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Ansgar Mondorf

University of Koblenz-Landau, Germany, mondorf@uni-koblenz.de

Daniel M. Schmidt

University of Koblenz-Landau, Germany, dmschmidt@uni-koblenz.de

Maria A. Wimmer

University of Koblenz-Landau, Germany, wimmer@uni-koblenz.de

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ENSURING SUSTAINABLE OPERATION IN COMPLEX ENVIRONMENT: THE PEPPOL PROJECT AND ITS VCD SYSTEM

Ansgar Mondorf, mondorf@uni-koblenz.de
Daniel M. Schmidt, dmschmidt@uni-koblenz.de
Maria A. Wimmer, wimmer@uni-koblenz.de

Institut for IS Research, University of Koblenz-Landau, Germany

Abstract

To facilitate EU-wide interoperability in public eProcurement, the European Commission co-funds the PEPPOL project. PEPPOL aims at setting up pan-European pilot solutions that conjointly exist with national infrastructures. The project has several building blocks enabling seamless use of European-wide eProcurement solutions ranging from eSignatures to electronic invoices. One of the key building blocks is the Virtual Company Dossier (VCD), an electronic document container that carries attestations and candidate statements required to evidence the fulfillment of non-exclusion and selection criteria in public tendering procedures. PEPPOL will settle a set of new concepts, adopt evolving standards, involve several stakeholders, and therewith influence ways of working in electronic public procurement. As there are many stakeholders involved in the VCD project we assume that changes will occur on very frequent basis. One of the critical questions that the development of VCD is currently facing is how to govern the project results and how to ensure sustainable operation of the solutions beyond the project. From the PEPPOL perspective governance could be defined as the process to effectively operate the VCD solutions and to propose how to keep them alive after the end of the project (long-term sustainability). In this paper we introduce key elements for governance of PEPPOL solutions within and beyond the project in order to ensure long-sustainable operation in a complex environment. The VCD will be used to exemplify the overall complexity and challenges for setting up an effective governance process.

Keywords: eProcurement, Interoperability, Governance, Innovation.

1 INTRODUCTION

Since 2003, interoperability in e-government has been largely investigated in research (see e.g. [1, 2, 7, 10, 11]). Interoperability refers to the capability of ICT systems (and their underlying business processes) to exchange information or services directly to operate effectively together (cf. [8, 9]). In this context by adding the pan-European dimension, the European Interoperability Framework (EIF) supplements national frameworks, rather than replacing them. The IDABC has developed the framework, with the second version currently being under revision [8, 9].

Existing research and practice (see e.g. [1, 2, 7, 8, 9, 10, 11]) distinguishes among different levels of interoperability:

- Political context describes that cooperating partners having compatible visions, and focusing on the same things.
- Legal interoperability refers to the synchronization of the legislation in the cooperating MS so that electronic data originating in any given MS is accorded to proper legal weight and recognition wherever it needs to be used in other MS.
- Organizational interoperability refers to enabling processes to cooperate.

- Semantic interoperability refers to the exchange of information in an understandable way within and across organizational borders.
- Technical interoperability refers to the ability to connect system by defining standard protocols and data formats.

In the context of interoperability, a major objective of the European Commission is to enable European-wide eProcurement across borders by creating common principles and technical solutions that are applied within all Member States. In 2005 the Manchester declaration has been signed with the aim to create a barrier-free access to public procurement for enterprises, especially SMEs, and to organise the process of public procurement more efficiently (cf. [12], [4]). According to a study by the EC, Governments are the largest buyer in the European Union purchasing goods and services at a level of 1.5 Billion Euro which approximately corresponds to 6 % of GDP. However, Governments are lagging behind major industries in exchanging relevant information with key actors such as economic operators. Therefore, the definition of common models for electronic data exchange is perceived extremely relevant for companies to participate in public eProcurement. The study also reveals that governments could save up to 5% on expenditure and the transaction costs for both buyers and suppliers could be reduced by 50-80% [5].

As a reaction, the European Commission co-funds the PEPPOL¹ (Pan-European Public Procurement On-Line) project within the Competitiveness and Innovation Framework Programme (CIP). The PEPPOL consortium consists of 12 participating countries and 18 public administrations that have the objective to set up a pan-European pilot solution that, conjointly with existing national solutions, facilitates EU wide interoperable public eProcurement as well as to simpler procedures in e-procurement. By making sure systems work together, Member States are helping European businesses to win public sector contracts anywhere in the EU. The vision of the PEPPOL project is that any company and in particular SMEs in the EU can communicate electronically with any European governmental institution for the entire procurement process. In specific, PEPPOLs significance relates to the strengthen competitiveness of SMEs EU wide. By levelling the playing field for SMEs, the backbone of Europe's economy, cross border e-procurement can boost competitiveness through better, simpler and more secure procurement due to predefined processes compliant with the procurement legislation.

