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D5.6 Pilot Evaluation, Handover and Long Term Sustainability

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Abstract

D5.6 includes final documentation about **domain and national pilots** such as the description of the **final pilot solution architectures** and additional documentation such as pilot testing activities and other material of pilot implementation. Moreover, D5.6 includes domain and national pilot evaluation including BB evaluation and pilot plans for Long-Term Sustainability and post-pilot conditions for adoption to support handover of pilots to future owners. All the related material is stored in the **wiki for e-SENS pilots** at the **Repository of Pilot Solutions**.

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Glossary

See: <http://wiki.ds.unipi.gr/display/ESENSPILOTS/Glossary>

Executive Summary

The aim of e-SENS (Electronic Simple European Networked Services) is to provide generic interoperable solutions for cross-border public services in Europe. e-SENS is an LSP project launched by the European Commission to support the realisation of European policies. All of the LSPs that have been launched facilitate the use of innovative technologies for the deployment of EU-wide services in selected areas and, in turn, the development of a Digital Single Market.

The main objective of this deliverable is to consolidate and present all available information on pilot documentation, building on the content of pilot plans described deliverables D5.4 and D5.5, but complemented and expanded not in a forward-looking manner but as a record of what has been done. Deliverable D5.6 presents the **final documentation about pilot solutions and results**, as well as **pilot evaluation**. It also includes the final status at project end regarding **handover of pilot results** to future owners and continuation of work.

To that end, deliverable D5.6 includes the **final pilot solution architectures of the domain and national pilots** of all domain use cases with details on technical architecture, (including SATs, ABBs, ABB specifications and SBBs) as well as description about further profiling of ABB specifications. It also includes additional documentation about **pilot testing activities** as well as other documentation of pilot implementation. Domain and national pilot solution architectures conform to the e-SENS Reference Architecture, contain e-SENS BBs and are **linked to the wiki of the e-SENS EIRA** through the links that pilot solutions have to e-SENS SATs, ABBs and SBBs.

Moreover, in the context of producing Deliverable D5.6 a **pilot evaluation** has been carried out in the last 6 months of the project, based on an evaluation framework that follows the approach taken by the PEPPOL LSP (2008-2012) that includes the following evaluation aspects:

- **Goals based evaluation** against the original goals of domain and national pilots including evaluation of KPI achievement;
- **Outcomes based and process based evaluation** with the use of commonly agreed criteria including collection of data on the concrete outputs from each pilot;
- **Evaluation of e-SENS BBs used in pilots**. WP5 evaluates business usability of BBs under the perspective of domain and national pilot teams.
- **Sustainability assessment** based on a WP3 questionnaire that evaluates the sustainability potential of pilots and prepares the sustainability plans for all pilots of e-SENS, including post-pilot conditions for adoption, to support possible transfer of ownership to future owners (where relevant).

The full body of information that has been collected, synthesized and consolidated in the context of deliverable D5.6, is stored in a **user-friendly electronic repository**, the **Repository of Pilot Solutions**, which is part of the **WP5 wiki for e-SENS Pilots** that includes documentation about e-SENS pilots and is related with the final WP5 deliverables D5.6 and D5.7b.

The methodology used in order to produce deliverable D5.6 was an iterative process which, based on the work of the previous years of e-SENS, compiles and finalizes all pilot-related material using common pilot documentation templates and guidelines to update, fine-tune and finalize the documentation about pilot solutions and produce pilot architecture documents for all domain and national pilots in the different domains of the project. Moreover, WP5 working groups, based on a pilot evaluation framework and related templates, carried out pilot evaluation, (including sustainability assessment), to support hand over of

national pilots to future business owners at national level as well as transfer of ownership of domain-level infrastructure to EU-wide governance structures of Core Service Platforms (where relevant).

The deliverable is composed of two parts:

1. this report, which provides a digest of relevant information
2. the **electronic Repository of Pilot Solutions** which is **part of the WP5 wiki for e-SENS Pilots** and includes all pilot documentation and evaluation material produced in the context of deliverable D5.6.

The present report is written as a summarized overview of all the key points that the reader would like to know about e-SENS pilots, but also as a gateway linking to further information on the electronic repository that can give the full picture. Extensive linking from this report to the e-SENS Pilots wiki allows the reader to explore subjects and areas that are more interesting, but always within the narrative of the condensed report so that the additional information can be accessed within the proper context.

The other main part of the WP5 wiki, is the **Pilot Blueprints and Requirements Repository** that is related to **deliverable D5.7b**. It includes the pilot blueprints and the related requirements of the domain UCs. Moreover, a separate part of the WP5 wiki presents the methodologies and templates used for both deliverables.

The links to the WP5 wiki which are related to deliverable D5.6 are shown below:

- **WP5 wiki for e-SENS Pilots:**
 - <http://wiki.ds.unipi.gr/display/ESENSPILOTS>
- **Repository of Pilot Solutions**
<http://wiki.ds.unipi.gr/display/ESENSPILOTS/Repository+of+Pilot+Solutions>

1. Introduction

1.1. Scope and Objective of Deliverable

Deliverable D5.6 falls within the “Pilot Coordination and Lifecycle Management” work stream of WP5 and is related to the following activities described in the Technical Annex of the project: Pilot enablement activities (A5.x.3.1), pilot running and monitoring activities (A5.x.3.2), Pilot evaluation activities (A5.x.3.3) and Pilot Adoption activities (A5.x.3.4).

The main objectives of deliverable D5.6 are:

- Maintain, revise, update and present final documentation about all e-SENS domain and national pilots with details on technical architecture, actual pilot deployment evidence testing for BB technical readiness, deployment end-to-end transactions, and other documentation of pilot implementation.
- Evaluate domain and national pilots, including pilot plans for Long-Term Sustainability and post-pilot conditions for adoption to support handover of national pilots to business owners of Generic Services¹ in MS/ACs as well as transfer of ownership of domain-level infrastructure to EU-wide bodies and/or stakeholder constituencies, where globally-relevant results from piloting contribute to the establishment or enhancement of EU-wide Core Service Platforms².
- Align with WP6 on integration of pilot solutions in the e-SENS EIRA.
- Present the pilot readiness and pilot maturity in deployment in the domain pilots and in all piloting MS at the end of the project based on the ABB readiness states and the ABB deployment maturity states that have been used to monitor pilot implementation.
- Present an overview of the results of processing of pilot evaluation data from all pilots.
- Present final conclusions on e-SENS pilots.

For a complete and integrated picture and easier reference and following a Y2 review recommendation, all pilot-related material that is produced in the context of deliverable D5.6 is organized in the **WP5 wiki for e-SENS Pilots**, and more specifically in the **Repository of Pilot Solutions**³ which stores all documentation about **pilot solution architectures, pilot testing and implementation and pilot evaluation**. The descriptions of the **final pilot solution architectures** of the domain and national pilots of all domain use cases include details on technical architecture, (including SATs, ABBs, ABB specifications and SBBs). Moreover, pilot solution architectures conform to the e-SENS Reference Architecture, contain e-SENS BBs and are **linked to the WP6 wiki for the e-SENS EIRA** through the links that the pilot solutions have to e-SENS SATs, ABBs and SBBs.

The **target audience** for this deliverable includes interested parties that want to look in more detail at final documentation of the pilot solutions of e-SENS pilots as well as pilot evaluation. As some parts of the information are fairly technical, the reader should have a technical background and is familiar with basic

¹ As defined in the Connecting Europe Facility (CEF) Regulation, Generic Services provide the connection of MS/AC-level infrastructure to pan-European infrastructure.

² As defined in the Connecting Europe Facility (CEF) Regulation, Core Service Platforms provide infrastructure deployed at a pan-European level, used in one or more business domains, across all MS/ACs.

³ The other main part of the WP5 wiki for e-SENS Pilots, is the Pilot Blueprints and Requirements Repository that is related to deliverable D5.7b which includes the pilot blueprints and the related requirements of the domain UCs.

technical concepts of software and systems design and/or has worked within business domains taking into account the technology dimension. The reader should also be familiar with the e-SENS Technical Annex, deliverables D5.3, D5.4 and D5.5 for reference to pilot plans and deliverables D6.1, D6.3, D6.6 and D6.7 for reference to technology BBs and D6.4 for reference to BB evaluation.

1.2. WP5 General Objectives and Vision

D5.6, as one of the deliverables of WP5, contributes to achieving the objectives of WP5.

The vision of WP5 is to demonstrate that it is feasible, realistic and sustainable to deploy real-life ICT services within and among countries across Europe. The pilots will be in so-called production pilot environments where actual transactions among public administrations, or between them and European citizens and businesses, can take place based on technological BBs in a cross border context. These BBs can in turn be re-used and integrated in different combinations. Thus, the BBs will be weaved into the fabric of public ICT infrastructure that underpins A2C, A2B, A2A applications and ultimately enhances the information society that underpins the Single European Market. Furthermore, the extensibility of BBs in the case of C2B and B2B will also be considered and handed over to WP3 with respect to long term sustainability and governance.

It is useful to clarify here the inter-relation of the WP5 deliverables, at least concerning the batch of deliverables D5.3, D5.4, D5.5 that fall within the “Pilot Identification, Definition and Planning” work stream of WP5 as well as D5.2 and D5.6. There exist **9 use cases** for the four original e-SENS domains approved by the e-SENS General Assembly in Baarn on 25 February 2014 and **2 use cases** for the new e-SENS 5-5 domain “Citizen Lifecycle” approved by the e-SENS General Assembly in Oslo on 27 March 2015).

- The piloting principles, processes, workflow and tools are included in deliverable D5.2, which is a handbook-style document that will be used as reference throughout the entire process of identifying, selecting, planning, executing, monitoring and evaluating pilots throughout their entire lifecycle.
- Deliverable D5.3 includes **domain and national pilot plans** prepared in year 1 and was submitted at the end of year 1 and before the 1st review.
- Deliverable D5.4 includes **updated and new domain and national pilot plans** and was submitted at the end of year 2 and before the 2nd review.
- Deliverable D5.5 includes **new national pilot plans on Y1 domain pilot plans and Y3 domain and national pilot plans** (on the use cases approved by the e-SENS General Assembly in Oslo on 27 March 2015).
- Deliverable D5.6 continues and finalises the work done in deliverables D5.3, D5.4 and D5.5 by including documentation about the **final pilot solution architectures** of the domain use cases with details on technical architecture, actual pilot deployment evidence including locations; parties involved; testing for BB technical readiness, end-to-end transactions etc. It also includes documentation about **pilot evaluation and results** (including sustainability plans of pilots) to support handover of pilots to future owners. The whole documentation is stored in the electronic Repository of Pilot Solutions.

1.3. Methodology of Work

Deliverable D5.6 compiles input from all pilots of e-SENS, updates pilot documentation produced in deliverables D5.4 and D5.5 and includes **final documentation** about **pilot solutions** as well as **pilot evaluation at domain and national level**. All material about domain and national pilots that is produced in the context

of deliverable D5.6 is stored in the **wiki for e-SENS pilots** and more specifically in the **Repository of Pilot Solutions**. Description of the **structure of the Repository of Pilots Solutions** is presented in **section 2.1**.

The following table summarizes the domain codes and names of the domain pilots. Summarising, there are in total **13 domain pilots**:

- 9 domain pilots in the 4 original domains (eProcurement, eHealth, e-Justice, Business Lifecycle) that were suggested by the domains and approved by the e-SENS General Assembly (Baarn, NL, 25-26.02.2014). These pilots were proposed and approved within Y1 or proposed and approved within Y2.
- 2 domain pilots in the new domain “Citizen Lifecycle” that were approved by the e-SENS General Assembly (Oslo, NO, 26-27.03.2015) and initiated in Y3.
- 2 new domain pilots in the e-Justice domain which initiated in Y4, namely, domain pilot 5.3.5 Mutual Legal Assistance/ European Investigation Order and domain pilot 5.3.6 Financial Penalties. These two UCs are coming from e-CODEX and were on-boarded in e-SENS so that they would have some more time to expand the geographical coverage and further develop the results.

As regards national pilots, there are **50 pilots** started with different timing in the project. The documentation and evaluation of all national pilots is included in the **Repository of Pilot Solutions on WP5 wiki**.

Domain Code	Domain Name	Domain Use Case Code	Domain Use Case Name
5.1	eProcurement ⁴	5.1.1	eTendering
		5.1.2	Virtual Company Dossier (VCD/ESPD)
		5.1.4	eInvoicing
5.2	eHealth ⁵	5.2.1	ePrescription/Patient Summary
		5.2.2	eConfirmation
5.3	e-Justice ⁶	5.3.1	Matrimonial matters and parental responsibility
		5.3.4	European Account Preservation Order (EAPO)
		5.3.5	Mutual Legal Assistance/ European Investigation Order
		5.3.6	Financial Penalties
5.4		5.4.1	Business Registration

⁴ The eProcurement domain decided to shelve UC 5.1.3 eCatalogues in the pre-award and post-award phase.

⁵ UC 5.2.3 eInvoicing during reimbursement, which was a cross domain UC with eProcurement, has been shelved.

⁶ The e-Justice domain decided to shelve UC 5.3.2 Maintenance Obligations and UC 5.3.3 Supervision of Probation Measures and Alternative Sanctions. UC 5.3.5 and UC 5.3.6 are the new domain use cases of the e-Justice domain.

Domain Code	Domain Name	Domain Use Case Code	Domain Use Case Name
	Business Lifecycle	5.4.2	Activity Registration
5.5	Citizen Lifecycle	5.5.1	Citizen Lifecycle (NemKonto, Patient Access, eEducation, Record Matching)
		5.5.2	eAgriculture

Table 1: e-SENS domain use cases

The methodology used in order to produce the current deliverable and achieve the objectives is an iterative process which, based on the work of the previous years of e-SENS, documents, compiles and finalizes all pilot-related material to support transfer of ownership to future owners of pilots. More specifically, WP5 management, domain leaders, workgroup coordinators (each workgroup being responsible for one domain pilot) and MS participants, based on the work carried out in the context of deliverables D5.3, D5.4 and D5.5 and using common **pilot documentation templates and guidelines** updated, fine-tuned and finalized the documentation about pilot solutions and produced pilot solution architecture documents for all domain and national pilots in the different domains of the project. Moreover, all WP5 working groups, based on a **pilot evaluation framework and templates**, carried out **pilot evaluation** for the domain and national pilots in the context of handing over of the pilots to business owners or CSP governance structures (where relevant).

The work was carried out in the workgroups using collaborative tools or online conference facilities and face-to-face meetings when appropriate. In the context of the work in Y2 and Y3, pilot solution architects had been appointed by the domain and national pilot teams cooperating strongly with the BB architects appointed from WP6 with specific responsibilities to support pilot implementers and work on particular BBs implemented by specific pilots. Targeted workshops were held throughout Y2 and Y3 and the approach continued in Y4. Moreover, for each domain pilot, WP5 has been constantly monitoring risks and discussing these openly during DB calls (where domain leaders and workgroup coordinators participate) and during MB calls.

Following Y3 review recommendations, the actions taken and reflected in deliverable D5.6 are described in the following table:

Recommendation	Actions taken
Finalise the rest of the pilots in all domains, gather evidence of results and achievements and demonstrate value.	WP5 initiated re-assessment of all domain activities and national pilots to make sure that every activity still remaining would have a concrete, achievable and worthwhile outcome and a handover target. Pilots were steered towards conclusion and handover of results in a sustainable way (e.g. some pilots are going into production within CEF). A specific reference to Y4 pilot re-focusing is included in all pilot fact sheets included in this report (see Chapter 3).
Improve pilot status reporting	Introduced the Pilot Fact Sheet that includes summarized information concerning each pilot (see Chapter 3).

Recommendation	Actions taken
	Furthermore, in addition to the Readiness Status of each pilot for each SAT/ABB, which was reported in deliverable D5.5, WP5 introduced a new monitoring parameter, the Deployment Maturity state of each pilot for each SAT/ABB at domain and national level. This indicator measures whether the pilot is in production or in pre-production or in a fully functioning test environment. Pilots may be placed at any of these three deployment maturity states, depending on the context at national and domain level (see Chapter 4).
Managing pilots most likely going live vs. pilots timing being beyond e-SENS duration.	See actions taken under 1 st recommendation as part of the pilot re-focusing.
Review how the EIDAS specifications and implementation constitutes an opportunity for the activation of further pilots and BBs implementation.	A specific reference to the eIDAS relevance of each pilot has been included in every Pilot Fact Sheet in this report (Chapter 3). Furthermore, extensive cooperation was held with WP4 on matters related to eIDAS – some of this work is reflected in WP4 deliverables as well.
Reflection on business case.	Part of the Fact Sheet scope – should be covered there. WP3 worked more extensively on business cases but in a more abstract way; pilots have reflected on their business dimension as part of the e-SENS Final Report as well (D1.12)
Review pilots in context of Once Only Principle in collaboration with WP4.	A specific reference to the Once-Only relevance of each pilot has been included in every Pilot Fact Sheet in this report (Chapter 3). This becomes quite relevant at the end of the project as many results are being taken up by The Once-Only Project (TOOP) and many activities continue there

Table 2: Actions taken after Y3 review

As it has been stated, to carry out the work, **common templates**, and **guidelines** were given to all WP5 domain contributors in order for them to prepare **final documentation** of the domain and national pilots and **evaluate** their pilots. More specifically:

- **Pilot Documentation:** Documentation of domain and national pilots includes:
 - Description of the **final pilot solution architectures** of the domain and national pilots of all domain use cases with details on technical architecture, (including SATs, ABBs, ABB specifications and SBBs) as well as description about further **profiling of ABB specifications** (where relevant). A **pilot solution architecture** of a domain use case documents the domain pilot architecture as well as all the related national pilot architectures of the Member States that participate in the domain pilot. Moreover, a pilot Solution Architecture conforms to the e-SENS Reference Architecture, contains e-SENS BBs and is **linked to the wiki for the e-SENS EIRA** through the links that the pilot solution has to e-SENS SATs, ABBs and SBBs.
 - **Additional documentation** produced by each pilot such as description about **pilot testing activities** and **other documentation of pilot implementation** (e.g. technical documentation of

software, implementation guidelines, domain agreements or other material to that effect, terms and conditions for handing over to production and other pilot-specific material).

In summary, pilot documentation is based on the following templates:

- **Domain pilot documentation template:**

This template is used by domain pilot teams to update the corresponding section/sub-sections of the domain pilot plans in deliverables D5.4/D5.5, describe the final domain pilot solution architectures implemented in the context of domain pilots and provide additional documentation about pilot implementation such as pilot testing activities and other documentation of pilot implementation.

The template is available on the WP5 wiki [here](#).

