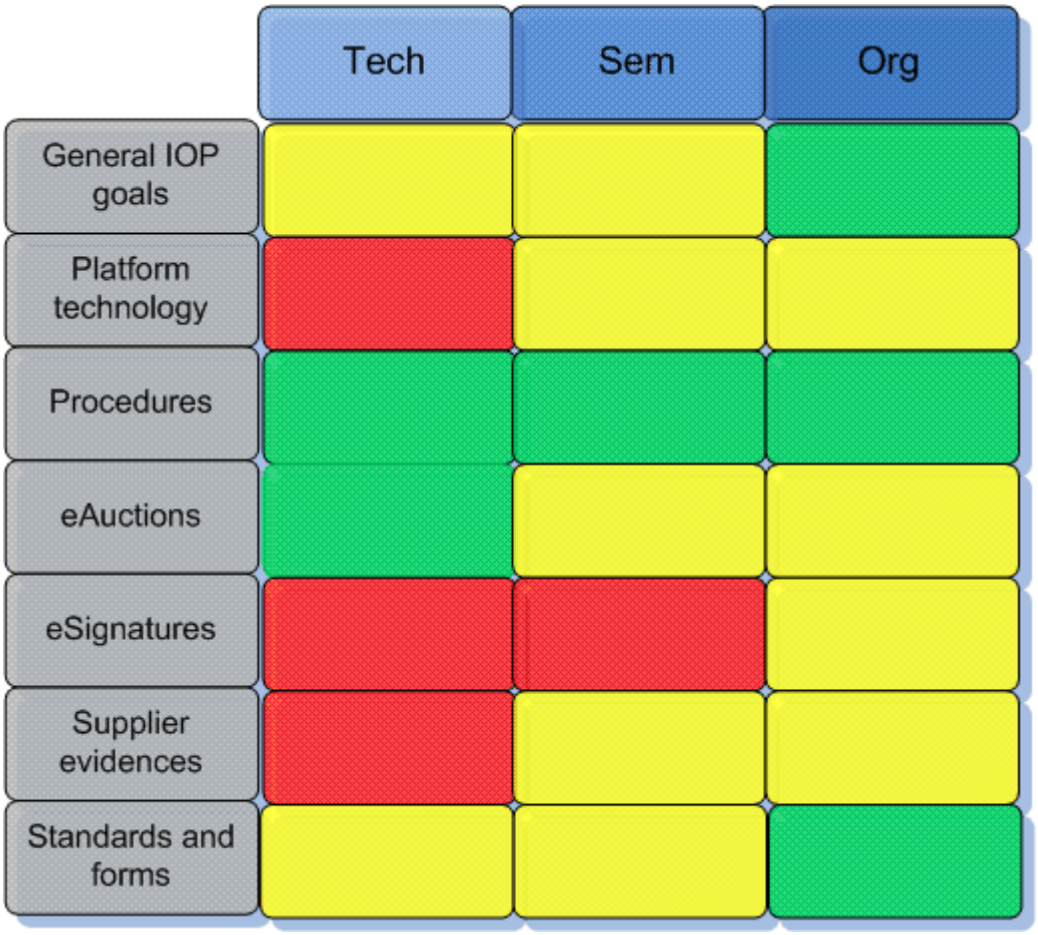

Figure 20: IOP progress

It shows the IOP status, respectively progress of the seven defined categories. Important to mention, it is only a relative demonstration, i.e. a green coloured field does not necessarily represent a fully interoperable situation, but that there is more progress than in other environments.

Interoperability in public eSourcing is constantly evolving, some segments faster than others. There is continuous input from diverse directions. One major challenge will be to align these various and sometimes conflictive interests, another to find the right balance of fair and transparent yet also efficient and cost-saving eSourcing.

Appendix A - Questionnaire

Questions:

1) Who operates the system? (examples: public/private institution, PPP)

2) How are security issues handled? (use/type of signatures, personal identity)

3) Do suppliers/buyers need additional software? If so, please explain shortly.

4) What phases and issues are supported by your system? Please mark. Feel free to add.

- Collaboration
- Workflow support
- Tender Specification
- Tendering (Receipt of Tenders etc.)
- Awarding
- eAuction
- Contract Management

5) Do you have standard procedures/formats for gathering required supplier information (e.g. business register, financial information etc.)? Please explain.