In order to reach long-term goals in a large scale pilot project like PEPPOL and to ensure sustainable solutions it will be crucial to deal with the interest and the relationships among the stakeholders involved. PEPPOL has to ensure accountability, fairness, and transparency in the relationship with its stakeholders for reaching long-term sustainability. This requires corporate governance and implies mastery of the technology, systems and organisations in question, ensuring that their combined activities serve the strategic goals and objectives for the run-time of the project and beyond. The paper at hand shall reflect overall complexity of large scale pilots like PEPPOL as well as solutions and concept to handle this in terms of corporate governance.

2 ELECTRONIC PUBLIC PROCUREMENT IN SCOPE OF PEPPOL

Procurement can be divided into three major phases: the pre-awarding phase, the award of contract and the post-awarding phase. Pre-award processes and the award of contracts on the one hand side and post-awarding processes on the other side have different level of complexity thus different challenges to solve. In order to establish equal legislations and conditions (in particular for (pre)award processes) between European Member States the European Commission has introduced the Procurement directives in 2004 ([3],[6]). The directives imply that the award of contracts is driven by principles such as freedom of movement of goods, freedom of establishment, freedom to provide services including equal treatment, non-discrimination, mutual recognition, proportionality and transparency. These principles implicate that (pre)award processes have to be governed to great extend through legislation and formal procedures which raises overall complexity. In contrast post-awarding processes

¹ <http://www.peppol.eu/>

like ordering, invoicing and payment are not depending on complex legislation. However they are facing other problems in particular the development of harmonized standards and their wide adoption in common infrastructure across European Member States.

2.1 The processes, actors and documents involved in electronic public procurement

The major actors in public procurement are buyers and suppliers which are often referenced as contracting authorities and economic operators. Beside this there are several intermediary systems like notification and tendering platforms supporting the overall process. The phases described above are further detailed in figure 1 through series of processes executed in public Procurement. In pre-awarding, PEPPOL addresses the eCatalogue, the eSignature and the Virtual Company Dossier. Processes of post-award addressed in PEPPOL are eOrdering, eInvoicing and the Infrastructure. In the subsequent discussion, focus is put on the Virtual Company Dossier activities.

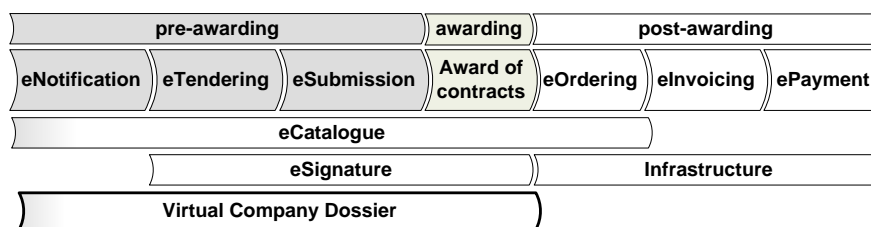


Figure 1: Building blocks of electronic public procurement

eNotification: A Contracting Authority prepares a contract notice and the contract documentation which includes (product) specifications like catalogue descriptions, related documents and conditions also referred to as the call for tender. The contract notice is produced and transmitted to the official gazette such as the Tenders Electronic Daily (TED) when due. An Economic Operator can use means such as the TED system, existing tendering platforms or official national gazettes to search for contract notices and to retrieve the relevant information about active tenders.

Virtual Company Dossier: Contract notices shall include the information mentioned in Annex VII A of the Directive, including the selection criteria regarding the personal situation of economic operators that may lead to their exclusion, and required information concerning the economic operators' personal situation, information and any necessary formalities for assessment of the minimum economic and technical standards, and where applicable, the legal form to be taken by the grouping of economic operators to whom the contract is to be awarded. Sometimes, the information on a contract notice provided in TED is not complete. Hence, the Economic Operator must directly get exact conditions from the Contracting Authority (Call for Tender).