- **National pilot documentation template:**

This template is used by MS to update the corresponding sections/ sub-sections of national pilot plans in deliverables D5.4/D5.5, describe the final national pilot architectures implemented in the context of the domain pilots and provide additional documentation about national pilots.

The template is available on the WP5 wiki [here](#).

- **Pilot evaluation:** It is based on the **pilot evaluation framework** that was used in PEPPOL⁷ which was adapted for e-SENS and includes the following approaches to evaluation:

- A. Goals based evaluation
- B. Outcomes based and process based
- C. Evaluation of e-SENS BBs used in pilots
- D. Sustainability assessment of pilots

The pilot evaluation framework is applied both at **domain pilot level** for all **domain pilots** as well as at **national pilot level** for all **national pilots**. For each case there is a corresponding **pilot evaluation template** that covers the above mentioned evaluation categories and is used by WP5 working groups for pilot evaluation.

The pilot evaluation process for Y4 includes the following steps:

1. Data collection based on the templates for domain and national pilot evaluation.
2. Consolidation and processing of pilot evaluation data from Domains and MS/ACs.
3. Conclusions and suggestions.

The pilot evaluation framework and the related templates for domain and national pilot evaluation are available on the WP5 wiki [here](#).

As it has been mentioned, the pilot evaluation material that is produced in the context of **step 1** of the evaluation process is stored on the **Repository of Pilot Solutions⁸ of the WP5 wiki for e-SENS pilots**. The results of processing and consolidation of pilot evaluation data gathered at domain and national pilot level (**step 2** of the evaluation process) are presented in **chapter 5**. Final conclusions and suggestions (**step 3** of the evaluation process) are presented in **chapter 6**.

⁷ PEPPOL, Deliverable 9.2, PEPPOL Pilot and Enablement Evaluation

⁸ <http://wiki.ds.unipi.gr/display/ESENSPILOTS/Repository+of+Pilot+Solutions>

- In addition to the above mentioned templates for pilot documentation and evaluation, WP5 has been closely monitoring the **ABB readiness and deployment maturity status at domain and national level** using a list of different states of the ABBs.

The **final pilot readiness and deployment maturity status at domain and national level** is included, as part of pilot documentation, and stored for each pilot on the wiki for e-SENS pilots. A **report on pilot readiness and pilot maturity at domain and national level** is also presented in **chapter 4**.

1.4. Relations to the Internal Environment of e-SENS

Deliverable D5.6 contributes and underpins achievement of WP5 objectives. It also contributes to other work packages that are related to WP5. More specifically, in the context of pilot evaluation that is carried out in D5.6, WP5 has been in close collaboration with WP6 regarding linking of BB use in pilots with the WP6 EIRA (including between the wikis) but also with WP3 for the development of the sustainability dimension of the evaluation framework for pilots. A questionnaire from WP3 on sustainability was answered by pilots at domain and national level, with results included in the wiki and analysed in this report (Chapter 5).

Additionally, WP5 has been in close cooperation with WP6 in matters on architecture and implementation support. The work and cooperation was carried out during face-to-face meetings and using collaborative tools or online conference facilities to exchange and evolve the result of the efforts. At least two joint Workgroups were operational during the project – one on AS4 interoperability and one on eID. Since Y2, Pilot Solution Architects, who had been appointed by the domain and national pilot teams from WP5, and BB Architects, who had been appointed by WP6, have been working closely in order to support pilot implementers.

WP5 has been in close cooperation with WP4 in the last year of the project, where WP4 together with some pilots (eHealth, Business Lifecycle) produced eIDAS impact analysis papers and prepared a legal agreement for eTendering pilot.

WP5 has also been in close cooperation with WP2 strengthening the pilot-related communication. Following a Y3 review recommendation, that cooperation intensified resulting in increased pilot-related communication, (including domain campaigns, news, marketing materials, articles etc.), improved pilot visibility and better understanding of the e-SENS added value.

1.5. Relations to External e-SENS Environment

There is a considerably intense interest in e-SENS piloting not only inside the project within its participants, but also around the e-SENS consortium, within a variety of interested stakeholders.

Target groups of external stakeholders include national administrations, European Commission (e.g. CEF, DG GROW, DIGIT, CONNECT, DG JUST), domain-specific bodies (e.g. EXEP Expert Group in eProcurement, eHMSEG, OpenNCP, eHealth Network, JASeHN in the eHealth domain), standardization organizations (e.g. CEN PC440), etc. Within the content of deliverable D5.6 it is possible to communicate to all external target groups, the final pilot documentation with emphasis on results and achievements, added value produced, impacts and lessons learnt. In addition, deliverable D5.6 supports handover of national pilots to business owners and transfer of ownership of domain-level infrastructure to Core Service Platforms of steady-state governance structures.

1.6. Quality Management

Category	Remarks	Checked by
Conformance to e-SENS template	Yes	WP5 management, WP1 reviewers
Language & Spelling	Yes	WP5 management
Delivered on time	Yes	WP5 management
Each technology description contains the correct elements	Yes	WP5 management
Consistency with description in the TA and in other e-SENS deliverables	Yes	WP5 management, WP1 reviewers
Contents is fit for purpose	Yes	WP5 management, all reviewers
Contents is fit for use	Yes	WP5 management, all reviewers
Commitment within WP	Yes	WP5 management, Domain Leaders, Workgroup Coordinators

Table 3: Quality checklist

1.7. Risk Management

The content of deliverable D5.6 has been the result of a months-long process within each WP5 domain and each working group within the domain producing detailed domain and national pilot documentation and evaluation for each domain use case.

This section describes the process used for effective risk management. It summarises the risks identified for creating deliverable D5.6. This includes identifying the risks, risk analysis, risk assessment and defining responses and risk owner.

Description	Probability	Impact	Priority	Response	Owner
Contributions from partners are not delivered in time	medium	high	medium	Communicating with partners and monitoring progress	WP5 management, domain leaders and workgroup coordinators
Contributions from MS are not delivered in time	high	high	high	Communication with MS, Monitoring progress, Alerting the General Assembly for non-responsiveness or extremely late responsiveness, Contacting the respective Head of Beneficiary	WP5 management, domain leaders and workgroup coordinators
Contributions from partners do not have the sufficient quality	medium	high	high	Working closely with domain leaders and workgroup coordinators, Iterations of the documents with comments	WP5 management

Description	Probability	Impact	Priority	Response	Owner
				and clarifications on what is expected	
MS pilot documentation and evaluation do not have the sufficient quality	high	high	high	Communication with MS and providing clarifications	WP5 management, domain leaders and workgroup coordinators

Table 4: Risks

1.8. Legal Issues

Legal issues, where relevant, are described within each domain or national pilot documentation.

Legal questions have been presented to WP4 by the pilots and were handled by WP4 experts. WP4 also provided advice for the legal provisions and possibly (in some cases) for the agreements that will be necessary for piloting in a real production environment (e.g. eTendering pilot).

1.9. Structure of the document

Deliverable D5.6 “Pilot Evaluation, Handover and Long Term Sustainability” is **comprised of two parts**:

- A **report** (this document) which is structured as follows:
 - Chapter 1 introduces the deliverable by giving the objective and scope of the deliverable, a general description of its WP (WP5), an overview of the methodology used in the context of the deliverable as well as its relations to internal e-SENS environment (WP5, other WPs), quality management, risk management and legal issues.
 - Chapter 2 describes the e-SENS Approach to Documenting and Evaluating Pilots and presents in more detail the electronic **Repository of Pilot Solutions** which stores all the pilot-related material that is produced in the context of deliverable D5.6 as well as the structure of the pilot fact sheets and the evaluation framework.
 - Chapter 3 presents the pilot fact sheets for all domains with links to corresponding pages on the wiki.
 - Chapter 4 presents the pilot readiness and deployment maturity status of SATs/ABBs at domain and MS level as well as some relevant statistics.
 - Chapter 5 presents an overview of the results of processing and consolidation of pilot evaluation data from all pilots and includes links to corresponding pages on the wiki.
 - The last chapter, Conclusions, presents the final conclusions.
- An **electronic part** which is the **Repository of Pilot Solutions** stored at the **WP5 wiki for e-SENS pilots**. As regards its structure the repository includes, in **separate sections for each domain**, documentation about domain and national pilots such as the description of the final pilot solution architectures of the domain and national pilots of all domain use cases with details on technical architecture, (including SATs, ABBs, ABB specifications and SBBs) and description about further profiling of ABB specifications; additional documentation about pilot testing activities; other documentation of pilot implementation; pilot evaluation. A detailed description of the **structure of the Repository of Pilot Solutions** is given in **section 2.1**.

2. The e-SENS Approach to Documenting and Evaluating Pilots

2.1. The Repository of Pilot Solutions

This **Repository of Pilot Solutions** is part of the **WP5 wiki for e-SENS Pilots** and it stores the **electronic part of D5.6**.

The **Repository of Pilot Solutions** of the e-SENS Solution Repository includes documentation about domain and national pilots such as the description of the final **pilot solution architectures** of the domain and national pilots of all domain use cases with details on technical architecture, (including SATs, ABBs, ABB specifications and SBBs) and description about further **profiling of ABB specifications**. It also includes additional documentation about **pilot testing activities, other documentation of pilot implementation**, as well as **pilot evaluation, results and recommendations to support handover of pilots**. The documentation included in the Repository of Pilot Solutions is related to the **deliverable D5.6 (Pilot Evaluation, Handover and Long Term Sustainability)**.

A **pilot Solution Architecture** of a domain use case documents the **domain pilot architecture** and all the related **national pilot architectures** of the Member States that participate in the domain pilot. A pilot Solution Architecture **conforms to the e-SENS Reference Architecture**, contains e-SENS BBs and is **linked to the wiki of the e-SENS EIRA** through the links that the pilot solution has to e-SENS SATs, ABBs and SBBs.

Below is the link to the Repository of Pilot Solutions:

- **WP5 wiki for e-SENS Pilots:**

- <http://wiki.ds.unipi.gr/display/ESENSPILOTS>

- **Repository of Pilot Solutions**

- <http://wiki.ds.unipi.gr/display/ESENSPILOTS/Repository+of+Pilot+Solutions>

The other main part of the WP5 wiki, is the **Pilot Blueprints and Requirements Repository** that is related to deliverable D5.7b. It includes the pilot blueprints including the requirements of the domain use cases of e-SENS. A short description of the WP5 wiki is given in the next section.

2.1.1. The WP5 wiki for e-SENS Pilots

The **WP5 wiki for e-SENS Pilots** stores the **e-SENS Solution Repository** which includes documentation about e-SENS pilots and is related with the final WP5 deliverables **D5.6** and **D5.7b**. It stores the **Repository of Pilot Solutions** which is the electronic part of D5.6 and the **Pilot Blueprints and Requirements Repository** which is the electronic part of D5.7b.

According to the following figures, the **e-SENS Solution Architecture**, conforms to the **e-SENS Reference Architecture**, contains e-SENS Building Blocks and is represented by the **Solution Repository** which is part of the **e-SENS Repository**. In the context of the work for the deliverables D5.6 and D5.7b, the e-SENS Solution Repository is implemented as a wiki, the wiki for e-SENS Pilots and is **linked with the entities of the e-SENS EIRA (SATs, ABBs, SBBs)** that are described in the electronic repository for the e-SENS EIRA:

<http://wiki.ds.unipi.gr/display/ESENS/WP6+-+Building+Blocks>

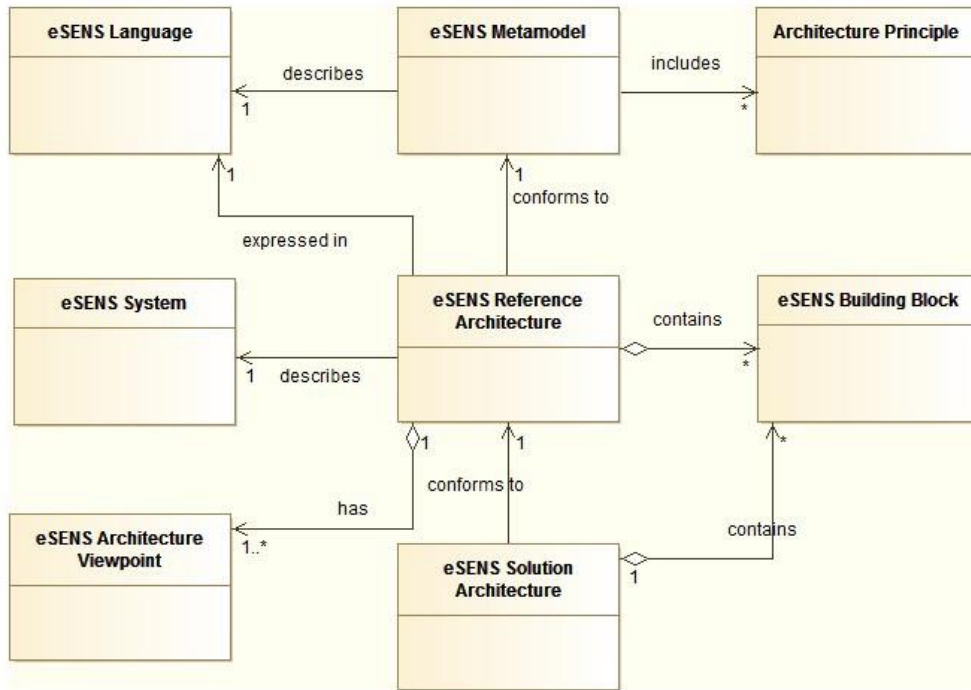


Figure 1: e-SENS Architecture Framework (source D6.6, section 4.2)

The following picture presents the **e-SENS Repository** with all its constituent repositories as well as the relationships between the entities of the different repositories.

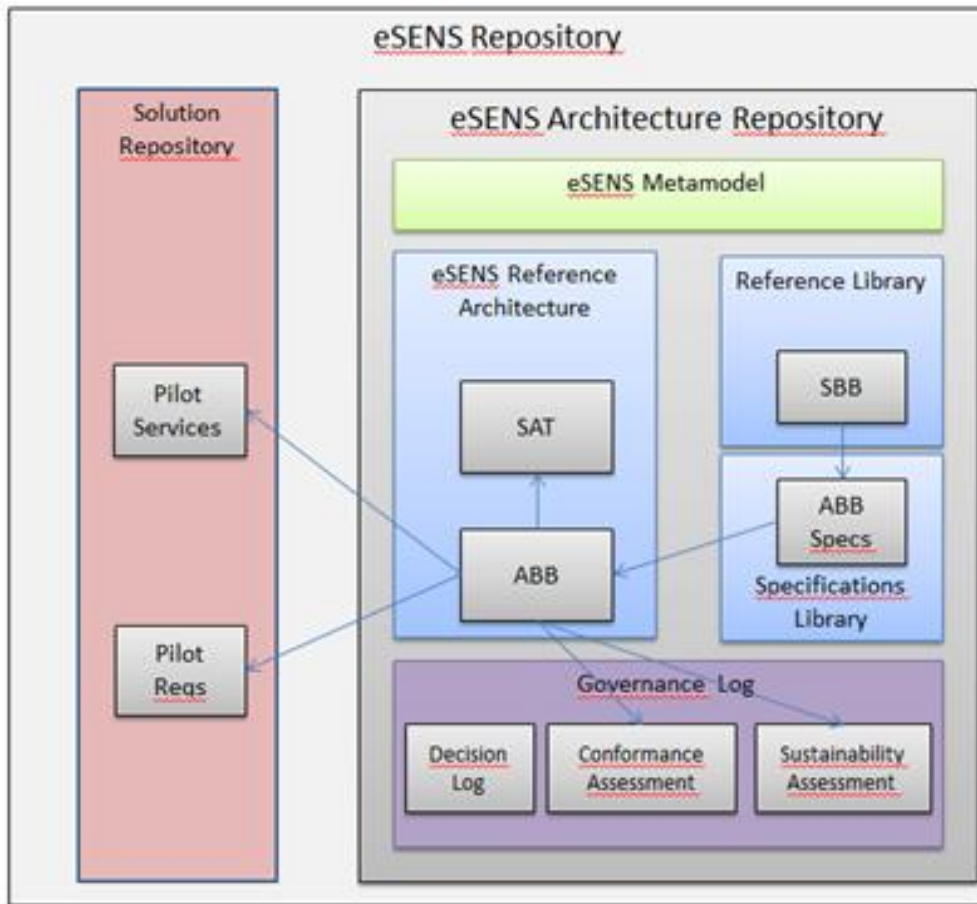


Figure 2: The e-SENS Repository with all its constituent repositories and the links between them (source D6.6, section 5.2)

2.1.2. Structure of the Repository of Pilots Solutions

As regards its structure, the Repository of Pilot Solutions includes, in **separate sections for each domain**, the final documentation of the domain pilots as well as the related national pilots. **Section 1.3** presents the domain codes and names of the domain pilots. Each section presents the **final domain pilot architectures** of the domain use cases in the specific domain, the related **national pilot architectures** for the MS/ACs participating in the domain pilots and their **mapping to the entities of the e-SENS EIRA**, as well as additional documentation produced by each pilot such as documentation about **pilot testing activities, pilot evaluation** and other pilot specific material.

The following figure presents a snapshot of the structure of the repository.