6) Do/did public institutions cooperate in the eSourcing/eProcurement process using your system? (examples: bundling of demand/mutual tender specification)

If yes, please shortly describe the type and process of collaboration and whether it is supported by your system in some way.

7) Did you also experience trans-border cooperation? If yes, please shortly describe.

Appendix B – Consolidated requirements

Category	Issue	Source	Phases					IOP Level					
			1	2	3	4	5	org		sem		tech	
			Demand	Specification	Tendering	Awarding	Contract M	organisation	process	content	data	components	protocols
General IOP requirements	**Free availability** of the procurement system	42(2)			x			x	x				
	eProcurement systems need to be **non-discriminatory**	42(5)		x	x	x		x	x				
	eProcurement systems need to be **freely available**	42(5)		x	x	x		x	x			x	x
	eProcurement systems need to be **interoperable**	42(5)		x	x	x		x	x	x	x	x	x
	Provide **cross-organisational** and **cross-national procedures** to support national public tenders at a European scale.	GTCP		x	x	x		x	x	x			
	Avoid the disruption of **electronic unity (between public entities and between eSourcing phases)**	GTCP e-Bourgogne	x	x	x	x	x	x	x	x	x	x	x
	Different implementations in pubic administrations need to be **connected**	GTCP	x	x								x	x
	For quality management and service improvement, **monitoring of cross-administrative workflows** is needed	GTCP	x	x	x	x		x	x			x	
	Provide **guidelines** for participation in cross-organisational **collaborations**	GTCP	x	x	x	x	x	x					
	Simplification of the tendering process	e-Bourgogne			x			x	x	x			
	Equal access possibilities, independent from company size	e-Bourgogne		x	x			x	x				
	Centralisation of services fulfilment while maintaining autonomy of service provision through local authorities and local legal entities	e-Bourgogne		x	x	x		x	x				
	Workflows for supplier coaching are needed	e-Bourgogne			x			x	x				
	On a user level, **multi-lingual interfaces** and content display is required	GTCP	x	x	x	x	x	x		x			

	Unrestricted and full direct access to the eProcurement system	38(6)				x	x			x	x				x	x
	CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x					x	x			x	
Platform technology	The use of **electronic means** need to fulfil specific requirements	42(3)		x	x	x						x			x	x
	eSourcing devices need to meet specific **minimum technological requirements**	42(5)		x	x	x									x	x
	Electronic reception and eAuction tools need to have a **time lock functionality**	Annex X and 54(4)				x	x				x				x	
	Infringement needs to be **detectable**	Annex X				x	x				x	x			x	x
	Availability of **different persona / authorisation levels** is required	Annex X and CBD		x	x	x				x	x	x			x	
	The **4 eyes principle** needs to be considered	Annex X				x	x				x				x	
	Specified **information** need to be **stored** (traceability)	43		x	x	x	x				x	x	x	x	x	x
	Simultaneous invitation of eAuction participants required	54(4)					x				x					
	Means to **automatically verify the compliance** of workflow and data exchange **with legal obligations** are needed	GTCP and Annex X		x	x	x					x	x	x	x		
	Software reusability to enable transferability	e-Bourgogne	x	x	x	x	x					x	x			
	Provide an implementation of elaborated **timestamp mechanisms** to secure correct bidding processes due to differing time zones in the European Union	GTCP and Annex X				x	x								x	x
	Regarding **information** communication **during the auction** the CA, the CA can choose to display either one or both of the following: - prices / values - number of participants	54(6)					x					x			x	
	Display of relevant auction **rankings** at any time	54(6)					x				x	x			x	
	Unrestricted and full direct access to the eProcurement system	38(6)				x	x			x	x				x	x

	CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x			x	x		x	
Processes	Where **analogue docs** are still needed, traditional processes remain required	42(5)d		x	x				x				
	Tenders notices above a specific threshold need to be published in **TED**	36(3)		x					x	x			
	In case of **collaboration** - **type of procedure** needs to be **agreed** on	Dir		x	x	x		x	x				
	Workflow support for tendering procedures is needed	Dir		x	x	x			x			x	
	Workflows for supplier coaching are needed	e-Bourgogne			x	x		x	x				
	Transformation of paper documents to electronic formats **(XML standards)**	GTCP	x	x	x	x		x		x	x		
	Description and **linkage of internal processes and external processes** is needed	GTCP	x	x	x	x	x		x	x			
eAuctions	The CA has the **option** whether to use **eAuction** as an award procedure	42 (1)		x		x		x	x			x	
	The CA has the following options for **auction closing conditions**: a) fixed date and time b) missing new values c) completed number of fixed phases	54(7)				x			x			x	
	Regarding **information** communication **during the auction** the CA, the CA can choose to display either one or both of the following: - prices / values - number of participants	54(6)				x				x		x	
	Full initial evaluation of eAuction participants is required	54(4)				x			x				
	Workflows for supplier coaching are needed	e-Bourgogne			x	x		x	x				
eSignatures	**Electronic signatures** need to comply with Directive 1999/93/EC	42(5)							x			x	
	Provide **advanced signature mechanisms** to foster the implementation of the European Directive on electronic signatures.	42(5)b GTCP		x	x	x		x	x		x	x	x

	Collaboration partners have to agree on **common level of trust in legal document exchange** and put means in place to support this	GTCP and CBD	x	x	x	x		x	x				x		
	European **certification architectures** need a **common basis** or links between different national architectures to allow cross-border exchange of certified documents	GTCP		x	x	x		x	x				x	x	
	Means to **electronically sign documents in cross-border setups** are needed	GTCP	x	x	x	x		x				x	x	x	
	Align different **eSignature approaches** of the eProcurement platforms	Initiatives			x	x		x	x						
	More **precise legislation** on the use of **eSignatures** is needed	Initiatives			x	x		x							
	Single access point for certificates is needed	CBD			x	x	x	x	x						
	Legal certainty and uniformity about whether to translate certificates or not	CBD			x	x	x	x	x						
	Effective user authentication through electronic signature	e-Bourgogne			x	x			x				x	x	
	Standard forms for common and repetitive data in certification process	CBD			x	x	x			x	x				
	Pan-European **accreditation system for CPS** required	Initiatives			x	x		x	x	x	x	x	x	x	
Supplier evidences	**Suppliers** need to **inform** about their **personal situation** (with info from tax or social service authorities)	45		x	x	x	x	x	x	x	x	x	x	x	
	Suppliers need to **prove** their **suitability** for the desired professional activity (trade register)	46		x	x	x	x	x	x	x	x	x	x	x	
	Suppliers need to **inform** about their **financial situation** (bank statements)	47		x	x	x	x	x	x	x	x	x	x	x	
	Suppliers need to **prove** their **technical / professional abilities**	48		x	x	x	x	x	x	x	x	x	x	x	
	Suppliers need to prove **fulfilment of QA standards** (certificates)	49		x	x	x	x	x	x	x	x	x	x	x	
	Suppliers need to prove **fulfilment of environmental management standards** (certificates)	50		x	x	x	x	x	x	x	x	x	x	x	

	Addressee (CA) needs to be considered (legislation, language etc)	CBD				x	x	x		x	x	x	x				
	Certifying power needs to remain with the certifiers	CBD				x	x	x	x	x							
	Standard forms for common and repetitive data in certification process	CBD				x	x	x			x	x					
	As certification is part of the tendering process, the same rules regarding **integrity and security** apply as to other tools	CBD				x	x	x		x				x	x		
Standards and forms	When publishing **notices, standard forms** are to be used	35(1)		x	x					x	x						
	For defined terms and categories **CPV** is to be applied	35(1)		x	x								x				
	Provide necessary **information** in invitation: - access - schedule - candidates evaluation result in case of “economically most advantageous” award procedure - mathematical formula(s)	54(4)					x			x	x						
	Achieve a **common understanding** on what distinguishes certain types of companies and related terms.	GTCP				x	x					x					
	Provide acceptable **data formats for bids** to be implemented on a European level.	GTCP				x	x						x				
	Common agreement on **data types and formats** for cross-organisational **document exchange**	GTCP	x	x	x	x							x				
	On a user level, **multi-lingual interfaces** and content display is required	GTCP	x	x	x	x	x		x			x					
	Standard forms (e.g. XML) for **various processes** are needed, for instance eAuctions, buyer-supplier communications, supplier evidences	Initiatives		x	x	x	x		x	x	x	x					
	Standard forms for common and repetitive data in certification process	CBD				x	x	x				x	x				
	Transformation of paper documents to electronic formats **(XML standards)**	GTCP	x	x	x	x			x			x	x				