If an Economic Operator decides to participate in a public tender across border, the call for tender has to be evaluated. Evaluating selection and exclusion criteria across borders requires from the economic operators have to match criteria set out in the contract notice with the evidences (attestations, candidate statements and certificates) available in its own country in order to prove compliance. The attestations and candidate statements available in the various Member States often differ in their quality, format, and coverage of criteria. These variances make it difficult for the participating actors to decide which document is most appropriate to evidence a given criteria, esp. in cross-border relations. In some countries, the initial submission covers only the application with a set of self-declarations (two-phased tendering). At a later stage and under an explicit request there is the real submission of the requested documents.

eSubmission: Finally, all required qualifications are submitted together with the offer to the contracting authority. Contracting authorities using means like tendering platforms to receive tenders electronically from economic operators. In addition many countries using electronic signature as legally recognised electronic means to indicate that economic operators adopt the contents of their tenders submitted.

At the time of **awarding** contracting authorities check compliance of qualifications with the appropriate (legal) requirements and terms set out in the call for tender. If all checks on qualifications

are done and no errors are identified the status of economic operator is changed to a “selected candidate”. Being selected as candidate is a pre-condition for the final award of contract.

Post-awarding: When contracts are awarded to an economic operators typical post-awarding processes like ordering, invoicing and payment are executed. Catalogues are used in both pre-award and post-award to describe products demand. While pre-award processes using intermediary system like notification and tendering platforms for message exchange, post-awarding processes have to rely on other means like common infrastructure to exchange messages (e.g. orders and invoices).

2.2 The PEPPOL building blocks: enabling European wide electronic public procurement

PEPPOL is supporting public eProcurement in Europe through six building blocks: the Virtual Company Dossier, eSignatures, eCatalogues, eOrdering, eInvoicing and Infrastructure. The paper at hand uses the pre-award case of submitting qualifications to contracting authorities as the case of choice. PEPPOL will enable this through the Virtual Company Dossier (VCD). Economic operators can use the VCD to respond to public tenders and present their qualifications in harmonized way across border. PEPPOL is also supporting the use of electronic signatures across borders and thereby concentrates on specific problems of creation, verification and acceptance of electronic signatures on electronic procurement documents, and in particular tender documents. Another building block is eCatalogue which concentrates on harmonization of various catalogue formats that are used in Member States. For all processes addressed in the project, PEPPOL provides an infrastructure to exchange electronic messages like eCatalogue descriptions, eOrders and eInvoices between the actors involved. This infrastructure will be used in post-awarding processes at first. In order to ensure interoperability of documents PEPPOL adopts and pilots’ specifications for eCatalogue, eOrdering and eInvoicing that have been developed in CEN/ISSS Workshop on business interoperability interfaces for public procurement in Europe².

3 THE VIRTUAL COMPANY DOSSIER

The Virtual Company Dossier (VCD) shall enable suppliers to collect attestations and candidate statements from existing registries and sources in their home country and to submit them electronically to a contracting authority within a container called VCD. The VCD includes several types of evidences which can be grouped into attestations (where the issuer is not the candidate) and statements by a candidate (where the issuer is the candidate). Furthermore evidence itself can be interpreted as a set of multiple documents (record) which may be required in cross border procedures such as: the attestation itself, a translation of that attestation, an apostille or legalization for that attestation and interrelated data in computable format (e.g XML). The attestations and candidate statements available in the various Member States often differ in their quality, format, and coverage of criteria. These variances make it difficult for the participating actors to decide which document is most appropriate to evidence a given criteria. This raises overall complexity for the actors involved. The Procurement Directive 2004/18/EC defines generic principles on mutual recognition of diplomas, certificates, or other evidences which apply. However, these principles are legally driven and lacking suitability for daily use. The VCD concept developed within the PEPPOL project shall ensure that the principle of mutual recognition can be easier adopted. It comprises of several components which are introduced in the subsequent sections.

3.1 The VCD schema

The VCD schema **firstly** provides a means to create a structure of the grouping of economic operators each of which has its own VCD. The VCD data model describes a conceptual view of the structure and distinguishes between several VCDs and one VCD Package. Each VCD thereby is economic operator specific while the VCD package bundles several VCDs together for a specific call for tender. This structure is shown in the figure below.