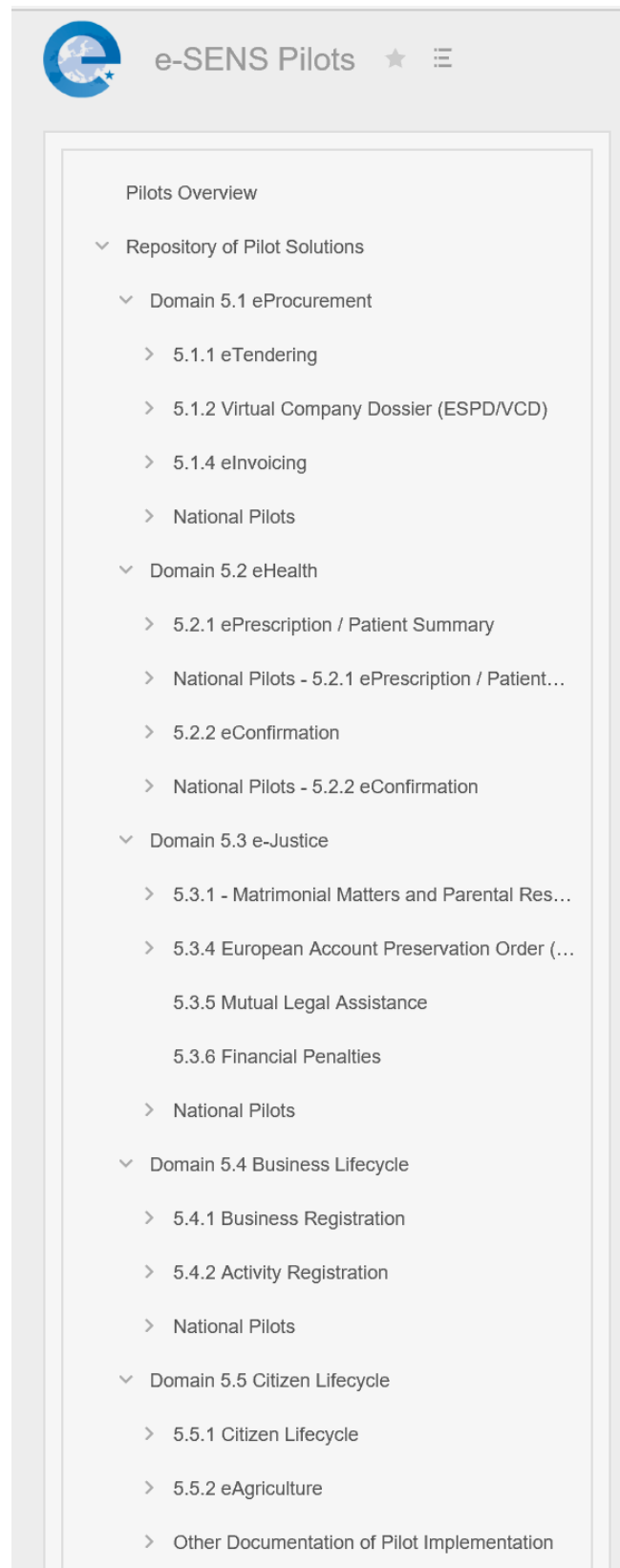


Figure 3: A snapshot of the structure of the Repository of Pilot Solutions

- Documentation about a **domain pilot** is based on the [domain pilot documentation template](#) which includes the following sections:
 - Use Case Overview
 - Motivation and Goals (background and rationale, value and domain importance, specific relationship with prior LSPs)
 - Process Description (actors, preconditions, flow of events, post conditions, assumptions, special requirements)
 - Architecture and Building Block Implementation (overview diagram of architecture and topology, use of e-SENS BB per area, use of established infrastructure at EU and MS level, pilot specifications)
 - MS Participation and ABB Readiness and Deployment Maturity Status
 - Pilot Testing
 - Other Documentation of Pilot Implementation

Moreover, apart from the above-mentioned sections, a last section includes the **domain pilot evaluation** report which is based on the **pilot evaluation framework and the corresponding template**. (The pilot evaluation framework and the templates for domain and national pilot evaluation are included on the wiki on the following link: [pilot evaluation framework and templates](#)).

- Documentation about a **national pilot** is based on the corresponding [national pilot documentation template](#) which includes the following sections:
 - Pilot Scope
 - Domain Use Case piloted
 - National Motivation and Goals
 - Business Process Overview
 - Pilot participants and Stakeholders
 - Pilot Description
 - Overview diagram of architecture
 - Pilot scenario
 - Use of e-SENS and Domain-Specific Building Blocks
 - Use of National infrastructure
 - Pilot Testing
 - Other documentation of pilot implementation
 - Moreover, apart from the above-mentioned sections, a last section includes the national **pilot evaluation** report which is produced based on the **pilot evaluation framework and the corresponding template**. (The pilot evaluation framework and the templates for domain and national pilot evaluation are also included on the wiki on the following link: [pilot evaluation framework and templates](#)).

2.2. The Pilot Fact Sheet

The **Pilot Fact Sheet** was introduced in e-SENS as a response to the review recommendation of improving pilot status reporting. It aims to summarize and digest all relevant information from a pilot into a limited space and provide links to further information on the wiki.

A fact sheet was produced for each of the different workgroups/domain pilots in the eProcurement and eHealth domains, because these pilots are very different from each other and they are oriented towards different stakeholders so we separated them. By contrast for the other three domains of e-Justice, Business Lifecycle and Citizen Lifecycle, we produced one fact sheet per domain covering all the use case-oriented workgroups. As a result, we have eight fact sheets for eTendering, ESPD/VCD, eInvoicing, ePrescription/Patient Summary, eConfirmation, eJustice, Business Lifecycle, Citizen Lifecycle (including eAgriculture).

The **Pilot Fact Sheet** includes summarized information for all the domain pilots and provides the basis for reporting pilots in deliverable D5.6 and **linking the report** with the detailed information presented on the **e-SENS pilots wiki**.

It includes the following sections:

1. **Scope and Focus**
2. **Rationale and Value**
3. **Implementation and Execution**
4. **Achievements and Lessons Learnt**
5. **Sustainability and Handover**

The **Scope and Focus** section includes a summary of the scope of the pilot and where it focused its work. The section also includes a description of the Y4-refocusing that took place after Y3 review. The section is linked with the **Use Case Overview** and the **Process Description** wiki pages of the pilot. Here in this first section, also the countries piloted are listed with links to their **national documentation and evaluation** pages on the wiki.

The **Rationale and Value** section includes a summary of why to pilot the specific use case and what is the value for different stakeholders. The section is linked with the **Motivation and Goals** page on the wiki.

The **Implementation and Execution** section includes a summary of what was implemented in the pilot and how the pilot was executed. It includes a figure of the Technical Readiness for each SAT at national level with justifications on the specific states for specific ABBs and the domain profiling work done for the ABB to be used in the pilot. There is also a figure which shows the Deployment Maturity for each SAT at national level, whether the pilot is in production or in pre-production or in a fully functioning test environment. Pilots may be placed at any of these three deployment maturity states, depending on the context at national and domain level. The section is linked with the detailed figures of **Technical Readiness for each ABB at national level** and the **Deployment Maturity for each ABB at national level**. Additionally there are links to the **Pilot Architecture and Use of BBs** or specific **BBs** and the **Pilot Testing** pages on the wiki.

The **Achievements and Lessons Learnt** section includes a summary of what was finally achieved and what were the lessons learnt. eIDAS and Once-Only relevance is also presented. The section is linked with the respective **Pilot Evaluation** page on the wiki and the **List of Artefacts** page if relevant.

The **Sustainability and Handover** section includes a summary of sustainability and handover issues along the dimensions of governance of specifications and governance of operations, transfer of ownership, CEF uptake,

Follow-up projects and MS adoption. This section is linked with the **Sustainability Assessment** part of the pilot evaluation page on the wiki.

2.3. The Pilot Evaluation Framework

The **pilot evaluation framework** used in e-SENS is based on the pilot evaluation framework that was used in PEPPOL⁹ and it was adapted for e-SENS. It includes the following approaches to evaluation:

- **A. Goals based evaluation**
- **B. Outcomes based and process based**
- **C. Evaluation of e-SENS BBs used in pilots**
- **D. Sustainability assessment**

These approaches to pilot evaluation are applied both at **domain pilot level** for all **domain pilots** of e-SENS as well as at **national pilot level** for all **national pilots**.

Each **domain pilot** is evaluated using the **domain pilot evaluation template** that is available in the WP5 wiki [here](#).

Each MS evaluates the national pilot it participates using the **national pilot evaluation template** that is available in the WP5 wiki [here](#). If a MS pilots more than one use cases in the same domain or in more domains, it evaluates each national pilot it participates separately.

In fact, the pilot evaluation templates for domain pilot evaluation and national pilot evaluation differ slightly with regard to the templates used for the goals based evaluation.

A more detailed description is given in the following sections.

2.3.1. A. Goals based pilot evaluation

This is an evaluation against the original goals of domain pilots as well as the MS's original goals with the individual pilot scenarios.

Domain pilot-centric or MS-centric criteria may be difficult to harmonize across domain pilots/MSs.

Goals based evaluation is applied at domain pilot level and at national pilot level with some differences with regard to the templates used in each case. More specifically:

- **Goals based evaluation at domain pilot level:**
 - A1. Achievement of domain goals
- **Goals based evaluation at national pilot level:**
 - A2. Achievement of National KPIs (for KPI5.3 and KPI5.4).

Since the MSs' original goals (evaluation criteria) are rather individual, this kind of evaluation does not necessarily identify general tendencies that fit into a consolidated view of the e-SENS context in which the

⁹ PEPPOL, Deliverable 9.2, PEPPOL Pilot and Enablement Evaluation

piloting is performed. As a consequence, the template is rather unstructured with regards to the individual goals, except for the KPIs¹⁰.

The KPIs represent an initial set of ambitions for each piloting country, and here the evaluation template follows the structure in the KPI spreadsheets. The WP5 KPIs include the following:

- KPI5.1: Relevance
 - Number of domain pilot plans (available in deliverables D5.4 and D5.5)
- KPI5.2: Relevance
 - Number of national pilot plans (available in deliverables D5.4 and D5.5)
- KPI5.3: Infrastructure (per BB, per pilot, per country) (available in deliverable D5.4)
 - Number and description of systems/platforms/services that are deployed in each MS implementing BBs
 - Types of BBs implemented in each system
- KPI5.4: Enablement and Impact potential (available in deliverable D5.4)
 - Number of potential users in connected communities
 - Type of connected users

KPI5.1 and KPI5.2 are reported by WP5 management based on available, positively qualified pilot plans.

Regarding **KPI5.3** and **KPI5.4**, in the context of D5.4 all piloting countries were requested to **declare their level of ambition** in each piloting domain. (Some piloting countries declared their level of ambition in October/2016). The ambition level was set by each MS for each domain pilot and it was then aggregated at WP5 level. (Section [Key Piloting Indicators](#) on the wiki presents per domain pilot for each MS the related ambition level for KPI5.3 and KPI5.4).

In the context of pilot evaluation, all piloting countries are requested to declare their **achieved level** with regard to KPI5.3 and KPI5.4 in each national pilot. Thus, the MS ambition level planned for KPI5.3 and KPI5.4 is compared with the corresponding achieved level at the end of the project.

2.3.2. B. Outcomes based and process based evaluation

This is an evaluation against some **general criteria** that **measure the value of the BBs and the e-SENS support structures in a pilot scenario based on pilot experience**. The criteria relate to both the **tangible outcomes of e-SENS (BBs)** and the **process (support, methodology etc.)**.

Among the plethora of possible criteria against which the pilots could be evaluated, it was decided that each criterion should evaluate the pilot project in an **e-SENS context**, that is: **How did the e-SENS BBs and the e-SENS organisation contribute to the success or challenges of the pilot?**

By this approach all pilot evaluations are aligned.

The common criteria are grouped in separate sections and are applied both at domain pilot level (i.e. per domain pilot) and at national pilot level (i.e. per national pilot). The **groups of criteria** are:

¹⁰ In the context of deliverable D5.4 and in order to assess the commitment of each piloting country in each piloting domain and the impact of e-SENS piloting, WP5 proposed a KPI structure that was approved by the national representatives of MS/ACs in the General Assembly in Oslo (26/3/2015).

1. **B1. e-SENS's vision and market adoption**
2. **B2. Project execution in an e-SENS context**

The measurement of pilot experience is based on a standard methodology of managing project execution by measuring on the following **6 key indicators** which are considered critical for a successful project outcome:

1. B2.1 Stakeholders were committed
 2. B2.2 Organisational Benefits were Realized
 3. B2.3 Work and Schedule were Predictable
 4. B2.4 Team was High-Performing
 5. B2.5 Scope was Realistic and Managed
 6. B2.6 Risks were Mitigated
3. **B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.**
 4. **B4. Pilot execution in production environment:** for that criterion quantitative data are collected with regard to the number of transactions performed in each pilot.

For each one of the above criteria there is a corresponding section in the **pilot evaluation document template** that is answered both at domain pilot level and at national pilot level for all pilots, (see **Section 2.3.5**).

An additional criterion is the **Effectiveness of e-SENS BBs**. (In fact this is a separate evaluation criterion because BBs are significant part of the work. See following section).

2.3.3. C. Evaluation of e-SENS BBs used in pilots

- **C1 Product-oriented evaluation:** identification and evaluation of the e-SENS BBs (ABBs) resulting from WP6 and assessment of their individual qualities based on the following criteria:
 - Status
 - Professional quality
 - Governance

The evaluation template includes the following questions:

- BB name and version
 - Obtained when?
 - Obtained from?
 - Technical quality of specs/software (e.g. amount of bugs, conformance testing results)
 - Governance (How Long Term Sustainability judged)
 - Overall assessment
 - Comments on BB view
- **C2. Pilot goals-oriented evaluation:** evaluates how well do the BBs cover the scope of the pilots in terms of the following:
 - Are they ready for market adoption?

- Do the BBs support openness and general market adoption?

The evaluation template includes the following questions:

- Fit for pilot purpose?
- Used in pilot?
- If evaluated but not used, why not?
- Gaps and suggestions

- **C3. Adoption-oriented evaluation:** BB evaluation based on pilot experiences.

The purpose is to evaluate the e-SENS BBs (ABBs) as seen as from the perspective of an external implementer, i.e. the pilot participants.

The evaluation template includes the following questions:

- Ease of implementation and necessary effort
- Comments on adaptation actions and adoption effort
 - Describe which additional adaptation/integration actions were required to adopt the BB for the pilot and what effort they took
- Quality of technical support, documentation and guidance
- Quality of conformance testing documentation and guidance
- Comments on adoption view

2.3.4. D. Sustainability assessment

The purpose of the sustainability assessment is to evaluate the sustainability potential and collect related data about the sustainability plans for all pilots of e-SENS including post-pilot conditions for adoption, to support possible transfer of ownership to future owners. Sustainability assessment is based on a template/questionnaire prepared by WP3 that includes the following sections:

- Relevant actors
- Development roadmap
- Use case content
- Legal issues
- Business issues
- EU dimension

According to the Technical Annex of the project:

- a template prepared by WP3 should be used by pilots in the evaluation and documentation of their sustainability potential.
- in the context of the action A5.x.3.4: Pilot Adoption: “pilots will have the mission to prepare the grounds and provide plans for Long-Term Sustainability, including post-pilot conditions for adoption and possible transfer of ownership to steady-state structures (where relevant). The Long Term Sustainability (LTS) planning and particular considerations will be the responsibility of each pilot since it is expected that there will be great differences between different pilots in different MS/ACs. These will be documented within D5.6”.

Sustainability assessment of e-SENS pilots is carried out both at domain pilot level for each domain pilot and at national pilot level for each national pilot and is part of **deliverable D5.6**.

Moreover, the most relevant aspects of the output coming from the pilots may give input to **WP3 deliverable D3.9**.

2.3.5. Evaluation process - Association between the evaluation approach and sections of the pilot evaluation templates

As it has been mentioned in the introduction, the pilot evaluation process for Y4 includes the following steps:

1. Data collection based on the templates for domain and national pilot evaluation.
2. Consolidation and processing of pilot evaluation data from Domains and MS/ACs.
3. Conclusions and suggestions.

In the context of the **first step** of the evaluation process, all e-SENS domain and national pilot teams evaluate the corresponding domain/ national pilot using the related templates.

The **second step** of the evaluation process includes a consolidation and processing of pilot evaluation data such as: calculation of **average rates** (where applicable) for each domain pilot and for each national pilot, calculation of **average rates per pilot** (where applicable) and consolidation of main evaluation data per pilot, calculation of **overall average rates** (where applicable) **from all pilots**, etc.

The **third step** (conclusions and suggestions) includes a final report for all WP5 pilots including the main results, potential impact - exploitation of results and overall conclusions.

The following table presents an association between the evaluation approaches of the pilot evaluation framework and the related section in the pilot evaluation templates for domain and national pilot evaluation. More specifically:

- The first column of the table includes the evaluation approaches of the pilot evaluation framework.
- Each evaluation approach corresponds to one or more sections of the pilot evaluation templates. (As regards the general criteria of the outcomes and process based evaluation, there is a corresponding section in both templates). Thus, each section of the pilot evaluation templates for domain and national pilot evaluation is associated with a specific evaluation approach of the pilot evaluation framework or evaluation criterion (in the case of the outcomes and process based evaluation). That association is shown in the second and third column of the following table.

For example, for the „e-SENS's vision and market adoption“ criterion of the outcomes and process based evaluation, the pilot evaluation data from the corresponding **sections** of the **domain and national pilot evaluation templates** are consolidated and processed in the context of the second step of the evaluation process.

Evaluation Approach	Section in <u>Domain Pilot Evaluation Template</u>	Section in <u>National Pilot Evaluation Template</u>
A. Goals based evaluation	A1. Achievement of domain goals (Overall Assessment and evaluation against own goals)	A2. Achievement of National KPIs (Evaluation against own goals/ Overall Assessment and Evaluation of KPI achievement)

Evaluation Approach	Section in <u>Domain Pilot Evaluation Template</u>	Section in <u>National Pilot Evaluation Template</u>
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	B1. e-SENS's vision and market adoption (Evaluation of pilot contribution to the e-SENS vision and its market adoption)	B1. e-SENS's vision and market adoption (Evaluation of pilot contribution to the e-SENS vision and its market adoption)
B2 Project execution in an e-SENS context	B2. Project execution in an e-SENS context (Evaluation of pilot execution in an e-SENS context)	B2. Project execution in an e-SENS context (Evaluation of pilot execution in an e-SENS context)
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Life-cycle Methodology (EPLM) and WP5/WP6 support (Evaluation of e-SENS pilot support: e-SENS Pilot Life-cycle Methodology (EPLM) and WP5/WP6 support)	B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Life-cycle Methodology (EPLM) and WP5/WP6 support (Evaluation of e-SENS pilot support: e-SENS Pilot Life-cycle Methodology (EPLM) and WP5/WP6 support)
B4. Pilot execution in production environment	B4 Pilot execution in production environment	B4 Pilot execution in production environment
C. Evaluation of e-SENS BBs used in pilots	C. Evaluation of e-SENS BBs used in pilot	C. Evaluation of e-SENS BBs used in pilot
D. Sustainability assessment	D. Questionnaire on sustainability plan	D. Questionnaire on sustainability plan

Table 5: Pilot evaluation approaches and association with domain and national evaluation templates

3. Domain Pilot Fact Sheets

3.1. eTendering Pilot Fact Sheet

3.1.1. Scope and Focus

The eTendering Pilot started with the ambition to provide a comprehensive coverage of the use cases that can be foreseen to bring interoperability among tendering platforms across Europe, following the recommendations of the [e-TEG Expert Group](#) and current EC policy (DG GROW) covering the entire pre-award phase of eProcurement. For reasons of time and resource limitation, the pilot focused from the start on the three system to system transactions considered of highest priority: Subscribe interest to a procedure, Access to documents, and Submit Tender.

The process of **Y4 re-focusing of all pilots** as a result of the Y3 Review affected the eTendering pilot in making sure the level of ambition was raised to include not just technical results, but actually a sustainable continuity in terms of governance within OpenPEPPOL. Activities to that effect, such as preparation of the new agreements within OpenPEPPOL were launched and implemented in the last 6 months of the project and are continuing within OpenPEPPOL.