	CA has the **option** to implement a so called "**Buyer Profile**" in their procurement system	35(1)	x	x	x	x			x	x		x	

Appendix C – TED cross-boarder statistics

	AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IS	IT	JP	LI	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	UK	US	OTHER
AT	403	1	0	1	1	1	23	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0
BE	1	388	0	1	0	0	3	0	0	1	0	10	0	0	0	0	3	0	0	0	0	0	0	7	0	0	0	0	0	0	0	1	0	0
BG	1	0	336	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
CH	2	0	0	119	0	0	13	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
CY	0	0	0	0	51	0	0	0	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	1	0	0	0	0	586	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	5	2	0	2
DE	12	1	0	7	0	0	3046	1	0	0	0	9	6	13	4	0	12	1	0	1	1	0	1	10	0	2	0	0	1	0	0	4	8	2
DK	3	0	0	0	0	1	8	292	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	4	1	0
EE	0	0	0	2	0	0	1	0	118	0	4	0	0	0	0	0	1	0	0	0	0	1	0	2	0	1	0	0	0	0	0	1	0	0
ES	1	3	3	1	1	0	7	0	0	2268	0	3	0	0	0	0	5	0	0	0	0	0	0	3	2	0	0	0	4	0	0	10	1	2
FI	1	0	0	0	0	0	3	0	2	0	296	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0
FR	4	23	0	10	0	0	35	0	1	11	3	7575	3	1	7	0	26	1	0	0	2	1	0	9	1	2	1	0	1	0	0	13	4	42
GR	1	0	0	0	0	0	10	0	0	1	0	3	360	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1
HU	5	1	0	0	0	2	3	1	0	0	0	1	0	431	0	0	2	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	4
IE	0	1	0	1	0	0	6	0	0	0	1	1	1	0	206	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	1	45	0	2
IS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT	6	0	0	2	0	0	1	0	0	3	2	3	1	0	1	0	1417	0	0	6	3	1	2	2	2	1	2	0	0	0	0	4	4	1
JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LI	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LT	0	1	0	0	0	0	3	0	3	0	3	0	0	0	1	0	1	0	0	509	1	5	0	2	0	1	0	0	0	0	0	2	1	2
LU	0	3	0	1	0	0	7	0	0	0	0	3	0	0	0	0	0	0	0	0	67	0	1	1	0	0	0	0	0	0	0	0	0	0
LV	1	1	0	0	0	1	3	0	0	0	2	2	0	0	0	0	0	0	0	8	1	322	0	0	0	2	0	0	2	0	0	1	1	2
MT	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	25	0	0	0	0	0	0	0	0	1	0	0
NL	1	6	0	0	0	0	8	0	0	1	0	3	0	0	1	0	1	0	0	0	0	1	0	830	0	0	0	1	1	0	0	3	1	5
NO	0	2	0	0	0	0	3	11	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	353	0	0	0	9	0	0	9	1	2
PL	5	0	0	5	0	3	15	1	0	2	1	2	0	0	1	0	4	0	0	0	0	0	0	3	0	2759	8	0	2	2	5	18	5	0
PT	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0	0	0	0	1	0	0
RO	9	0	0	0	0	1	20	1	0	1	1	4	3	7	0	0	3	0	0	0	0	0	0	2	0	0	0	977	0	0	0	2	4	1
SE	1	3	0	2	0	0	3	7	1	0	3	3	0	1	1	0	0	1	0	0	0	0	0	2	5	0	0	0	606	1	0	3	3	3
SI	7	0	0	1	1	2	3	1	0	0	1	3	0	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	1	308	2	0	0	1
SK	1	0	0	0	0	6	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	181	0	0	0
UK	3	4	0	2	0	0	12	3	0	1	1	5	1	0	11	0	2	0	0	0	0	0	0	5	0	2	0	3	1	0	0	1746	11	8
US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2

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