² <http://www.cen.eu/cwa/bii/specs/>

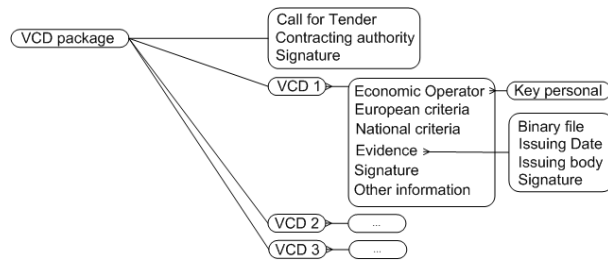


Figure 2: A conceptual view on the VCD schema

VCD schema **secondly** includes evidences and ensures legal interoperability and mutual recognition of evidences on the basis of European and national legislation. Therefore the national procurement domains are linked to a single European common domain within the European VCD service (cf. next section). The European selection and exclusion criteria defined within Articles 45-51 of the European Directive 2004/18/EC thereby are to be considered as reference criteria, while national criteria which are the basis for individual public tenders in respective countries are considered the local criteria. Evidences also include further information like the issuing body which may be verified through electronic signature as well as the issuing date and other related information.

VCD schema **thirdly** includes other relevant information which is needed in the context of providing qualifications in response to call for tender e.g.

- information about the economic operator or consortium answering the call for tender
- information about relevant key personal of the economic operator(s) that may be related to evidence (e.g. criminal records are typically issued for natural persons and not for the economic operator as such)
- information about the contracting authority which will receive the VCD
- information identifying the respective call for tender

3.2 The European VCD System

The European VCD System is focusing on the legal interoperability of evidences on the basis of European and national legislation. It is therefore necessary to gather national contexts and to define a basic European semantic interoperability model that supports mutual recognition of evidence across European Member States. Therefore national procurement domains are linked to a single European common domain within an ontology. For every national domain a representation of the national context is developed which provides an overview of national criteria demanded in public procurement, and how these are evidenced. The national contexts are connected with a single European semantic interoperability model which acts as pivot element. The European selection and non-exclusion criteria defined within Articles 45-51 of the European Directive 2004/18/EC [3] thereby are to be considered as reference criteria, while the national criteria which are the basis for individual public tenders in respective countries are considered the local criteria. The figure below shows the semantic interoperability model of the European VCD System.

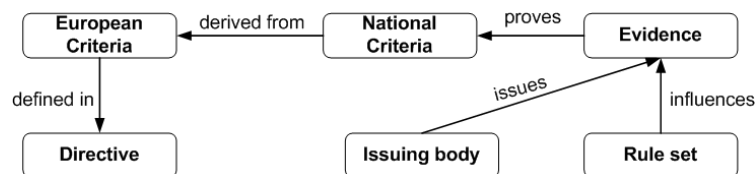


Figure 3: Semantic interoperability model of the European VCD service

The semantic interoperability model supports basic guidance in applying the relevant community rules on mutual recognition of evidences in cross-border procurement procedures. The semantic model especially requires and provides for a mapping between available national attestations and the selection and exclusion criteria set by the contracting authority through European criteria. It also

provides a rule set supporting alternative means for evidencing criteria, when foreign economic operators are considered.

As European criteria are the same for all Member States, they act as the pivot element for the mapping. The semantic model clarifies the relationship between national attestations of similar type and the kind of criteria those documents refer to. An economic operator participating in a tender of a foreign country can quite easily understand the requirements (what criteria have to be fulfilled) and decide which are the best evidences to prove the criteria requested by the contracting authority. In contrast the contracting authority can check through the same mapping mechanism whether the submitted attestations express fulfilment with the relevant criteria or requirements.

As mentioned above the semantic interoperability model has been formalized within an ontology. The VCD ontology serves as data and rule set storage. The core functionality of the European VCD service enables the generation of a list of evidences that are in accordance with the rule set. This generation is performed by the VCD ontology interaction tool which provides on the one hand a graphical user interface (GUI) and a reasoner that performs the generation according to the rule set. The ontology creates a VCD schema skeleton that consists of the defined elements (Criteria, Evidence, Rules). It is used in the national VCD piloting projects of the various countries participating in the PEPPOL project but it can be invoked as well by any user as the European VCD System should be publicly available.

3.3 National VCD Systems

National VCD Systems will enable economic operators to compile a VCD according to the VCD Schema and services provided by the European VCD System. In a minimal setup National VCD Systems consists of a VCD editor, a graphical user interface, a manual upload interface for qualifications of any kind and a VCD builder which packages everything together as zip file. The minimal scenario will enable economic operators to fill in their VCD. Beside they can use the European VCD System for legal consultation manually. The minimal scenario shall be mainly applied in countries that are not yet member of the PEPPOL VCD project. The figure below shows this within the high-level architecture.