A more detailed description of the [use cases](#) and the [process descriptions](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [Germany](#), [Denmark](#), [Netherlands](#), [Norway](#), [Portugal](#) and [Vortal](#) can be found on the e-SENS Pilots wiki.

3.1.2. Rationale and Value

Currently in Europe, the Contracting Authority (CA) uses an eTendering platform to run a public procurement procedure, and each Economic Operator (EO) interested in participating should use the same platform. This is a 3-corner topology where the choice of platform is done by the CA as the law dictates, but it means that an EO must access several eTendering platforms in order to place bids for different opportunities. When the EO wants to participate in procedures in another country this becomes rather cumbersome, but it is also complicated within countries that do not have a single national platform but several ones from the market (Portugal, France, Germany, Italy, Nordics etc.).

The eTendering pilot attempted for the first time to decouple the preparation of a tender from its submission, making it possible for the EO to use a platform of its choice to receive the tender documents and prepare the tender, and then use system-to-system interoperability for the tender to be submitted to another platform, the one that the CA uses. This is a 4-corner topology that was made possible by the use of eDelivery connecting the eTendering platforms in a secure, reliable and trusted manner. The biggest challenge was to make sure that the pilot solution would meet the [business](#) and [legal](#) requirements that are particularly sensitive in the Submit Tender use case where liability can be significant as receiving a tender before deadline under the required conditions has a high commercial value.

The interoperability between eTendering platforms, which the pilot was set up to prove and promote, brings high value to the market of EOs who can now minimize the number of systems they use, thereby lowering the barrier for the participation of companies (particularly SMEs) to different public procurement procedures and makes cross-border bidding easier, thereby facilitating the expansion of the Single Market. For the eTendering platform providers, interoperability opens up new possibilities for them to provide services to EO, whereas until now the CAs are their only customers. For the CAs and the public sector in general,

interoperability can increase the number of bids per procedure, thereby increasing competition and avoiding oligopolies of public sector suppliers.

The pilot was established in a way that it would involve real market actors, i.e. public and private eTendering platform providers from different countries, but also ICT market actors that already provide eDelivery connectivity products and services in the eProcurement domain through the PEPPOL network.

A more detailed description of the pilot's [Motivation and Goals](#) can be found on the e-SENS Pilots wiki

3.1.3. Implementation and Execution

The eTendering Pilot started with just two platform providers (NL, DK) and one eDelivery Access Point (IBM) and by the end of the project found implementations by seven platform providers (two public, five private) from six countries.

The following table shows the countries that piloted and the level of technical readiness they reached in each SAT of the e-SENS Architecture. A more detailed overview of [Technical Readiness at ABB level](#) can be found on the e-SENS Pilot Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.1 eTendering	Germany	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Denmark	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Enablement in progress
	Spain - Pixelware	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Netherlands	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Norway	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Portugal (ESPAP)	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Portugal (Vortal)	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Enablement not started

Figure 4: eTendering Pilot – Technical Readiness for each SAT at national level

The Pilot used almost the entire range of e-SENS Building Blocks and provided significant advances over the state-of-art. In [eDelivery](#) it worked with the AS4-based CEF eDelivery architecture for the first time in the eProcurement domain. The [eDocuments and Semantics](#) architecture was based on CEN/BII profiles following the industry-strength PEPPOL approach for profiling them further into Business Interoperability Specifications (BIS). A new [trust framework](#) was established for the 4-corner model combining the transport-layer circle of trust between the APs following the PEPPOL model and using a single PKI, whereas a second circle of trust between the eTendering platforms at the business layer was established using a Trust List. Since the submission of tenders in a 4-corner model is a business-sensitive transaction, an Evidence Emitter ABB has been profiled and implemented in order to provide [non-repudiation](#) of the transaction. The only BB not used was eID as it was left out of scope but it was actually used in Norway outside e-SENS, since there were mandatory requirements to use strong national and cross-border authentication of EOs.

A more detailed overview of [Pilot Architecture and use of BBs](#) can be found on the e-SENS Pilots wiki,

The pilot built its solutions in stages and followed an incremental approach, initially sharing infrastructure and later deploying it in each country. In Portugal there was a public Access Point (AP) provided by ESPAP (a

public authority responsible for national interoperability among Portuguese providers) and used by Gatewit (a private provider) whereas a separate Access Point deployed by Vortal (another private provider). The Spanish provider (Pixelware, private) used an Access Point provided by UPRC (Greece). The same AP was used by Germany in most of the pilot until in the last 6 months of the project when the solution was more mature, it was insourced to a DE provider (Governikus). The Netherlands started the pilot by using the IBM AP and later deployed its own with the support of Chasquis consulting, a private developer of the Holodeck B2B AS4 gateway solution.

All piloting countries reached the desired technical readiness level in all BB areas, with minor exceptions in the Evidence Emitter where IBM, supporting DK did not reach full transaction capability because it used its pre-production and production environments, and Vortal had some additional challenges not faced by other implementers because they operate a .NET environment based on Microsoft products and had to implement most functionalities from scratch because it could not use most of the Java-based software that was available to the pilot. At the time there were no Microsoft-based implementers of AS4 gateways compliant to eDelivery but at the time of writing this report (early 2017) there are such vendors that have passed the CEF conformance test and can be available for further implementations by the market.

Following from the previous point, it should be highlighted that the eTendering pilot provided a key group of real-life eDelivery implementers with new requirements, interacting with the AS4 interoperability workgroup that worked between WP6 and WP5 and which became the reference point for the implementation and acceptance of the e-SENS AS4 profile that e-SENS handed over to CEF eDelivery. Within the eTendering pilot it was demonstrated that the full range of the eDelivery architecture (message exchange, dynamic discovery, non-repudiation, backend interface) could be implemented and be interoperable using three different vendors: IBM, Holodeck and Flame.

Regarding the Deployment Maturity level of implementation, the following table gives the overall picture of the eTendering pilot, whereas a more detailed overview of [Deployment Maturity at ABB level](#) can be found on the e-SENS Pilots Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.1 eTendering	Germany	Pre-Production	Full-function test pilot	Full-function test pilot		Full-function test pilot	Pre-Production
	Denmark	Actual Production	Full-function test pilot	Full-function test pilot		Full-function test pilot	Pre-Production
	Spain - Pixelware	Pre-Production	Full-function test pilot	Full-function test pilot		Full-function test pilot	Pre-Production
	Netherlands	Pre-Production	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Norway	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Lab environment
	Portugal (ESPAP)	Pre-Production	Pre-Production	Pre-Production		Full-function test pilot	Full-function test pilot
	Portugal (Vortal)	Lab environment	Lab environment	Lab environment		Lab environment	

Figure 5: eTendering Pilot – Deployment Maturity for each SAT at national level

It is clear that the highest level of deployment maturity can be found for eDelivery, since the vendors and service providers are already active in the ICT market and in the field of eProcurement as well. Consequently, eDelivery solutions were in most cases deployed in pre-production environments, which usually meant that only business, and not technical reasons, existed for not getting into actual production. In one case (IBM for DK) the AS4-based solution was added to the cloud-based production environment of the company, as a

result of the eTendering pilot. IBM of course already provides commercial services in production on the AS2 protocol mostly for post-award eProcurement on the PEPPOL network.

The pilot did not go into actual production in any country with end-to-end real transactions. [Testing](#) was extensively documented in each of the Connectathons, testing events between participants that took place on a regular basis.

The pilot extended its implementation scope by engaging heavily with eTendering platform providers which were not part of the original e-SENS consortium. This was done mainly through EUPLAT, a European Association of private providers, and resulted in having Vortal (PT) and Pixelware (ES) pilot with the eTendering workgroup in the 4th year of the project. Due to timing, a pilot plan for these two implementers was not included in D5.4 or D5.5. The pilot was followed by another EUPLAT member, Negometrix (NL), who did not proceed to a full implementation due to resource restrictions. The new providers entered the e-SENS consortium in Y4 through esens.com and got a budget allocation from the project's reserve.

3.1.4. Achievements and Lessons Learnt

The main achievement of the eTendering pilot was that it put interoperability among eTendering platform on the domain map, through its successful implementation of a technical solution, but also a governance framework to make operations feasible and sustainable. A small community of interoperable eTendering platforms was born and will continue its work, expanding as others adopt the solution.

Another key achievement that will greatly help further adoption was the inclusion of the pilot results to the [2017 CEF Call on eProcurement](#), where public and private providers can be funded by CEF to take the pilot results into real production. This is a huge boost of credibility for the pilot results, even though it actually acted as a counter-incentive for getting into production within the duration of the project. The eTendering Pilot cooperated closely with DG GROW prior to the Call launch and provided a [reference page](#) with links to the specifications CEF expects to be implemented. The page was included in the Call text.

An important lesson was that interoperability is by no means an easy sell when it comes to eTendering platforms, which compete for the business of CAs and until now they have not even been allowed to get income from EOs because legislation mandates that there should be no financial barriers to participation in public procurement procedures – hence the business case for offering EO-side services is far from evident. At the same time, the most advanced platforms already offer a highly sophisticated way of structuring and combining data in order to provide a better service to CAs, which are the main customers, whereas the degree of data structuring in the current interoperability profiles for tender submission have not yet reached that level.

As a result of these market realities, the use case of tender submission was, and still is, rather controversial among platform providers. Market incumbents in particular are deeply sceptical and we saw in e-SENS that they implemented only the other use cases. But the attitude is gradually changing as EO-side services get underway and the open CEF Call will be an opportunity to start building those services and find the right business models for them. This was something beyond the reach of the eTendering pilot that had to focus its activities on delivering a fully functioning and sufficiently governed solution. Market stakeholders and policy owners in governments will continue to consult each other in fora such as the multi-Stakeholder Expert Group on eProcurement (EXEP).

Regarding governance, the pilot succeeded in convincing OpenPEPPOL that it was worth opening up its operations to accommodate the nascent eTendering Community. OpenPEPPOL is itself in a transition as it is about to open up its eDelivery network to more communities running different business processes and using different types of payload, all on the same network. That challenge plus the need to have two levels of legal agreements – one at the transport layer following the current example of PEPPOL TIA and a new one at

business level between the eTendering platforms, created the need to establish a transition period for the incoming eTendering community into OpenPEPPOL. A working group has been established within OpenPEPPOL for this purpose, with its mandate including the preparation of the eTendering community for operations, which are foreseen for early 2018 following the implementation timetable of the CEF Call.

At the same time, it was important to convince external stakeholders that handing over governance to OpenPEPPOL was a workable and valuable prospect. This has also been achieved, as shown by the fact that the EC included in the 2017 CEF Call for eProcurement that the governance of operations regarding eTendering interoperability will take place in the OpenPEPPOL Pre-award Coordinating Community, as a successor to the e-SENS eTendering pilot.

The **eIDAS relevance** of the pilot was significant because the Trust List-based technical solution and governance of the circle of trust between eTendering systems is eIDAS-friendly since it is envisioned that the MS may want to be directly involved in the accreditation of the eTendering platforms and their national registration as Trust Service Providers. Therefore, a single PKI solution that OpenPEPPOL uses for the transport layer might not fly.

The **Once-Only relevance** of the pilot was significant due to the definition of a secure and reliable way of connecting systems in the eProcurement domain using CEF eDelivery, which is an architecture used also in the Once-Only Large Scale Pilot (TOOP).

A [list of artefacts](#) produced by the eTendering pilot is in the process of being handed over to OpenPEPPOL and implemented through CEF.

More details on [pilot evaluation](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.1.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** OpenPEPPOL (transition in progress). A handover to CEN TC440 was contemplated but current charging practices by CEN create issues with information becoming restricted and available only on condition of payment. The EC and the MS are not yet in a position to establish a governance framework for eProcurement that is more directly linked to the public sector, therefore OpenPEPPOL as a functioning and operational governance organization in the domain is the only viable option.
- **Governance of Operations:** OpenPEPPOL (transition in progress). A new PEPPOL Authority is being established for this purpose, with which the eTendering agreements of the platform providers are going to be signed. The PEPPOL TIA (Transport Infrastructure Agreements) for eDelivery providers are being revised to include the requirements of the eTendering operational environment. As mentioned in the point above, no alternative is being considered by the EC and MS at the moment.
- **Transfer of Ownership:** In progress – will be completed by the end of the transition period within OpenPEPPOL.
- **CEF uptake:** Through the currently open 2017 Call on eProcurement (deadline September 21st, 2017, applications to be submitted by then). The use of dynamic discovery within an environment of interconnected AS4 gateways has been taken up by the CEF eDelivery DSI and is implemented in the Domibus sample implementation maintained by the EC.

- **Follow-up projects:** Those to be funded by CEF 2017 and following years. Furthermore, the use case for interoperability between eTendering platforms is being extended within the context of the Once-Only principle and will be piloted within the TOOP Large Scale Pilot (2017-2019)
- **MS adoption:** Mainly through CEF, in the short-to-medium term. In the medium-to-long term, the implementation off the Once-Only Principle through the Single Digital Gateway Regulation will provide a more extended legal basis for system-to-system interoperability on pre-award eProcurement.

More details can be found at the [sustainability](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.2. ESPD/VCD Pilot Fact Sheet

3.2.1. Scope and Focus

Work in the ESPD/VCD pilot from the beginning of the project was closely aligned with the development of the ESPD exchange data model and schema as well as the update of eCertis, which was taking place under the responsibility of DG GROW in 2014-2015. But the final acceptance of the ESPD by the MS was very much delayed until the autumn of 2015 and the data model was not published by the EC until January 2016; at the same time, because of the legal obligation to have ESPD electronic above threshold by 2018, the EC published the CEF 2016 Call in March 2016 and included as a key priority the development of ESPD services by competent authorities in the MS.

The ESPD/VCD pilot developed a sample implementation of ESPD and VCD in parallel with the EC, making sure that there was interoperability between the two and the EC included the e-SENS implementation in the [2016 CEF Call on eProcurement](#) as one of the options the MS could use when they were implementing a service under CEF funding.

These developments had a profound effect on the direction of the pilot. Countries such as Germany and Greece, which had planned to pilot nationally were unable to do so before the spring of 2016 and at that time the opportunity to develop ESPD services funded under CEF was already available so it was no longer relevant or valuable from the side of e-SENS to provide pilots with such national implementations. Therefore, as part of the **Y4 re-focusing of all pilots**, the national plots of DE and GR were discontinued and resources were diverted in working further with the EC in providing updates to the ESPD exchange data model so that all implementations in Europe would be interoperable and the VCD specification would also continue to be interoperable with the ESPD. This was continued until the end of the project, making available an ESPD BIS and a VCD BIS specifications which are handed over to the community of implementers.

After the re-focusing, the only national pilot remaining operational was the [Italian](#) one which was important because it used eDelivery to transfer a VCD request and a VCD response in a pre-qualification business scenario.

A more detailed description of the [use cases](#) and [process description](#) can be found on the e-SENS Pilots wiki.

3.2.2. Rationale and Value

The ESPD/VCD pilot was included in e-SENS in order to provide the possibility to the eProcurement domain to continue work from the PEPPOL project on the Virtual Company Dossier under new circumstances created by the introduction of the ESPD with the 2014 Directive on Public Procurement. The intention was to extend the PEPPOL approach in the VCD using not only EU qualification criteria but also national ones, and to have a central semantic mapping engine providing machine-readable information on the cross-border equivalent

of national evidences in order to facilitate CAs accept with a good degree of legal certainty evidences issued in other MS.

The ESPD/VCD pilot provided concrete value to the domain by shadowing the ESPD implementation of the EC and contributing to the data model in ways that made possible the use of the national criteria by CAs, which is a more intuitive way than using the EU criteria. This approach has been adopted by the EC in version 2.0 of the ESPD exchange data model (to be available later in 2017) but it was already present in the VCD implementation that e-SENS provided even though eCertis does not yet provide national criteria consistently for all the countries. Nevertheless, the pilot pioneered the use of national criteria as the default way for both CAs and EOs to use ESPD and VCD.

The pilot also provided the possibility to use the eQualifications approach that is now introduced through self-declarations with the use of the ESPD, when the evidences are still needed by the CA. The VCD specification is, to put it simply, an ESPD with the possibility to attach the evidences. Work was based on a careful assessment and consideration of [legal requirements](#) stemming from the EU Directives.

Even though in some MS the qualifications procedure goes towards de-materialization with data automatically fetched by the CA (at a national level this is possible in countries like Estonia and Belgium), in many countries the evidences are still required by law. Since the mandate of the EC to provide a data model and a fully functioning service to the MS had to be limited to the letter of the 2014 directive, i.e. to ESPD as a self-declaration, it was left to e-SENS to provide artefacts that allowed the use of the same service to handle self-declarations for bidding and evidences for awarding. According to how the EC itself has presented the VCD implementation of e-SENS, it is a good way to start in countries that do not have any national aggregators of evidences or other infrastructure that connects eTendering platforms to national databases. These, after all, were the reasons why the sample VCD implementation was included in the list of recommended ways to implement ESPD in the 2016 and 2017 CEF calls on eProcurement.

Last but not least, the pilot pioneered the use of eDelivery for the exchange of information regarding to qualifications, since there is a legal obligation in the 2014 Directive for the CA to retrieve evidences if electronically available. Apart from demonstrating the feasibility of using the same infrastructure as in eTendering interoperability in order to help CAs fulfil that particular obligation, the pilot paved the way for the implementation of the Once-Only Principle in pre-award eProcurement.

A more detailed description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

3.2.3. Implementation and Execution

As already mentioned, only one country carried the pilot to full conclusion at a national level, as seen in the following table:

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.2 Virtual Company Dossier (ESDP/VCD)	Italy	Technical Readiness	Technical Readiness			Technical Readiness	

Figure 6: ESPD/VCD Pilot – Technical Readiness for each SAT at national level

The pre-qualification use case was initially interested for Norway and the Netherlands but these countries had a major commitment to the eTendering pilot and Norway particularly piloted a tender profile with ESPD, so there were no resources to devote to piloting cross-border transactions with Italy.

The pilot focused on eDelivery and eDocuments/semantics, which were the most important aspects of the use case implementation for pre-qualification. The basic transport layer trust model was used. A more detailed overview of [Technical Readiness at ABB level](#) can be found on the e-SENS Pilot Wiki.

In Italy there are many central purchasing bodies so it makes sense to implement the pre-qualification use case to be implemented nationally (more than 40 CPBs). As there was no other country piloting that use case, there were no cross-border communications.

However, it will take more time for national decisions to roll out this type of functionality and mandate it for CPBs, therefore the pilot implementation between Intercent-ER (Emilia Romagna marketplace) and Consip (National Central Purchasing Body) did not get deployed beyond a fully functional test prototype as can be seen by the following table, whereas a more detailed overview of [Deployment Maturity at ABB level](#) can be found on the e-SENS Pilots Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.2 Virtual Company Dossier (ESDP/VCD)	Italy	Full-function test pilot	Full-function test pilot			Full-function test pilot	

Figure 7: ESPD/VCD Pilot – Deployment Maturity for each SAT at national level

Even though there were not many countries implementing, the pilot produced a lot of material with domain significance. The [eDelivery](#) architecture followed that of eTendering, to make sure that the same infrastructure can be used for all different phases of pre-award procurement. Work on [eDocuments and Semantics](#) was very important and contributed directly to the ESPD exchange data model that the EC developed and continues to maintain.

Furthermore, the pilot made contributions towards a [reference UBL-based syntax](#) and [related artefacts](#) that the EC has developed, chiefly through the definition of a [Domain Vocabulary](#). The pilot provided a set of fully implementable Business Interoperability Specifications (the [ESPD BIS](#) and the [VCD BIS](#)), following the PEPPOL BIS approach that includes an information semantic model, a syntax and implementation guidelines such as domain-specific business rules. Basis of this work were the CEN/BII profiles for ESPD and VCD as well as the work of ISA on semantics and core vocabularies.

The pilot developed the [ESPD/VCD System](#) which is a modular sample implementation that can be re-used by service providers who want to integrate the main engine behind their own user interface or entirely. This modularity is a feature that provides flexibility not present in the EC implementation – moreover, the latter is implementing the ESPD only, not the VCD.

A more detailed overview of [Pilot Architecture and use of BBs](#) can be found on the e-SENS Pilots wiki,

Conformance testing for the pilot was done in cooperation with DG GROW and the ISA test-bed. A more detailed description of [Pilot Testing](#) can be found at the e-SENS Pilot wiki.

3.2.4. Achievements and Lessons Learnt

The biggest achievements of the ESPD/VCD pilot lie in its contribution to the development of the ESPD exchange data model and UBL-based syntax as well as paving the way for further work to implement an early, domain-specific flavour of the Once-Only Principle in the eQualification area of the eProcurement domain, as described earlier.

Looking forward, the ESPD/VCD system implementation will be used by several implementers of the ESPDint project (2017-2018), which is funded by CEF. As part of the ESPDint project, e-SENS work on software

implementation will be continued together with the EC in order to produce a reference implementation of ESPD/VCD v2.0. In e-SENS, the ESPD/VCD pilot showed the value of having an implementation project driven by MS and working in parallel with the more institutional implementers in the EC making sure that the specifications and core services developed and deployed by the EC are interoperable with the national services that are expected to interconnect.

The BIS specifications of ESPD and VCD are being handed over to OpenPEPPOL, where a working group inside the pre-award Coordinating Community is being established in order to provide a de-facto standardized way to implement ESPD using UBL syntax binding. Norway intends to mandate this syntax and other countries may follow or at least OpenPEPPOL members would, but by and large there is no obligation to commit to any given syntax and only voluntary commitments in a community-based operational environment can be expected. This is what OpenPEPPOL aims for, based on the input from e-SENS.

The lesson to draw here is that, on the one hand, a solid legal basis is a huge driver towards implementation of interoperability standards and digitization of eGovernment procedures in ways that work cross-border as well as nationally. During the PEPPOL project there was a lot of work on the VCD by a small group of visionaries, but it was too early to convince MS to adopt it and therefore work was abandoned after the end of the project. Now the landscape is different because there is a legal obligation to implement ESPD and soon a legal obligation to implement Once-Only in eProcurement.

On the other hand, interoperability cannot be based just on a common legal obligation and a common data model. A full stack of standardized artefacts is needed, for example a syntax and business rules – it is what the PEPPOL and e-SENS-type BIS provide. However, even if such a spec exists, only a voluntary community-based governance can ensure that systems are interoperable, otherwise a European norm has to be mandated – and there is no such prospect for ESPD at least in the immediate horizon.

Furthermore, interoperability needs continuous testing. This was done between e-SENS and DG GROW and will continue between DG GROW and the CEF-funded implementation projects, with the contribution of OpenPEPPOL.

The **eIDAS relevance** of the pilot was similar to that of the eTendering pilot, since both used the same definitions of eDelivery.

The **Once-Only relevance** of the pilot is particularly high, given that the VCD request and response over eDelivery using a standardized ESPD data model is already a way to implement Once-Only and will be the basis on which the TOOP LSP will pilot the extension of the use case picking up where e-SENS left off.

A [list of artefacts](#) produced by the ESPD/VCD pilot is in the process of being handed over to OpenPEPPOL (BIS) and to the ESPDint project funded by CEF (ESPD/VCD System implementation).

More details on [pilot evaluation](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.2.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** OpenPEPPOL for the BIS (transition in progress), and the ESPDint project for the sample implementation.
- **Governance of Operations:** OpenPEPPOL (transition in progress), since there does not seem to be any alternative promoted by the EC and MS. However, it remains to be seen whether a real operational

environment like in post-award will be developed around ESPD interoperability. This will probably happen when the Once-Only Principle in eProcurement is implemented.

- **Transfer of Ownership:** In progress – will be completed by the end of the transition period within OpenPEPPOL. Regarding the software, it will be further revised within ESPDint to follow the EC towards the finalization of ESPD v2.0.
- **CEF uptake:** It has already happened since March 2016 with the CEF Call on eProcurement published then; this year, it is still the top priority under the currently open 2017 Call.
- **Follow-up projects:** The ESPDint project is carrying the mantle from e-SENS when it comes to further direct work with the EC and developing further the e-SENS sample implementation. Work on the extension of the use case itself will take place within the TOOP LSP, where eQualifications are once more a piloting use case from an OOP perspective.
- **MS adoption:** Mainly through CEF, in the short-to-medium term. In the medium-to-long term, the implementation of the Once-Only Principle through the Single Digital Gateway Regulation will provide a more extended legal basis for system-to-system interoperability on eQualifications within pre-award eProcurement.

More details can be found at the [sustainability](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.3. eInvoicing Pilot Fact Sheet

3.3.1. Scope and Focus

The eInvoicing pilot focused entirely on the introduction of CEF eDelivery, based on the AS4 protocol, to an environment where all the other ABBs work as in the PEPPOL network (Dynamic Discovery through SMP, Single-root PKI for the transport infrastructure, PEPPOL identifiers etc.).

The work was carried in parallel with the e-SENS AS4 interoperability workgroup, involving the vendors of AS4 gateways and ended up stress-testing performance and interoperability among AS4-based solution environments configured to run eInvoicing on the PEPPOL network.

A more detailed description of the [use cases](#) and [process description](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [Austria](#), [Denmark](#), [Greece](#), [Norway](#) and [Slovenia](#) can be found on the e-SENS Pilots wiki.

3.3.2. Rationale and Value

eInvoicing is perhaps the only use case that was piloted in a Large Scale Pilot project (PEPPOL) and went into production already within the lifetime of the project with thousands of transactions in 2011-2012. Since then, eInvoicing has grown inside the OpenPEPPOL community and millions of transactions are taking place over the PEPPOL network in real production settings and in real business context. As result, the eInvoicing community is very sensitive to any changes in what has been a stable environment running PEPPOL eDelivery on the AS2 protocol between the Access Points.

Since e-SENS was conceived as a convergence project, where efforts were made to migrate from a multitude of protocols and architectures from the old LSPs (PEPPOL, SPOCS, e-CODEX, epSOS) towards one infrastructure, adopted and promoted by CEF eDelivery based on the AS4 protocol, it was important that the eInvoicing community, running large transaction volumes in production, is convinced of the technical and business suitability and feasibility of an AS4-based infrastructure.

The positive results of this pilot showed that eInvoicing can run on an AS4-based eDelivery network, without any technical problems. In parallel, OpenPEPPOL and CEF eDelivery entered into a MoU where procedures and conditions were mutually agreed for an eventual migration of the PEPPOL network towards AS4. Conditions had to do with technical feasibility and suitability but also with market maturity and the e-SENS eInvoicing pilot helped in a positive way showing technical viability and showing that at least a number of Java-based AS4 vendors and open source implementers could run eInvoicing without significant issues.

As part of the **Y4 re-focusing of all pilots**, the eInvoicing pilot did not continue before the summer of 2016, since it had already concluded its work and reached its objectives. Actually, that decision had been taken already during project re-planning in view of the Y4 extension, where it was decided that the eInvoicing pilot would not continue in Y4.

A more detailed description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

3.3.3. Implementation and Execution

As already mentioned, the scope was limited to eDelivery, where the eDocument payload was the PEPPOL eInvoice (BIS 4a) and the Trust Establishment used the PEPPOL model of single-root PKI. All piloting countries reached technical readiness as seen from the table below. A more detailed overview of [Technical Readiness at ABB level](#) can be found on the e-SENS Pilot Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.4 eInvoicing	Austria	Technical Readiness	Technical Readiness			Technical Readiness	
	Denmark	Technical Readiness	Technical Readiness			Technical Readiness	
	Greece	Technical Readiness	Technical Readiness			Technical Readiness	
	Norway	Technical Readiness	Technical Readiness			Technical Readiness	
	Slovenia	Technical Readiness	Technical Readiness			Technical Readiness	

Figure 8: eInvoicing Pilot – Technical Readiness for each SAT at national level

In terms of deployment maturity, as seen in the table below, most countries remained at a test pilot level apart from Slovenia which elevated the system to pre-production. The reason most countries remained as test pilots was that PEPPOL is still running AS2 and these countries are already in the PEPPOL network so it will take time before they will go into production with AS4 – they will follow the timelines of OpenPEPPOL migration and this is not yet happening. Slovenia had national reasons to go further because it linked the system to a national eInvoicing gateway.

A more detailed overview of [Deployment Maturity at ABB level](#) can be found on the e-SENS Pilots Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.1.4 eInvoicing	Austria	Full-function test pilot	Full-function test pilot			Full-function test pilot	
	Denmark	Full-function test pilot	Full-function test pilot			Full-function test pilot	
	Greece	Full-function test pilot	Full-function test pilot			Full-function test pilot	
	Norway	Full-function test pilot	Full-function test pilot			Full-function test pilot	
	Slovenia	Pre-Production	Pre-Production			Pre-Production	

Figure 9: eInvoicing Pilot – Deployment Maturity for each SAT at national level

Apart from the four piloting countries listed here, the tests were joined by a Service provider from the Czech Republic and by Chasquis consulting, the company that has developed and is maintaining the Holodeck open-source implementation of an AS4 gateway.

Between the pilot participants, three different AS4 implementations were tested against each other: IBM, Holodeck and Flame.

A more detailed overview of [Pilot Architecture and use of BBs](#) can be found on the e-SENS Pilots wiki,

A more detailed description of [Pilot Testing](#) can be found at the e-SENS Pilot wiki.

3.3.4. Achievements and Lessons Learnt

The pilot managed to prove technical feasibility of the use of AS4-based eDelivery to run eInvoicing. More particularly, that the e-SENS AS4 profile, used in several domains, was also suitable for eInvoicing. This made it possible for OpenPEPPOL to continue on a path towards eventual migration from AS2 to AS4.

Furthermore, eInvoicing is itself a CEF Building Block, meaning that it is considered a reusable solution in a multi-domain environment. The fact that CEF eInvoicing can work well with CEF delivery strengthens the case for using the 4-corner model for eInvoicing, which has been proven the best way to open up a market of service providers by interconnecting them, thereby connecting all their customers.

However, it takes more than the functional, technical and stress-testing that was conducted within this pilot to determine the business viability of moving to another infrastructure. A series of conditions on market adoption of AS4 is expected to be met and when that happens in a way that is acknowledged by the community of service providers, then the time will come to migrate.

On the other hand, there are signs the requirements for higher security and guaranteed delivery of invoices are starting to appear. Such requirements are not being implemented in today's PEPPOL network but if there is demand for them then the case for moving to CEF eDelivery becomes stronger because AS4 offers a higher level of security. In fact, eRDS requirements might soon point to that direction and if that happens then the landscape will change.

The **eIDAS relevance** of the pilot itself was not particularly significant, since there was no stakeholder consultation about additional requirements – the scope was limited to implementing and testing the AS4-based eDelivery architecture.

The **Once-Only relevance** of the pilot was not particularly significant either.

More details on [pilot evaluation](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.3.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** n/a – no new specifications were developed
- **Governance of Operations:** n/a – operations on AS4 will begin when OpenPEPPOL migrates and this will take time.
- **Transfer of Ownership:** n/a
- **CEF uptake:** CEF eInvoicing funds implementations on AS4 already since the 2016 Call. The pilot contributed to raising interest of market actors in requesting CEF funding for implementing AS in eInvoicing.
- **Follow-up projects:** n/a
- **MS adoption:** Mainly through the legal obligation to implement the European Norm, published by CEN TC434 in 2017.

More details can be found at the [sustainability](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.4. ePrescription/Patient Summary Pilot Fact Sheet

3.4.1. Scope and Focus

The ePrescription/Patient Summary Pilot (eP/PS) was the main eHealth pilot of e-SENS and continued the use cases which had been implemented and piloted in epSOS, which ended and handed over all results to EXPAND for further maintenance. The functional scope and the baseline infrastructure for eP/PS remained the same based on the interconnection of National Contact Points (NCPs). The IHE protocols for communication between the NCPs as well as the domain semantics were not touched either.

What the eP/PS pilot did was to re-factor certain aspects of the infrastructure using e-SENS BBs, aiming to improve the eHealth infrastructure through standardized, re-usable solutions. Most of the work concerned the internal functions of the infrastructure (e.g. replacement of the configuration services for the NCP network with an SMP-based solution), the trust framework (introduction of non-repudiation through the Evidence Emitter to complement the existing audit trail functions) and, most importantly, the use of eID for cross-border identification of patients either through health cards or using the eIDAS infrastructure.

At the same time the CEF began to support the real-life implementation of the eHealth solutions by the MS, thereby increasing the need for more robust, standardized solutions that used building blocks known to the EC, easy to maintain and flexible to integrate. The pilot worked very closely with the EC (DG DIGIT and DG SANTE) and the OpenNCP community for the design of specifications and the development of artefacts that would be used for implementation under CEF funding. The advantage of e-SENS was that it provided a forum for at least some MS to voice and validate their requirements, and also pilot the solutions in order to prove technical feasibility and assess impact.

A more detailed description of the [use cases](#) and process descriptions for [ePrescription](#) and [Patient Summary](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [Austria](#), [Spain](#), [Greece](#), [Italy](#), [Luxembourg](#) and [Portugal](#) can be found on the e-SENS Pilots wiki.

3.4.2. Rationale and Value

The eHealth domain was included from the start in e-SENS because of the epSOS community that was important in the convergence experiment that the project attempted. For an initial period of up to a year, the scope of the pilot was not clear and in fact there was considerable friction as the eHealth community wanted to ensure that some of its long-standing investment in industrial strength standards which are maintained together with the industry through IHE would not have to be abandoned.

Once that was clear, a scope started to emerge. A number of possible improvements to the epSOS infrastructure had been identified in EXPAND and this was the foundation of the pilot's motivation. The possibilities were presented to the MS that were participating in e-SENS and the pilot gave the opportunity for other who did not (e.g. France) to voice an opinion about the priorities the MS wanted to give to the improvement possibilities. Based on the MS prioritization and a sizing of the effort needed versus the time and resources available, the scope was set to include the replacement of the epSOS configuration services through SMP, the inclusion of non-repudiation functionalities to the NCP by building an Evidence Emitter solution, and the use of eID to identify patients accessing a point of Care in a foreign country.

The value of the SMP solution is clear – the epSOS configuration services were a non-standardized solution whereas the SMP (Service Metadata Publisher) is part of CEF eDelivery and used in production in the eProcurement domain. This meant that it was possible for the EC to build an SMP-based component that would be used for a combination of configuration and trust. At the same time, the introduction of an Evidence Emitter increases the trustworthiness of the NCP network by providing non-repudiation services which are a concrete requirements that the eHealth domain has adopted.

When it comes to eID, the more immediate concern was to replace a bespoke identification procedure that epSOS had developed, for lack of a better alternative at the time, based on keying in patient identifiers depending on the country of origin – a cumbersome and error-prone procedure, not to mention that it would be hard to maintain as a non-standard environment.

Nevertheless, the use of eID presented many challenges to the eHealth domain but also many opportunities. Since eHealth is one of the most privacy-sensitive domains where liability can be high, the key stakeholders are understandably cautious before adopting any solutions. On the other hand, the introduction of the eIDAS regulation is a game changer because it applies to eHealth and can be leveraged to provide legal certainty and ease the burden on MS to agree on how, whether and by what means to trust each other when exchanging data. Of course there were many challenges particular to the eHealth domain, which were tackled during the project, resulting to a full eIDAS-based solution towards its end.

As part of the **Y4 re-focusing of all pilots**, the eP/PS pilot had to commit to concrete handover targets for all its activities, otherwise some would be discontinued. This new focus resulted in submitting two change proposals for the SMP and Evidence Emitter through the eHealth DSI specifications through the formal maintenance process that consults the MS. For eID, a list of artefacts was produced and handed over to the EC for future inclusion to the specifications that the MS will implement funded under CEF.

A more detailed description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

3.4.3. Implementation and Execution

The eP/PS pilot brought together 6 countries and the BB implementation scope focused on eID, Trust and non-repudiation, with SMP the only eDelivery ABB that was piloted. The other ABBs of eDelivery, notably Message Exchange, were out of scope.

Most countries in most BBs reached the target of technical readiness, as can be seen from the table below, apart from Spain that started piloting much later than planned and for some time was about to drop out of the pilot but in the end stayed and did some implementation that did not finish.

Trust Establishment did not reach technical readiness because the core service of DIGIT was not available until close to the end of the project (February 2017 was the last estimate given) so pilot testing was done using the PEPPOL SMP which will not be the version that eHealth will use.

A more detailed overview of [Technical Readiness at ABB level](#) can be found on the e-SENS Pilot Wiki.

WPS NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.2.1 ePrescription/Patient Summary	Austria	Technical Readiness			Technical Readiness	Enablement in progress	Technical Readiness
	Spain						Enablement in progress
	Greece	Technical Readiness			Technical Readiness	Enablement in progress	Technical Readiness
	Italy	Technical Readiness			Technical Readiness	Enablement in progress	Technical Readiness
	Luxembourg	Technical Readiness			Enablement in progress	Enablement in progress	Technical Readiness
	Portugal	Technical Readiness			Technical Readiness	Enablement in progress	Technical Readiness

Figure 10: ePrescription/Patient Summary Pilot – Technical Readiness for each SAT at national level

The eP/PS pilot did a lot of work on all three areas of intervention it embarked on. The SMP/SML was used as a combination of configuration service, discovery service and trust anchor. Such a use of SMP/SML had not been attempted before so eHealth had a very specific set of requirements that had to be taken into account. Assessing those requirements resulted in DIGIT submitting a change proposal to OASIS in order to extend the SMP/SML specification in ways that would support eHealth. Some of the changes were accepted, others not, but workarounds were suggested and DIGIT could proceed with implementation. In the meantime, the eP/PS pilot worked with the PEPPOL version of the SMP and the OpenNCP Foundation extended the NCP with the relevant functionality.