The right hand side of the figure is introducing additional VCD components that are being developed and piloted by members of the PEPPOL consortium. They include user and access management as well as an interface to the European VCD System. Economic Operators can use the European VCD System for creating a VCD schema skeleton as introduced in the previous section. The VCD skeleton consists of criteria to evidence relationships that are mutually recognized and it can be used as basis for filling in the VCD with the VCD editor. The advanced scenario may also include interfaces to national registries where evidence can be electronically retrieved from competent issuing authorities such as registers for criminal records or business registers (single point of contact). Further components are a documents/storage manager which supports economic operators in managing their qualification documents over time. A disassemble service enables economic operators to reuse already created VCDs for new tenders. The signer will help economic operators to sign their VCD or parts of it within the application already while the transportation interface is intended to enable submission of VCD to contracting authorities via the PEPPOL infrastructure.

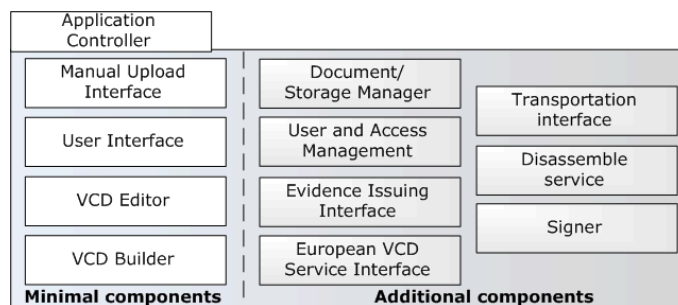


Figure 4: High Level Architecture of national VCD pilots

4 TIMELINE AND PHASES OF THE PEPPOL PROJECT

The PEPPOL project is established for a duration of 42 months with 50% funding of the European Commission ending in October 2011. During this lifetime the project runs through different phases starting with the specification of the building blocks. One of the major requirements of the project is to run its pilots in real eProcurement environment for at least one year (production pilot phase). In order to enable production pilots PEPPOL adopts a methodology developed in CEN BII/ISSS that systematically increases the complexity of environment through proof of concept phase and test pilot phase [13]. A challenging question for PEPPOL is how to effectively operate its pilot solutions in complex environment and how to keep them alive after the end of the Project (long-term sustainability). The overall timeline is introduced in the figure below.

Mai 2008 ⇨	Nov 2009 ⇨	May 2010 ⇨	Nov 2010 ⇨	Nov 2011 ⇨
Specification Phase	Proof of Concept phase	Test pilot phase	Production pilot phase	Sustainability phase
<ul style="list-style-type: none"> ▪ Requirements Engineering ▪ Interaction Design ▪ Specification Development ▪ Model transformation 	<ul style="list-style-type: none"> ▪ Artificial setup with narrow scope ▪ Test application with test data ▪ No participants ▪ Short lifetime ▪ No focus on quality 	<ul style="list-style-type: none"> ▪ Artificial setup with medium scope ▪ Real application with test data ▪ Few participants ▪ Medium lifetime ▪ High focus on quality 	<ul style="list-style-type: none"> ▪ Real life setup with large scope ▪ Real application with real data ▪ Many participants ▪ Long lifetime ▪ High focus on quality 	<ul style="list-style-type: none"> ▪ End of Pilots ▪ Final Project Delivery ▪ Governance and policies established ▪ Monitoring and Maintenance

Figure 5: Phases of the PEPPOL project

The main goal of the proof of concept phase is to test the specifications developed in an artificial setup with a narrowed scope. Thereby old processes are still in place and the interchange of information is restricted to one to one communications between artificial participants. Also at this stage the quality of development is not focused at. The main goal is to test feasibility of pilots during a short period.

In the test pilot phase the scope of development is continuously raised. One of the major goals is to increase the overall quality of developments and the implementation of real applications that are tested with real actors but artificial data. In the context of the VCD this is done by running through historical tenders. Therefore few pilot participants in terms of economic operators and contracting authorities have to be found. For the recruitment of pilot partners the PEPPOL project concentrates on the eHealth sector. The solutions developed in PEPPOL shall in particular enable small and medium sized Enterprises (SMEs) to participate in public eProcurement cross border. However cases where economic operators currently participate cross border are rare as many barriers still exist. In order find interested piloting partners the eHealth care sector is chosen as market players in this sector are often SMEs that supply very specialized products across European hospitals and other health care facilities. Thus market players in the Health care sector have high interest to improve their cross border processes enabled through PEPPOL.