The Evidence Emitter was initially designed in WP6, taking into account the eHealth requirements as a first step, and then the eProcurement and Business Lifecycle requirements. An early implementation of the Evidence Emitter using ATNA Evidences was made available, and integrated to the OpenNCP and passed conformance testing in the IHE Connectathon of April 2015.

Regarding eID, in the first part of the project the pilot worked on card-based solutions as a means to provide some solutions to the points of care that are faced with patients carrying eHealth cards. But not all countries issue them and when issued they are not at the same technological level, they are incompatible and not interoperable. So an eIDAS-based solution was sought using cross-border eID for patient identification.

The problem in eHealth is that patient identification in the country of destination is used to fetch healthcare information about the patient from the country of origin. As a general case, the national healthcare systems

that hold the patient summary and the ePrescription use different identifiers than those on the national eID. Therefore, in order to use the eIDAS infrastructure, which is based only on the minimum data set, some additional attributes have to be binded with the cross-border authentication request so that the link from the eIDAS infrastructure to the healthcare infrastructure can be made.

This context brought the pilot to the situation where it had to define how additional sector-specific attributes should be handled by the eIDAS infrastructure. This has not been done for any other domain yet, not in an orchestrated and institutional manner, so the pilot had to pave the road as it walked on it. Nevertheless, eID was implemented in the piloting countries and demonstrated now a cross-border attribute exchange can work on eIDAS in a complementary way to the basic authentication service. A [technical feasibility study](#) has documented the findings of the pilot and it has been given to the EC for sharing with the MS.

In terms of deployment maturity, as can be seen by the following table most countries reached a pre-production environment which is explainable by the fact that the eHealth infrastructure since the epSOS times has been oscillating between production and pre-production and the MS used the already existing infrastructure. Luxembourg was an exception because it stopped piloting at the beginning of Y4 so the BB deployment maturity at the time had not reached the same level that the other MS reached later in Y4.

A more detailed overview of [Deployment Maturity at ABB level](#) can be found on the e-SENS Pilots Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.2.1 ePrescription/Patient Summary	Austria	Full-function test pilot			Full-function test pilot	Pre-Production	Pre-Production
	Spain						Lab environment
	Greece	Full-function test pilot			Full-function test pilot	Pre-Production	Pre-Production
	Italy	Pre-Production			Pre-Production	Pre-Production	Pre-Production
	Luxembourg	Pre-Production			Lab environment	Lab environment	Lab environment
	Portugal	Pre-Production			Pre-Production	Pre-Production	Pre-Production

Figure 11: ePrescription/Patient Summary Pilot – Deployment Maturity for each SAT at national level

A more detailed overview of [Pilot Architecture and use of BBs](#) can be found on the e-SENS Pilots wiki.

The pilot used the well-known and well-tested procedures of the eHealth domain for testing. eHealth through IHE has pioneered the connectathons approach and the eP/Ps pilot of e-SENS has used the IHE procedures and similar ones that the EXPAND project provided. A more detailed description of [Pilot Testing](#) can be found at the e-SENS Pilot wiki.

3.4.4. Achievements and Lessons Learnt

The pilot achieved its technical objectives by implementing all the desired BBs, thereby enhancing and proving the eHealth infrastructure specifications, which originated in epSOS and are now governed by the CEF eHealth DSI in consultation with the MS through the eHealth Multi-Stakeholder Expert Group (eHMSEG).

The pilot also managed to maintain a close relationship with the EC, the eHMSEG but also other governance bodies such as the eHealth Network, with which e-SENS liaised through JaseHN, an implementation project preparing eHN decisions.

The relationship with CEF was the most important dimension and showed what can be done when teams work in parallel with aligned objectives and activities. The CEF eHealth DSI has opened three successive rounds of funding, each starting implementation in early 2017, early 2018 and early 2019 respectively. e-SENS submitted two Change Proposals for the inclusion of the SMP and Evidence Emitter solutions to the set of specs that the MS funded under CEF will implement in 2017. The CP on SMP was accepted, the one on EE is still subject to more conditions – the consultation continues. eID is left for 2018 so no CP was submitted. Instead, the artefacts produced by the eID pilot in eHealth are being handed over to the EC for future exploitation – DIGIT will be the custodian on behalf of DG SANTE.

The eID pilot showed that it is very important to maintain the involvement of stakeholders, notably the MS, and that even though EU-wide legislation exists (such as eIDAS), its implications are often not seen or even ignored by specific domains. Stakeholders need to be well informed and need to understand all the possibilities – this is evident by the caution, even resistance, that the use of eIDAS met by some MS.

The **eIDAS relevance** of the pilot was very significant. It demonstrated how a domain can organize itself and agree on using additional sector-specific attributes over the eIDAS network. Furthermore the pilot contributed to an eIDAS impact analysis for eHealth that was conducted in cooperation with WP4.

The **Once-Only relevance** of the pilot was not particularly significant.

A [list of artefacts](#) produced by the pilot can be found on the e-SENS Pilots wiki.

More details on [pilot evaluation](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.4.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** eHealth DSI – transition in progress, variable speeds depending on the BB
- **Governance of Operations:** A multi-lateral Agreement has been under discussion with the domain stakeholders for some time. The e-SENS pilot did not make a particular contribution.
- **Transfer of Ownership:** EC – eHealth DSI for SMP and Evidence Emitter, DG DIGIT for the eID artefacts.
- **CEF uptake:** eHealth DSI- implementation phases of 2017 and 2018.
- **Follow-up projects:** n/a
- **MS adoption:** Mainly through CEF-funded projects.

More details can be found at the [sustainability](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.5. eConfirmation Pilot Fact Sheet

3.5.1. Scope and Focus

The eConfirmation was added to the eHealth domain as a second workgroup, even though the actual use case is peripheral to healthcare and has to do with the social security dimension of providing care – i.e. confirmation of the social security status of an EU citizen in the country of origin and the entitlement of that citizen to receive care in the country of destination under the same terms as the citizens of that country.

The pilot defined its use case focusing on filling the gap for EU citizens that do not possess an eHealth Insurance Card (EHIC), which by EU law is the recognized token that entitles EU citizens to receive care in another MS. In absence of an EHIC, a Provisional Replacement Certificate (PRC) can be issued by the country of origin and provided to the Point of Care in the country of destination. The eConfirmation pilot digitized the PRC and used e-SENS BBs to automate the request for a PRC and the response that follows.

A more detailed description of the [use case](#) and [process description](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [Netherlands](#) and [Estonia](#) can be found on the e-SENS Pilots wiki.

3.5.2. Rationale and Value

The eConfirmation case is, at least partly, digitizing a new procedure that had not been piloted before in a Large Scale Pilot, even though the eConfirmation group has been working together for years in projects such as NetC@RDS (TEN-TELECOM programme) and has been trying to create a community of implementers doing cross-border transactions.

The initial rationale for including it into e-SENS was that it is a use case that is triggered by the same event as the ePrescription/Patient summary use case when an EU citizen visits a point of care in another MS. It was therefore hoped that synergies would materialize, with two use cases from the same starting point, one accessing a network of healthcare data exchange and another accessing a network of social security data exchange. These synergies did not materialize due to the fact that eConfirmation scoped out eID, which would have provided a common initial step of patient identification. To be fair, when eConfirmation defined its scope, the ePrescription/Patient Summary pilot had not yet decided to do the extensive work on eID that it ended up doing, mostly in the second half of the project.

The value of the eConfirmation use case is not only that it allows EU citizens without an EHIC to prove their eligibility to receive care in another MS on grounds of social security coverage, but also that it constitutes a fully automated procedure where data exchange helps streamline the processes at both ends of the transaction (the point of care in the country of destination and the social insurance organization in the country of origin) and therefore makes it easier, faster and much more efficient to process the back-end administrative functions that have to do with reimbursement of costs for the care provided. By contrast, the EHIC is not digitized and therefore does not help automate any step of the end-to-end administrative process.

As part of the **Y4 re-focusing of all pilots**, the eConfirmation pilot was discontinued and did not extend into Y4. In fact, this decision had already been taken by the project during Y3, since the pilot did not have sufficient momentum with only two countries left in it, so it was felt better to conclude development and testing by the end of Y3 – effectively summer of 2016.

A more detailed description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

3.5.3. Implementation and Execution

The eConfirmation pilot started with a larger group of countries that included Austria, Slovakia and Poland. The organizations from Austria and Slovakia which could take part in the pilot never received backing from their governments and Poland started the pilot and provided a plan but later had to withdraw when priorities changed inside the government and the participation in the eConfirmation pilot was no longer considered interesting.

As a result, only Netherlands and Estonia were left to define the architecture, profile the BBs and implement the pilot – which they did, reaching technical readiness in all the main BB areas of e-SENS except eID, as seen in the following table.

A more detailed overview of [Technical Readiness at ABB level](#) can be found on the e-SENS Pilot Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.2.2 eConfirmation	Estonia	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Netherlands	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness

Figure 12: eConfirmation Pilot – Technical Readiness for each SAT at national level

In terms of deployment maturity, the two piloting countries reported reaching pre-production level but this is a matter of internal definition since the pilot did not meet any legal conditions for going further than a test environment – notably, the legal validity of the electronic PRC and its legal equivalence to an EHC or a paper-based PRC was questioned even in the Netherlands, the country that coordinated the pilot and provided most of the work to profile and implement

A more detailed overview of [Deployment Maturity at ABB level](#) can be found on the e-SENS Pilots Wiki.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.2.2 eConfirmation	Estonia	Pre-Production	Pre-Production	Pre-Production		Pre-Production	Pre-Production
	Netherlands	Pre-Production	Pre-Production	Pre-Production		Pre-Production	Pre-Production

Figure 13: eConfirmation Pilot – Deployment Maturity for each SAT at national level

In terms of BB implementation, the eConfirmation pilot did a great job in designing and implementing the ePRC as an eDocument that contains and transfers structured, machine-interpretable data cross-border. The possible requirements for semantic mapping in a scalable, multi-country environment were not addressed and could be taken up as a next step after e-SENS.

The implementation of eDelivery was based on identical installations of the Holodeck implementation in the two piloting countries, with handheld configuration of p-modes and certificate exchange, sufficient to test bilaterally. In order to create a multi-country community of implementers, more work needs to be done on a scalable model for addressing, discovery, trust and configuration, and further profiling of some ABBs used in the pilot will be necessary.

A more detailed overview of [Pilot Architecture and use of BBs](#) can be found on the e-SENS Pilots wiki,

A more detailed description of [Pilot Testing](#) can be found at the e-SENS Pilot wiki.

3.5.4. Achievements and Lessons Learnt

The eConfirmation pilot presented a very interesting case study for the entire process of selecting and implementing use cases in a Large Scale Pilot. The main obstacles that were encountered were two: Firstly, the Ministries of Social Security prioritized the implementation of EESSI (Electronic Exchange of Social Security Information), which is a legal obligation and has been funded under CEF the last two years. Naturally, governments did not prioritize eConfirmation.

Secondly, and more importantly, it was discovered that there was no legal certainty in issuing and accepting an ePRC, thereby limiting the possibility for the pilot to draw a wider interest and create a community of implementers.

Timing played an important role. When the eConfirmation use case was accepted into e-SENS, some stakeholders voiced concerns about duplication of effort and overlap with EESSI. The eConfirmation pilot explained, rather convincingly, that this was not the case – however, the lack of prioritization of eConfirmation due to higher priority of EESSI (and not necessarily an overlap) was not foreseen.

Moreover, the legal obstacle was discovered rather late into the game during Y3 when most of the work for technical implementation was already done and considerable costs had been occurred. Had the pilot conducted proper due diligence from a legal standpoint right from the start, this situation might have been avoided and resources could have been diverted elsewhere.

In reality though, what these two obstacles show is that in a pilot project some risks have to be taken and the outcome will not always be successful from every aspect. With the benefit of hindsight, different choices might have been made with this pilot but at the time the course taken seemed the right one and the risks seemed tolerable.

On the other hand, such obstacles can be overcome in the future and the work done does not lose its intrinsic value. In November 2016, after the conclusion of the pilot and shortly before the end of e-SENS, a [consultation process on legal viability](#) was undertaken with DG EMPL of the EC and it was recognized that the pilot results were of sufficient interest for the MS to reconsider prioritizing the eConfirmation use case and solving the legal uncertainty challenges. To this date (June 2017) no further steps have been made, but the use case might be taken up again in the future.

The **eIDAS relevance** of the pilot was not particularly significant.

The **Once-Only relevance** of the pilot was not particularly significant.

More details on [pilot evaluation](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.5.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** N/A – an ad hoc group of interested organizations remains in contact looking for the next opportunity to put more effort into the use case.
- **Governance of Operations:** N/A – an ad hoc group of interested organizations remains in contact looking for the next opportunity to put more effort into the use case.
- **Transfer of Ownership:** N/A.
- **CEF uptake:** N/A.
- **Follow-up projects:** Nothing specific at the moment.
- **MS adoption:** Will depend on solving the legal uncertainty issues.

More details can be found at the [sustainability](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.6. eJustice Domain Fact Sheet

3.6.1. Scope and Focus

In the e-Justice domain, [Matrimonial matters](#) pilot and [European Account Preservation Order \(EAPO\)](#) pilot were piloted from the beginning of the project, whereas the e-CODEX pilots on [Mutual Legal Assistance \(MLA\)](#) and [Financial Penalties](#) were on-boarded after the end of e-CODEX.

In the beginning, also UC 5.3.2 Maintenance Obligations 4/2009 and UC 5.3.3 Supervision of Probation Measures and Alternative Sanctions 2008/947 were considered for piloting, but the domain decided to focus its activities in only two use cases.

For the 3 first years, the e-Justice activities in e-SENS were running in parallel with e-CODEX.

During the process of Y4 re-focusing of all pilots as a result of the Y3 Review, e-Justice decided to focus on viable national pilots in existing use cases, and on-boarded two use cases from e-CODEX for expanding the geographical coverage and further developing the results according to upcoming regulation.

Matrimonial matters pilot focused on Regulation 2201/2003 and how to enable Central Authorities to work closely and cooperate in order to comply with their tasks related to the practical application of the procedure for return of the abducted child and allow competent authorities and citizens to access, send and receive messages and documents, and digitally sign the standard forms provided by Regulation 2201/2003. The goals of the pilot were modified underway due to the complexity of the procedure, and the part of the procedure related to international child abduction was not implemented.

A more detailed description of the [use case](#) and [process description](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [France](#), [Italy](#), and [Poland](#) can be found on the e-SENS Pilots wiki.

EAPO pilot focused on Regulation 655/2014 and how to facilitate the recovery of cross-border debts for both citizens and businesses.

A more detailed description of the [use case](#) and [process description](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [France](#), and [Netherlands](#) can be found on the e-SENS Pilots wiki.

MLA pilot focused on allowing investigative judges and prosecutors to communicate, through a secure digital channel, and request for legal assistance and evidences and therefore providing them with the exact information on the sender and on the registration of the demand which were a barrier for good and efficient collaboration before. As this pilot was on-boarded in e-CODEX, the focus within e-SENS was to:

- Integrate new countries.
- Adapt the process modelling to the Directive 2014/14 as well as the schemas since MLA will change to European Investigation Order, on the basis on Directive 2014/41, on May 22nd 2017 when the Directive enters into force.
- Extend the procedure to all business transactions (only the two first business transactions were piloted in e-CODEX).

More details on the national pilots of [Germany](#), [Netherlands](#), [Austria](#), [Greece](#), and [Portugal](#) can be found on the e-SENS Pilots wiki.

Financial Penalties pilot focused on Financial Penalties (Framework Decision 2005/214) applied to traffic offenses. As this pilot was on-boarded in e-CODEX, the focus within e-SENS was to rework on the connectivity

and on the design of the certificate which needs to be sent in a language accepted by the receiving authority as well as to further establish the mutual business agreements covering the pilot.

3.6.2. Rationale and Value

The rationale for the Matrimonial matters pilot was to explore the field of family law, since the interest for the citizen is great. In addition, offering a digital procedure to handle international child abduction would grant political visibility, as such cases increase with international mobility. 630,000 international marriages are dissolved each year so the value is indeed great. Description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

The rationale for the EAPO pilot was the fact that around one million of small and medium-sized enterprises (SMEs), which make up 99% of businesses in the EU, face problems with cross-border debts and up to €600 million a year in debt is unnecessarily written off because businesses find it too daunting to pursue expensive, confusing lawsuits in foreign countries. Additionally citizens suffer when goods bought online are never delivered or when goods purchased once travelling abroad are defective or counterfeit. Description of the pilot [Motivation and Goals](#) can be found on the e-SENS Pilots wiki.

3.6.3. Implementation and Execution

The following figure shows the countries that piloted in the 4 pilots of the e-Justice domain and the level of technical readiness they reached in each SAT of the e-SENS Architecture. A more detailed overview of Technical Readiness at ABB level can be found on the e-SENS Pilot Wiki in respective pages for [Matrimonial matters pilot](#), for [EAPO pilot](#), for [MLA pilot](#) and for [Financial Penalties pilot](#).

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.3.1 Matrimonial matters and parental responsibility	France	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Italy	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Poland	Technical Readiness	Technical Readiness	Technical Readiness			
5.3.4 European Account Preservation Order (EAPO)	France	Enablement in progress	Enablement in progress	Technical Readiness		Technical Readiness	
	Netherlands	Enablement in progress	Enablement in progress	Technical Readiness		Technical Readiness	
5.3.5 Mutual Legal Assistance (MLA) / European Investigation Order	Germany	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Austria	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	
	Greece	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	
	Netherlands	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Portugal	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	
5.3.6 Financial Penalties (FP)	France	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Netherlands	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness

Figure 14: e-Justice domain – Technical Readiness for each SAT at national level

Matrimonial matters pilot: The pilot used almost the entire range of e-SENS Building Blocks and all piloting countries (France, Italy, and Poland) reached the desired technical readiness level in all BB areas. The only BB not used was eID as it was left out of scope. A more detailed overview of [Pilot Architecture and use of BB](#) can be found on the e-SENS Pilot Wiki. Italy developed a stand-alone connector providing the functionalities needed to draft the forms envisaged by the Regulation and other forms that may be needed by the implementation of the procedure. Also, the stand-alone connector was interfaced with the digital signature infrastructure provided by the Ministry of Justice. The pilot did not run in production environment, due to organisation issues which were not solved before the end of the project (problematic identification of the Italian Tribunal in charge of doing the piloting which occurred just in January 2017, expiration of certificates).