The test pilot phase will lead the project towards production phase which again focuses on the quality of real applications developed. However the production pilots denote how PEPPOL building blocks can be used in real life setups within larger scope. In this phase any economic operators in the participating countries can use the VCD system to create real VCDs for proving their compliance with certain criteria to a contracting authority. With the VCD system, it is envisaged that economic operators will be assisted in identifying requested evidences thus it is vital to ensure confidence in using the VCD system. Contracting authorities therefore shall promote the tools already in the call for tender.

The PEPPOL project and therewith the production pilot phase will end in November 2011. PEPPOL needs to develop strategies to further operate its services beyond the lifetime of the project. The sustainability phase needs to be well prepared within the project lifetime already in order establish governance principles and policies that will enable sustainable operation of the building blocks developed. Relevant relationships between external and internal PEPPOL stakeholders need to be identified when addressing governance in complex environments. For an effective operation it is essential to develop governance structures and policies that ensure accountability, fairness, and

transparency when stakeholders are cooperating. The next chapter will introduce key players who are affecting or could be affected by the VCD system.

5 STAKEHOLDER VIEWS ON PEPPOL AND ITS VCD SYSTEM

Stakeholders in PEPPOL play an important role as the project establishes interoperable solutions supplementing national frameworks, rather than replacing them. Stakeholder (groups) can be differentiated according to their geographical coverage and field of interest with regard to PEPPOL and specifically the VCD system. At first external stakeholders should be identified.

Member States and governments that are not yet in the PEPPOL consortium are one of the most important stakeholders for PEPPOL. Only wide adoption of PEPPOL building blocks will facilitate EU wide interoperable public eProcurement as well as to better, simpler and safer procedures in e-procurement. Thus PEPPOL maintaining a network of interested governments on federal, regional and local level and keeping them informed through regular conferences. Also PEPPOL has set aside parts of its funding to attract new governments and Member States during the project life time. In 2009 a new CIP call was launched with the aim to increase the impact of the PEPPOL project. New consortium participants and existing beneficiaries that seek to participate in additional work packages were given the opportunity for further involve.

The VCD schema is one the results that is mostly affected by both internal and external stakeholders. On the one hand side building blocks developed in PEPPOL such as the VCD system rely on a well defined schema. However data models in interoperability take a specific role enabling interoperability through standardization and semantic alignment. PEPPOL itself does not intend to develop standards on its own but to build its solutions upon evolving standards in the procurement domain. Therefore PEPPOL maintains a strategic relationship with the CEN/ISSS workshop on business interoperability interfaces for public procurement. (CEN/ISSS WS/BII). While work in PEPPOL is restricted to consortium partners the CEN/ISSS workshop is open for any other stakeholder that is willing to participate. The aim of CEN/ISSS is to identify and document the required business interoperability interfaces related to pan-European electronic transactions in public procurement expressed as a set of technical specifications. CEN/ISSS also coordinates and provides support when pilot projects such as PEPPOL implement the technical specification in order to remove barriers preventing interoperability. The interrelation between CEN/ISSS and pilot projects such as PEPPOL is reflected through an adapted V-model in the figure below [13].

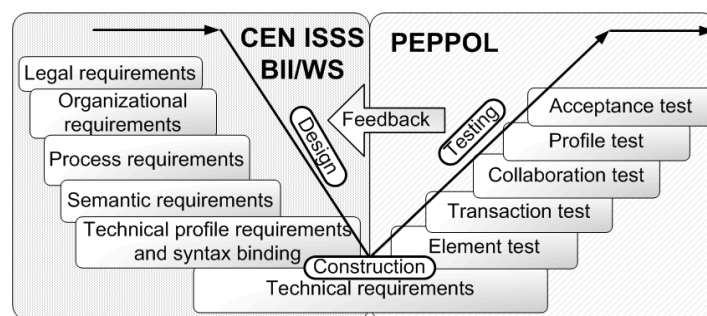


Figure 6: V-model that shows interrelation between PEPPOL and CEN/ISSS BII/WS workshop [13]

CEN/ISSS develops a set of technical profile specifications and syntax bindings on the basis of legal, organisational and semantic requirements identified by its stakeholders. PEPPOL adopts these specifications for the construction of its pilot and feeds its findings and testing experiences back into the workshop. This strategic relationship enables PEPPOL to build its results on emerging standards that are sustainable even beyond the project scope.