EAPO pilot: The pilot used almost the entire range of e-SENS Building Blocks and piloting countries (France, and Netherlands) reached the desired technical readiness level in eSignatures and Trust Establishment. In eDelivery and eDocuments/Semantics SATs did not manage to reach technical readiness due to the fact that certain organisational aspects would be in place after March 2017 in order to start testing. A more detailed overview of [Pilot Architecture and use of BB](#) can be found on the e-SENS Pilot Wiki. Poland, although initially planned to participate in EAPO pilot, conducted only the preliminary analysis. Germany didn't pilot in the EAPO pilot because they don't have the legal basis for that. In Germany, they can only take part in electronic legal procedures, if it is foreseen in the relevant law, which wasn't the case.

MLA: All piloting countries (Germany, Netherlands, Austria, Greece, and Portugal) reached the desired technical readiness level in all BB areas. Germany, Greece and Netherlands participated already in the e-CODEX pilot. The other countries were new. Greece developed a Form Development Tool (FDP) for creating related forms as well as sending/receiving the necessary documentation via the Domibus node and Portugal customized that tool to fit Portuguese requirements. A more detailed overview of [Pilot Architecture and use of BB](#) can be found on the e-SENS Pilot Wiki.

Financial penalties pilot: The pilot used almost the entire range of e-SENS Building Blocks and all piloting countries (France, and Netherlands) reached the desired technical readiness level in all BB areas. A more detailed overview of [Pilot Architecture and use of BB](#) can be found on the e-SENS Pilot Wiki.

Regarding the Deployment Maturity level of implementation, the following table gives the overall picture of the e-Justice pilots, whereas a more detailed overview of Technical Readiness at ABB level can be found on the e-SENS Pilot Wiki in respective pages for [Matrimonial matters pilot](#), for [EAPO pilot](#), for [MLA pilot](#) and for [Financial Penalties pilot](#).

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.3.1 Matrimonial matters and parental responsibility	France	Lab environment	Lab environment	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Italy	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Poland	Full-function test pilot	Full-function test pilot	Full-function test pilot			
5.3.4 European Account Preservation Order (EAPO)	France	Lab environment	Lab environment	Full-function test pilot		Full-function test pilot	
	Netherlands	Lab environment	Lab environment	Full-function test pilot		Full-function test pilot	
5.3.5 Mutual Legal Assistance (MLA) / European Investigation Order	Germany	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Austria	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	
	Greece	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	
	Netherlands	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Portugal	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	
5.3.6 Financial Penalties (FP)	France	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
	Netherlands	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot

Figure 15: e-Justice domain – Deployment Maturity for each SAT at national level

The pilots did not go into actual production in any country with end-to-end-transactions. Testing was done between the different pilot participants.

3.6.4. Achievements and Lessons Learnt

The Matrimonial matters pilot demonstrates the possibilities digital tools offer for improving access to justice and cooperation across borders. The pilot fills a hole and has great potential impact.

For the EAPO pilot a prototype demonstrating how a digitalization of the procedure could look like has been implemented with structured document exchange. Due to the fact that the Regulation only entered into force on January 18th, 2017 and due to complicated character of the procedure, the prototype implemented will be used in the context of a future e-Justice call targeting the EAPO regulation.

MLA pilot has been live for more than a year in e-CODEX and a great number of transactions are registered each month. Focus within the countries in e-SENS was to on-board new countries (Portugal and Austria), continue and expand the activities launched in the existing countries, Germany, Netherlands, and Greece, and on shifting the use case to EIO because the Directive 2014/14 on European Investigation Order will enter into force on May 22nd. Agreement on the needed changes in the business process modelling and in the schemas were agreed on and implemented by the countries.

In the Financial Penalties pilot, France and the Netherlands have already had real transactions within e-CODEX. However, some part needed to be set up again and further work on the schemas were also necessary; real transactions were possible. Since in the first time only a few cases would be sent to test the capacity of the national systems, the countries also worked on extending the process to include all eligible cases (19.000

cases / year from FR to NL). The pilot has a very high potential impact, not only in terms of volume of exchanges, but also on improving the road safety in Europe.

eIDAS relevance is high for all e-Justice pilots because it used eDelivery compliant with eRDS and also Trust Service Providers e.g. for issuing the trust-ok tokens.

The Once-Only relevance of the pilot was not particularly explored during the course of the project

More details on pilot evaluation can be found at the e-SENS Pilots wiki in respective pages for [Matrimonial matters pilot](#), for [EAPO pilot](#), for [MLA pilot](#) and for [Financial Penalties pilot](#) and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.6.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications and Operations:** Me-CODEX (transition in progress) where all domain activities will be sustained and expanded. As stated in the COSI conclusions of the Council, long term sustainability should be carried out by eu-LISA. The MLA pilot also provides input to the e-Evidence project launched by the Commission on transmission of requests for assistance and evidences. This project will use the solution developed in e-CODEX end extended in e-SENS.
- **Transfer of Ownership:** In progress.
- **CEF uptake:** CEF calls on e-Justice
- **Follow-up projects:** Me-CODEX and e-Evidence projects
- **MS adoption:** Mainly through CEF and e-Justice calls

More details on sustainability and handover can be found at the e-SENS Pilots wiki in respective pages for [Matrimonial matters pilot](#), for [EAPO pilot](#), for [MLA pilot](#) and for [Financial Penalties pilot](#) and in the Evaluation Chapter of this report.

3.7. Business Lifecycle Pilot Fact Sheet

3.7.1. Scope and Focus

The Business Lifecycle Domain included two use cases: Business Registration and Activity Registration. They are quite similar, in that both assume that an Economic Operator (in fact a legal representative or an authorized representative) of a company from a country of origin intends to exercise the right of every business to have a footprint in another country either by creating a new company (Business Registration) or by offering services (Activity Registration). On the side of the country of destination, there is an eService which automates the registration process or simply is a Single Point of Contact.

The use cases have been piloted previously in Large Scale Pilots (STORK from the eID side, SPOCS from the eDelivery side). In e-SENS, the domain started with eID piloting intentions where MS wanted to connect to the STORK infrastructure services that had not been connected before. These early pilots have largely concluded before the end of Y3 and some MS have continued to enhance the eID infrastructure under the 5.5 Domain moving towards eIDAS.

The most interesting aspect of the Business Lifecycle piloting was the introduction of an eDelivery pilot, initially between France and Germany and then joined by Greece, Slovenia and Austria. This pilot interconnected general-purpose providers of secure communications at national level so that they were able to exchange messages between their subscribers across borders with the same legal certainty that they were able to deliver nationally.

A more detailed description of the [use case for Business Registration](#) and [Activity Registration](#) as well as the [process description for Business Registration](#) and [Activity Registration](#) can be found on the e-SENS Pilots wiki.

More details on the national pilots in [Germany and France](#), [Austria](#), [Denmark](#), [Spain](#), [Greece](#), [Norway](#), [Poland](#), [Sweden](#), [Slovenia](#), can be found on the e-SENS Pilots wiki.

3.7.2. Rationale and Value

The Business Lifecycle Domain was initially a way to integrate part of the STORK community into e-SENS and extend the scope of eID piloting that had taken place there. From this perspective, the eID pilots presented incremental advances and the inclusion of eSignatures extended the ways of signing forms or eDocuments and validating signatures across borders. New ways of using eSignatures through federated eID (such as the Swedish solution on federated signing) appeared in e-SENS first in the Business Lifecycle domain, providing to many countries a variety of ways that eID and eSignatures could be used. In fact, several countries, mostly Nordic, followed the federated signing paradigm.

The eDelivery pilot of Business Lifecycle was very important because it showed how CEF eDelivery can be used to interconnect payload-agnostic communications based on standardized messages that are also process-agnostic since the infrastructure needs to be able to connect any type of recipient (natural or legal persons, administrations etc.) in a way that registered post does. Since the target community is indeed open, this is a different way of using eDelivery than in other domains where the communication takes place between business systems in a closed, process-specific circle, and is based on exchanging structured data. The eDelivery pilot of Business Lifecycle designed an eIDAS-friendly solution that is eRDS-compliant and can be a model for an interconnection of all national providers of secure and legally binding communications within each of the MS, extending legal certainty of the message delivery across borders.

Work of semantics shadowed what was done in the ESPD/VCD pilot between e-SENS and DG GROW around e-Certis. With the input from e-SENS and its semantic mapping approach, DG GROW designed e-Certis as a domain-agnostic semantic mapping engine that can support semantic interoperability in the very important domain of business mobility. The Business Lifecycle pilot provided samples of semantic assets that showed how this could be done but since e-Certis did not manage to establish a separate instance for the concept to be fully tested, work was not completed. Nevertheless, the experience has recently fed directly into TOOP – The Once-Only Principle Project, where business mobility is being piloted, and will be continued with a view to provide semantic interoperability to support the business registration procedure that the Single Digital Gateway foresees in scope of the upcoming Regulation.

As part of the **Y4 re-focusing of all pilots**, the Business Lifecycle pilot wrapped up the ID and eSignature pilots and concentrated on achieving concrete results and handover prospects in the eDelivery pilot, where the architecture created and tested in the pilot is taken up by MS that will go into production under NOBLE, a CEF-funded project. In the same spirit, the domain tried to focus on the provision of a comprehensive proof-of-concept that could show how e-Certis can be used for semantic mapping in business mobility in order to provide a heads-up for TOOP. That work was not completed due to external dependencies and is being continued within TOOP.

A more detailed description of the pilot [Motivation and Goals for Business Registration](#) and [Activity Registration](#) can be found on the e-SENS Pilots wiki.

3.7.3. Implementation and Execution

The following table shows the level of technical readiness reached in the different countries. Although in most cases the target of technical readiness was reached, the picture looks patchier than in other domains. The reason is that this domain extended its scope with additional work on semantics and on eDelivery and therefore not every part of the work could be completed in all countries to the same level.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.4.1 Business Registration	France	Technical Readiness	Technical Readiness	Technical Readiness		Enablement in progress	Technical Readiness
	Greece	Enablement in progress	Technical Readiness	Technical Readiness	Technical Readiness	Enablement in progress	Enablement in progress
	Norway		Enablement in progress		Real Transactions		
	Sweden		Enablement in progress	Technical Readiness	Technical Readiness	Technical Readiness	
	Slovenia	Technical Readiness			Technical Readiness	Enablement in progress	Enablement in progress
5.4.2 Activity Registration	Germany	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
	Austria	Technical Readiness	Technical Readiness			Technical Readiness	Technical Readiness
	Denmark				Technical Readiness		
	Spain		Enablement in progress	Technical Readiness	Technical Readiness		
	Poland		Enablement in progress	Real Transactions			

Figure 16: Business Lifecycle Domain – Technical Readiness for each SAT at national level

We are looking at the Business Lifecycle Domain as a whole, because architecture and use of BBs was similar. Generally, the countries that focused on eDelivery reached a higher readiness level on average and the ones that piloted eID and eSignatures had full success – in fact, from this group e-SENS got two of its few pilots that went into real production and had real transactions: The eSignatures pilot in Poland for Activity Registration and the eID pilot in Norway in Business Registration.

Results were more tentative in [semantics](#) (as already explained earlier) and in countries that attempted to pilot both the eID and eDelivery part (e.g. Greece).

When it came to the use of [eDelivery](#), combination of [Trust Establishment](#) and Non-Repudiation, it should be considered that the pilot was at almost a green field, despite the availability of REM Dispatch/Evidence messages following ETSI standards and the SPOCS experience in generating and processing them (some countries used a modified version of a SPOCS connector as back-end integration behind their Access Points). The pilot wanted to be eIDAS-friendly but it took time to define the specification of a domain Trusted List that could be used so that all Access Points could use their own certificates in a preview of a world where AP providers would be just registered as eRDS Trust Service Providers. But no AS4 gateway implementations support this type of trust model so additional work had to be done on the Holodeck implementation, which the eDelivery pilot participants used. With Evidence Emitter, work was based on REM Evidence Messages, re-using the experience from SPOCS.

A more detailed overview of [Technical Readiness at ABB level for Business Registration](#) and [Activity Registration](#) can be found on the e-SENS Pilot Wiki.

Regarding Deployment Maturity, the results are shown in the following table and shows a picture similar to that of Technical Readiness.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.4.1 Business Registration	France	Lab environment	Lab environment	Lab environment		Lab environment	Lab environment
	Greece	Lab environment	Lab environment	Full-function test pilot	Full-function test pilot	Lab environment	Lab environment
	Norway		Lab environment		Actual Production		
	Sweden		Lab environment	Pre-Production	Pre-Production	Pre-Production	
	Slovenia	Pre-Production			Pre-Production	Lab environment	Lab environment
5.4.2 Activity Registration	Germany	Pre-Production	Pre-Production	Pre-Production		Pre-Production	Lab environment
	Austria	Pre-Production	Pre-Production			Pre-Production	Lab environment
	Denmark				Pre-Production		
	Spain		Lab environment	Pre-Production	Pre-Production		
	Poland		Lab environment	Actual Production			

Figure 17: Business Lifecycle Domain – Deployment Maturity for each SAT at national level

The eID and eSignatures pilots went to pre-production or production, the same happened with some of the countries that implemented eDelivery. Other countries that were perhaps over-extended in the implementation of BBs, did not go beyond Lab environment for some of them. In hindsight, this may not have given robust results at a national level in all cases, but the breath of work in the important domain of business mobility and the fact that work is continuing in follow-up initiatives should be taken into account in an overall appraisal of pilot value.

A more detailed overview of [Deployment Maturity at ABB level for Business Registration](#) and [Activity Registration](#) can be found on the e-SENS Pilots Wiki.

A more detailed overview of [Pilot Architecture and use of BBs for Business Registration](#) and [Activity Registration](#) can be found on the e-SENS Pilots wiki,

A more detailed description of [Pilot Testing for Business Registration](#) and [Activity Registration](#) can be found at the e-SENS Pilot wiki.

3.7.4. Achievements and Lessons Learnt

Within what could be considered a generic business mobility scenario, and sometimes the only differentiation between Business and Activity Registration was the business context of the service in the country of destination. Semantics were an exception – these were different, since in the Business Registration work tried to come up with a generic view (an extremely difficult task since business registration is not at all harmonized among MS), whereas in Activity Registration semantics were rather specific to the professions and countries.

Estonia had to abandon the eSignatures pilot for the following reasons:

- Implementing the new functionality was difficult. The team looked into SD-DSS and the Swedish signing solution and tried to find best ways to integrate one of these solutions to their existing business processes and technical platform. However, since they already have solutions for signing with foreign ID-cards (Belgium, Portugal, Finland) and mobile-ID (Lithuania), the main obstacle was how to add new solution and keep the existing system as a whole. One more challenge they faced was how to manage (update, modernization etc.) this new signing solution from service provider perspective. The national solution they have in use now is managed (updated etc.) by RIA (Information System Authority) that also has all the necessary know-how and competence about the signing solution and what the trends in eSigning are etc. So adding a new solution for signing means the institution must create the competence and know-how on how to keep the solution updated etc.
- National e-Residency program began (foreign citizens can apply for Estonian ID for authentication in e-services and signing documents electronically). Having an Estonian ID-card means the person can authenticate to all Estonian e-services including start a business online. They have over 13.000 e-Residency owners from 135 different countries (i.e. from Greece). Almost 1000 new companies established by e-residents, additional 2000 are connected to companies (i.e. board members). Therefore their focus was on improving the Company Registration Portal for the users from different countries.

The business mobility domain continues in the Once-Only LSP (TOOP) that will re-use the e-SENS results.

At a national level, this domain delivered certain national services using eID and eSignatures, sometimes in production. These standalone services add to the not-so-long list of functioning or near-complete cross-border eServices in Europe, supporting the Single Market.

The interconnection of national providers of secure and legally binding message delivery services has the potential to become a tightly-knot domain in its own rights, because these providers need to agree on more than technology – they need to get together and create a real community with its own governance and perhaps organizational support for operations.

In general, Business Lifecycle is not a cohesive domain with a history and track record of interoperability in the same way as eProcurement, eHealth and eJustice. For this reason there are no stakeholder organizations that can act as follow-up receivers of the results as for example OpenPEPPOL or the tightly focused MS groups of eHealth and eJustice. For this reason, Business Lifecycle delivers results either directly to the MS and their national services or to the entire public domain, mostly CEF eDelivery.

For example, the Business Lifecycle eDelivery pilot was the first group to use non-PEPPOL certificates for SMP (in fact used the CEF PKI). The pilot also used a trusted list for the certificates of the gateways – an eIDAS-friendly solution which however will live on only in follow-up initiatives such as the NOBLE project (funded under CEF) where the pilot participants are taking the e-SENS solution into real production. Some generic artefacts are being handed over to CEF eDelivery.

The **eIDAS relevance** of the pilot was very high due to the general-purpose, eRDS-compliant eDelivery solution it produced.

The **Once-Only relevance** of the pilot is also very high, mainly due to the semantic mapping and the handling of semantic interoperability issues that is fed directly into TOOP. In fact, the business mobility domain continues its work in TOOP, enhanced and expanded with a much more focused mandate.

A [list of artefacts](#) from the eDelivery pilot was produced and can be found on the e-SENS Pilots Wiki.

More details on [pilot evaluation for Business Registration](#) and [Activity Registration](#) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.7.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** CEF eDelivery, NOBLE (eDelivery), TOOP (semantics), ,
- **Governance of Operations:** NOBLE project for eDelivery; MS for eID and eSignature (national services)
- **Transfer of Ownership:** In progress
- **CEF uptake:** NOBLE, future uptake after TOOP.
- **Follow-up projects:** NOBLE, TOOP.
- **MS adoption:** Mainly through CEF-funded projects (eDelivery, semantics). National initiative linking to eIDAS

More details can be found at the [sustainability for Business Registration](#) and [Activity Registration](#) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

3.8. Citizen Lifecycle Pilot Fact Sheet

3.8.1. Scope and Focus

The 5th domain of e-SENS was a project objective from the beginning. e-SENS was supposed to find new domains to pilot its BBs, outside the 4 original ones, which corresponded to the 4 previous LSPs.