Another major building block of VCD system is the European VCD System. The European VCD System specifically addresses parts of the legal procurement framework applied in Europe. It bases its

results on previous findings and studies carried out by DG market. Previously to PEPPOL the Commission Service designed a questionnaire “Eligibility of tenderers”³ in order to facilitate access to information related to evidences. Beside that, a feasibility study was carried out which was used as major input when the European VCD System was designed in PEPPOL [14]. The Commission service is currently building the eCertis information system that transposes the results of that feasibility study into a technical environment. Major differences between the European VCD System and eCertis are the scope and the technical support for economic operators. While eCertis is focussing on all European Member States it is not providing any means for using this information in standardized VCD. Beyond this European VCD System intends to provide reliable rules supporting mutual recognition while eCertis only provides general overview of related qualification documents. However both projects using same conceptual approach and are closely interconnected. Thus corporation in particular with regard to operation and maintenance needs to be focused at. Results of this strategic corporation may also feed into further improvements and amendments of the current procurement legislation.

For PEPPOL it will be also extremely important to cooperate with piloting partners adopting the PEPPOL solutions. These can be the ICT Industry on the one hand side which implements certain parts of the PEPPOL building blocks in order to provide new services to their customers and to increase profits. On the other hand actors that are carrying out public procurement (economic operators and contracting authorities) need to be supported in using the building blocks as introduced in the previous section.

Internal stakeholders are in particular the consortium members as well as the commission services that have awarded the contract. These groups have certain interest in sustainable operation of the PEPPOL building blocks beyond the project. Therefore European and national interests have to be considered and aligned. Building blocks may be operated as common components, reusable component or beneficiary specific components. While common components need to be cooperatively governed by the whole consortium on European level, reusable components are only relevant to few consortium partners. In contrast beneficiary specific implementations are under the control of specific members thus requiring less corporative governance.

6 GOVERNANCE OF PEPPOL VCD SYSTEM

In general, governance can be defined as “the establishment of policies, and continuous monitoring of their proper implementation, by the members of a governing body of an organization. It includes the mechanisms required to balance the powers of the members (with the associated accountability), and their primary duty of enhancing the prosperity and viability of the organization.”⁴

In particular, this definition covers and references policies. A policy can be defined as a set of basic principles and associated guidelines, formulated and enforced by the governing body of an organization, to direct and limit its actions in pursuit of long-term goals. In order to reach long-term goals in a large scale Pilot project like PEPPOL and to ensure sustainability it will be crucial to deal with the interest and the relationships among the stakeholders involved.

6.1 Defining Governance in terms of PEPPOL and the VCD system

In a wider sense, corporate governance can be defined as a framework of rules and practices by which a steering committee ensures accountability, fairness, and transparency in the relationship with its stakeholders. Thereby maintenance plays an important role because systems involved have to be adapted frequently according to a changing environment. As there are so many different organisations and countries involved in the PEPPOL project we can assume that changes will occur on very frequent basis. From the PEPPOL perspective governance could be defined as the process of effectively operating the PEPPOL solutions and proposing how to keep them alive after the end of the project (the

³ http://ec.europa.eu/internal_market/publicprocurement/2004_18/index_en.htm

⁴ <http://www.businessdictionary.com/definition/governance.html>

so called PEPPOL long-term sustainability). PEPPOL will settle a set of new concepts and standards, will involve several stakeholders, and will influence ways of working.

According to EIF, governance deals with the ownership, definition, development, maintenance, monitoring, and communication of the various aspects of an interoperability solution (policies, standards, requirements, components etc). In PEPPOL governance implies mastery of the technology, systems and organisations in question, ensuring that their combined activities serve the strategic goals and objectives set out by the European Commission, the governing board and the beneficiaries for the run-time of the project and beyond.

6.2 Frameworks for Governance: the EIF and others

There are quite a few supporting references developed to guide the implementation of information technology governance. Under the most well-known frameworks are CobiT [15], ITIL [16] and ISO 27001/27002 [17]. Taken together, these provide a comprehensive guidance and leading practices for IT Governance. As elaborated earlier in this paper, the focus on IT is not satisfying the requirements the PEPPOL solutions demand. Following the EIF approach on governance, in a first step a Governance structure/model has to be defined, encompassing involvement of the stakeholders in the governance activities. This model should focus on the following aspects:

- Specifying decision rights: What has to be governed? Which kind of decisions need to be made? Who can make them?
- Specifying and managing the life-cycles for the artefacts and components of PEPPOL VCD, including periodic reviews, top-down re-assessments, and taking into account paradigm shifts when they occur in respect to changing environment;
- Measuring effectiveness by defining metrics (e.g. key success indicators) as well as using them to evaluate and monitor VCD solution related artifacts and taking appropriate actions whenever needed.

Those aspects mentioned above (decision-making, life-cycle management, monitoring) have to be dealt with during project run-time and after the project. In particular after the project these aspects gain an increased importance and new context. Processes and procedures would have to be established to deal with the application of the metrics, to ensure compliance and provide effective enforcement. In addition economic aspects of sustainable operation of PEPPOL solutions have to be clarified.

The objective of EIF is to support the European Union's strategy of providing user-centred eGovernment services by facilitating, at a pan-European level, the interoperability of services. In this context by adding the pan-European dimension, EIF supplements national frameworks, rather than replacing them. It offers a comprehensive set of principles for European cooperation in e-government by giving recommendations and guidelines with regard to legal, organisational, semantic and technical aspects of interoperability as well as the political context. Governance can be seen as an importance aspect to ensure interoperability in long term on the different layers introduced by the EIF. Following the aspects of interoperability as defined in the EIF, the aspects of governance can be defined as follows:

Political aspects of Governance: There is political will to maintain compatible vision developed in PEPPOL and to facilitate the operation of PEPPOL solutions after the project.

Legal aspects of Governance: The possibility to adapt new regulations on the European Level that will strengthen and support PEPPOL solutions. Also a consistent synchronization with legislation in the cooperating MS has to be ensured.

Organisational aspects of Governance: The processes, roles and responsibilities necessary to enable decision making and cross border interaction have to be defined.

Semantic aspects of Governance: Aligning terminology (e.g. to be found in data models, identifiers, code lists, UI) and ensuring the consistent usage across PEPPOL, in the community of procurement in Europe (e.g. CEN) and beyond (e.g. UNCEFACT).

Technical aspects of Governance: To ensure that infrastructures and architectures (interfaces, components, and artefacts) are maintained and monitored. This may include the interlinking of PEPPOL solutions with other computer systems.

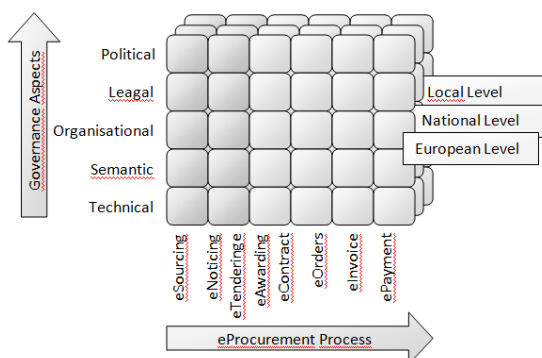


Figure 7: Framework of Governance covering the dimensions of governance aspects, electronic procurement and hierarchical level (cf. [18])

The PEPPOL project defines the eProcurement process with the steps eSourcing, eNotice/eTendering, eAwarding/eContract, eOrders, eInvoice, and finally ePayment. Each step of the electronic procurement process has to be treated in terms of governance in a similar way. Thus, the aspects of governance are valid for each part of the process.

A third dimension of governance, which has to be dealt with are the different levels of regional hierarchy. The PEPPOL project focuses on the European level and was set up to deliver solutions with a European scope. Governance on this level has to be both PEPPOL specific (e.g. legal issues or common components) and procurement community specific (e.g. data models). However, most parts of the PEPPOL solutions will become tangible in national implementations, namely the national pilots (e.g. beneficiary specific components). Depending on member states' hierarchical setup, also on a local level the PEPPOL solutions may be in place and thus require governance.

7 CONCLUSIONS

In this paper, we have introduced the scope of the PEPPOL project, which establishes a set of building blocks to support public procurement across Member State countries of the European Union. The building blocks are conceptualised in a way to build an interoperability layer to interconnect systems of public procurement processes existing in the individual countries to support pre-awarding and post-awarding procedures. The main focus of this paper was pre-award's Virtual Company Dossier with its main conceptual designs and the overall governance of the VCD system.

For the topic of governance the basic concepts and challenges were introduced which will be tackled in the future work on VCD. The current activities of the project are concluding the technical, legal and organisational specifications, while the subsequent phases will implement pilots and methodologies to secure governance and long-term sustainability of the solutions.

The framework for governance introduced in this paper, covering the dimensions of governance aspects, electronic procurement, and hierarchical level has to be further developed to serve as guidelines for reaching the ambitious objectives of the project - to ensure an innovative service widely used by the eProcurement stakeholders in order to realise the expected added value.

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