As it turned out, most of the domains where data exchange was coming up as a legal obligations had also been into the target focus of CEF (Social Security – EESSI, Business Registries Interconnection – BRIS, etc.) or had already funded initiatives underway (e.g. EUCISE2020 – maritime domain and others). Whilst the domains which are driven by such motivations had already started their own initiatives, e-SENS could engage with them and try to support them – and for some time did so with EUCISE, aspiring for Maritime to be the 5th domain in the project. However the timelines and the internal EUCISE consultations did not present a clear landscape for e-SENS that had to make a choice and no other suitable domains were around.

This pointed e-SENS to the direction of more eID piloting, since eID was too under-represented in the piloting scope and the implementation of eIDAS infrastructure created a new environment where MS had incentives to start linking services to the eIDAS network and of course had a deadline until September 2018 to deploy their own eIDAS nodes.

The 5th domain was born by collecting MS intentions for eID-based pilots that would use the eIDAS infrastructure. Since the period to September 2018 and even beyond would be considered as interim or transitional, the question was posed how could MS that had functioning services connected to the STORK infrastructure could migrate more smoothly to eIDAS. An idea was born to develop an adaptor, later architected as plugin mounted on the eIDAS node that could take care of the protocol and attribute translation between STORK and eIDAS.

Consequently, the 5th domain of e-SENS included a number of national services connected to the eIDAS network and the development of the eIDAS/STORK plugin that was used by the services that were still connected to the STORK infrastructure in countries like Greece, Sweden etc.

A more detailed description of the use cases ([NemKonto](#), [Patient Access](#), [eEducation](#), [Record Matching](#), [eAgriculture](#)) and process descriptions [NemKonto](#), [Patient Access](#), [eEducation](#), [Record Matching](#), [eAgriculture](#)) can be found on the e-SENS Pilots wiki.

More details on the national pilots of [Austria](#), [Denmark](#), [Spain](#), [Sweden](#), [Iceland](#), [Netherlands and Germany](#) can be found on the e-SENS Pilots wiki.

3.8.2. Rationale and Value

The overall value was to provide support to the MS in their migration from STORK to eIDAS. The eIDAS/STORK plugin allows MS to communicate with other countries over the eIDAS network without changing anything in their configuration of STORK-based services, if they want to keep the STORK PEPS. But the latest version of the plugin allows the MS to connect to a “thin layer” that intermediates with the eIDAS node, still having the Service Providers “speaking the STORK language” but without any need to keep the STORK PEPS.

This strategy allows MS more time to migrate the services while the core infrastructure moves easily to eIDAS, which is the basic legal obligation. Since there are still many services in the MS that use STORK, this option gives value to the MS that are in this position.

Another eID-related issue where we can still only see the tip of the iceberg is the multitude of additional attributes that the MS can provide. The domain 5.5 pilot did extensive work on them, starting from some domain 5.4 work on semantics regarding businesses. This work was extended to produce an inventory of the attributes available in the MS. These need to be discoverable and accessible – this can be a major stepping stone towards the implementation of the Once-Only Principle.

From the pilots that were implemented at national level, some were of purely national interest (such as [Nemkonto in Denmark](#)) but others are of wider relevance, even though they were not piloted in many countries. The [Patient Access](#) pilot (Austria) is a migration of the old STORK 2.0 pilot on eIDAS infrastructure and the same goes with the [eAgriculture](#) pilot (Netherlands-Germany-Austria).

Furthermore, Iceland piloted [Record Matching](#), which is a generally acknowledged problem; even though cross-border authentication is possible now in most countries, it is still hard to provide service to a foreign citizen without opening some kind of footprint in the national infrastructure of the service provider country. And then it becomes an issue to match that footprint and related services to the eIDs with which the same person might be coming back.

[eEducation](#) was also piloted with Sweden as service provider and Norway as identity provider, but it is a use case of wider relevance and its results can be replicated, particularly since it included the integration of eID with the Moodle LMS platform used by many universities.

As part of the **Y4 re-focusing of all pilots**, some planned activities such as eDelivery in eEducation and further conceptualization on issues such as record matching were discontinued because it was felt that they would not provide much value. Work was focused on the development of the eIDAS/STORK plugin and on the implementation of specific services by MS that participated in the domain.

A more detailed description of the pilot Motivation and Goals ([NemKonto](#), [Patient Access](#), [eEducation](#), [Record Matching](#), [eAgriculture](#)) can be found on the e-SENS Pilots wiki.

3.8.3. Implementation and Execution

The domain 5.5 pilot was executed around an eID workgroup that included domain 5.5 participants, eID piloting countries from the Business Lifecycle domain and WP6 experts on eID. At times, representatives of the CEF eID DSI were taking part and a close working relationship was formed. The WG was launched at the end of October 2015 and continued until the end of the project.

Technical Readiness of the implemented pilots can be seen in the following table. In the domain 5.5, e-SENS found some more national pilots that made it all the way to real production and real transactions; the Swedish eEducation pilot and the Icelandic Record matching pilot. All pilots however reached at least the target level of technical readiness and real transaction capability.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots							
5.5.1 Citizen Lifecycle - Nemkonto	Denmark					Technical Readiness		
	Spain					Technical Readiness		
5.5.1 Citizen Lifecycle - Patient Access	Austria					Technical Readiness		
5.5.1 Citizen Lifecycle - eEducation	Sweden				Real Transactions	Real Transactions		
5.5.1 Citizen Lifecycle - Record Matching	Iceland					Technical Readiness		
5.5.2 eAgriculture	Netherlands					Technical Readiness		
	Germany					Technical Readiness		

Figure 18: Citizen Lifecycle Pilot – Technical Readiness for each SAT at national level

From a deployment maturity perspective, the next table gives a similar picture. The Swedish and Icelandic pilots reached production level and the rest of the pilots reached pre-production. The eAgriculture pilot was the only one that, due to legal and security constraints, remained at a level of fully functioning test pilot.

WP5 NATIONAL PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017		eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Domain Pilots	National Pilots						
5.5.1 Citizen Lifecycle - Nemkonto	Denmark				Pre-Production		
	Spain				Pre-Production		
5.5.1 Citizen Lifecycle - Patient Access	Austria				Actual Production		
5.5.1 Citizen Lifecycle - eEducation	Sweden			Actual Production	Actual Production		
5.5.1 Citizen Lifecycle - Record Matching	Iceland				Actual Production		
5.5.2 eAgriculture	Netherlands				Full-function test pilot		
	Germany				Full-function test pilot		

Figure 19: Citizen Lifecycle Pilot – Deployment Maturity for each SAT at national level

A common approach for testing and documenting eID pilots in both the 5.4 and 5.5 domain was developed and executed. A more detailed description of [Pilot Testing](#) can be found at the e-SENS Pilot wiki.

3.8.4. Achievements and Lessons Learnt

One of the main achievements of the domain 5.5 pilot was the development of the eIDAS/STORK plugin, under the rationale mentioned earlier. The pilot documented the [adoption and sustainability potential](#) of this component and on that basis had extensive consultations with the CEF eID DSI which concluded with the EC decision to take it over. The documentation is being jointly written between the EC and the developers of e-SENS as a follow-on activity after the end of the project.

Another specific output was the [inventory of infrastructure and attributes](#) provided and consumed by MS. This work can form the basis for attribute exchange on a wider scale, i.e. in the context of the Once-Only Principle. This work will be continued by TOOP.

Of course, putting new services into production with real use was perhaps one of the most gratifying achievements that this domain, together with Business Lifecycle domain provided to the e-SENS community and to the service owners and users.

The **eIDAS relevance** of the pilot was very significant, as mentioned already. The pilot contributed to easing the migration path of MS from STORK to eIDAS infrastructure while keeping the live services online. The work on attributes may influence the future of the eIDAS infrastructure, particularly if coupled with requirements from the need to implement the Once-Only principle cross-border. This will be further explored in TOOP.

The **Once-Only relevance** of the pilot was also very significant, as mentioned above.

More details on pilot evaluation ([NemKonto](#), [Patient Access](#), [eEducation](#), [Record Matching](#), [eAgriculture](#)) can be found at the e-SENS Pilots wiki and in the Evaluation Chapter of this report. A further account of the pilot experience and related recommendations can be found in D1.12 – e-SENS Final Report.

3.8.5. Sustainability and Handover

The following summary of sustainability and handover issues can be made:

- **Governance of specifications:** CEF eID DSI (for the plugin)
- **Governance of Operations:** MS through the eIDAS network
- **Transfer of Ownership:** In progress to CEF eID DSI (plugin)
- **CEF uptake:** eID DSI
- **Follow-up projects:** TOOP
- **MS adoption:** national projects for eIDAS compliance and in the medium to long term national projects to implement once-only.

More details can be found at the sustainability ([NemKonto](#), [Patient Access](#), [eEducation](#), [Record Matching](#), [eAgriculture](#)) section of the pilot evaluation on the e-SENS Pilots wiki and in the Evaluation Chapter of this report.

4. Pilot Readiness and Deployment Maturity

4.1. Introduction

This chapter presents the readiness of pilots as well as the deployment maturity of pilots at the end of the project based on the **SAT/ABB readiness states** at **domain** and **national level as well as the SAT/ABB deployment maturity states** that have been used to monitor the pilot readiness and pilot maturity in deployment during pilot implementation.

The following tables present the **ABB readiness states** at **domain** and **national level** and the **ABB deployment maturity states** that have been used to monitor the pilot readiness and pilot deployment maturity.

More specifically:

- The table below shows the legend for the readiness states of the SAT/ABBs in a domain pilot.

Real Transactions	Pilot has achieved real transactions with this SAT/ABB
Technical Readiness	Pilot has reached technical readiness in this SAT/ABB
Enablement in progress	Pilot enablement in progress - SAT/ABB integration going on
Enablement not started	Pilot enablement did not start for this SAT/ABB

Table 6: Color-coded legend for SAT/ABB readiness at domain level

- The table below shows the legend for the readiness states of the SAT/ABBs at MS level.

Real Transactions	Pilot has achieved real transactions with the BB
Technical Readiness	Pilot has reached technical readiness in at least the BB
Enablement in progress	Pilot enablement in progress - BB integration going on
Enablement not started	Pilot enablement did not start for the BB

Table 7: Color-coded legend for SAT/ABB readiness at MS level

- The table below shows the legend for the deployment maturity states of the SAT/ABBs in a pilot.

Actual Production	Pilot has delivered an actual system proven in operational environment and actual use of the system has been made
Pre-Production	Pilot has delivered a system prototype deployed and demonstrated in an environment near or at planned operational systems
Full-function test pilot	Pilot has delivered a system prototype deployed and demonstrated in a test environment simulating operational conditions
Lab environment	BBs function in a lab environment

Table 8: Color-coded legend for ABB deployment maturity

The following sub-sections present the pilot status at the end of the project in the domain pilots and in all piloting MS with regard to the above mentioned states of the ABBs readiness and deployment maturity. Moreover, **statistical data** regarding **pilot readiness and deployment maturity per SAT** at domain and national level are also included. The **statistics per SAT** are based on the ABB readiness and deployment maturity states mentioned above. In case the ABBs of a SAT used in pilot are at different readiness states and deployment maturity states, then the “**higher**” ABB readiness state and the “**higher**” ABB deployment maturity state are used as the readiness and deployment maturity states for that SAT.

Some initial statistics are shown below.

There are in total **13 domain pilots**:

- 9 domain pilots in the 4 original domains (eProcurement, eHealth, e-Justice, Business Lifecycle) that were suggested by the domains and approved by the e-SENS General Assembly (Baarn, NL, 25-26.02.2014). These pilots were proposed and approved within Y1 or were proposed and approved within Y2).
- 2 domain pilots in the new domain “Citizen Lifecycle” that were approved by the e-SENS General Assembly (Oslo, NO, 26-27.03.2015) and initiated in Y3.
- 2 new domain pilots in the e-Justice domain which initiated in Y4, namely, domain pilot 5.3.5 Mutual Legal Assistance/ European Investigation Order and domain pilot 5.3.6 Financial Penalties.

The list of ABBs is the one that has been defined in WP6 – EIRA (e-SENS wiki).

4.2. Pilot Readiness at Domain Level

The following figure and the related table below present an overview of the status of pilot readiness for each SAT at domain pilot level.

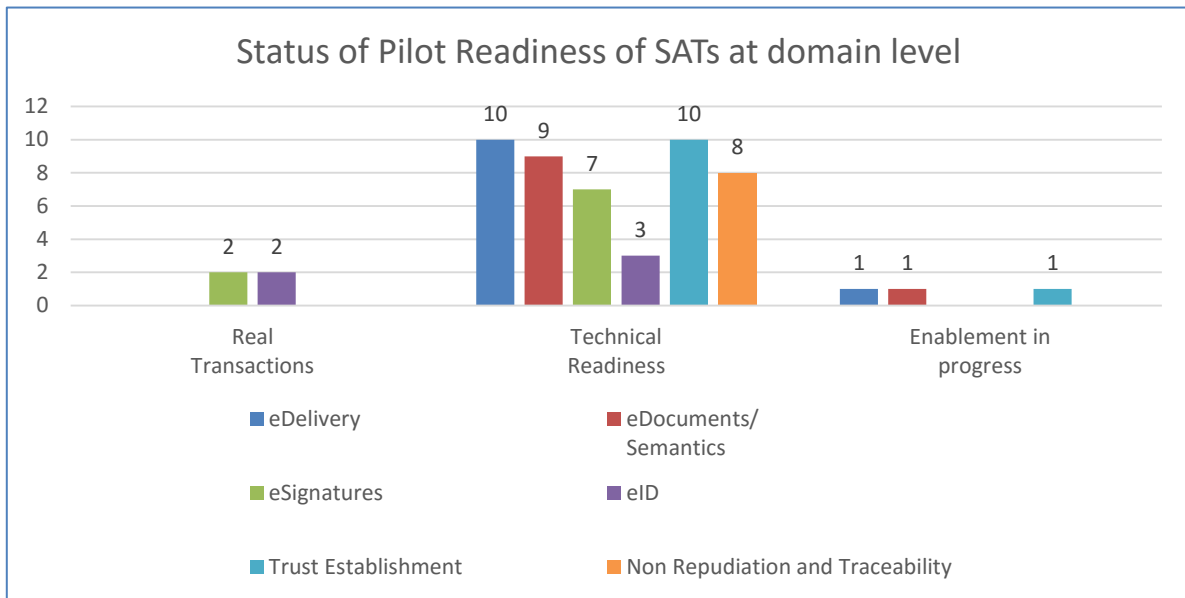


Figure 20: Overview of Pilot Readiness of SATs at domain level

SAT readiness states at domain level	eDelivery	eDocuments/Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Real Transactions	0	0	2	2	0	0
Technical Readiness	10	9	7	3	10	8
Enablement in progress	1	1	0	0	1	0
Enablement not started	0	0	0	0	0	0
SUM	11	10	9	5	11	8

Table 9: Data - Overview of Pilot Readiness of SATs at domain level

The following figure presents the pilot readiness for each SAT at domain pilot level for each domain pilot.

WP5 DOMAIN PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017	eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
5.1.1 eTendering	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
5.1.2 Virtual Company Dossier (ESDP/VCD)	Technical Readiness	Technical Readiness			Technical Readiness	
5.1.4 eInvoicing	Technical Readiness	Technical Readiness			Technical Readiness	
5.2.1 ePrescription/Patient Summary (eP/PS)	Technical Readiness			Technical Readiness	Enablement in progress	Technical Readiness
5.2.2 eConfirmation	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
5.3.1 Matrimonial matters and parental responsibility	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
5.3.4 European Account Preservation Order (EAPO)	Enablement in progress	Enablement in progress	Technical Readiness		Technical Readiness	
5.3.5 Mutual Legal Assistance/ European Investigation Order	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
5.3.6 Financial Penalties	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness	Technical Readiness
5.4.1 Business Registration	Technical Readiness	Technical Readiness	Technical Readiness	Real Transactions	Technical Readiness	Technical Readiness
5.4.2 Activity Registration	Technical Readiness	Technical Readiness	Real Transactions	Technical Readiness	Technical Readiness	Technical Readiness
5.5.1 Citizen Lifecycle			Real Transactions	Real Transactions		
5.5.2 eAgriculture				Technical Readiness		
SUM	11	10	9	5	11	8

Figure 21: Pilot Readiness for each SAT at domain pilot level – All pilots

Below follow the tables with the readiness of SATs and ABBs in domains 5.1 and 5.2, in domain 5.3 and in domains 5.4 and 5.5.

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.1.1 eTendering	WG5.1.2 VCD/ESPD	WG5.1.4 eInvoicing	WG5.2.1 ePr/PS	WG5.2.2 eConfirmation
1	eDelivery & e-Interaction					
1.1	eDelivery SAT					
1.1.1	Messaging Exchange ABB	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness
1.1.2	Addressing of Entities ABB	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness
1.1.3	Service Location ABB (SML/BDXL)	Technical Readiness	Technical Readiness	Technical Readiness	Technical Readiness	
1.1.4	Capability Lookup ABB (SMP)	Technical Readiness	Technical Readiness	Technical Readiness	Technical Readiness	
1.1.5	Backend Integration ABB	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness
2	Semantics, Processes and Documents					
2.1	eDocuments SAT					
2.1.1	Document Packaging ABB (ASiC)	Technical Readiness	Technical Readiness			Technical Readiness
2.1.2	Document Routing ABB (SBDH)	Technical Readiness	Technical Readiness	Technical Readiness		Technical Readiness
2.1.3	Document Provisioning ABB	Technical Readiness	Technical Readiness	Evaluated, not used		Technical Readiness
2.2	Semantics SAT		Technical Readiness			
3	Identity, Security and Trust					
3.1	eSignatures SAT					
3.1.1	eSignature Creation ABB	Technical Readiness				Technical Readiness
3.1.2	eSignature Validation ABB	Technical Readiness				Technical Readiness
3.1.4	eSignature Mobile ABB					
3.2	eID SAT				Technical Readiness	
3.3	Attribute Provider SAT					
3.4	Trust Establishment SAT				Enablement in progress	
3.4.1	Trust Network - Mutual Recognized Certificate	Technical Readiness	Technical Readiness			Technical Readiness
3.4.2	Trust Network - PKI ABB	Technical Readiness	Technical Readiness	Technical Readiness		
3.4.3	Trust Network - Trust Service Status List ABB	Technical Readiness				
3.5	Non Repudiation and Traceability SAT					
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Technical Readiness			Technical Readiness	
3.5.2	Timestamping ABB	Technical Readiness				Technical Readiness

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.3.1 Family Law	WG5.3.4 EAPO	WG5.3.5 MLA	WG5.3.6 Financial Penalties
1	eDelivery & e-Interaction				
1.1	eDelivery SAT				
1.1.1	Messaging Exchange ABB	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
1.1.2	Addressing of Entities ABB	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
1.1.3	Service Location ABB (SML/BDXL)				
1.1.4	Capability Lookup ABB (SMP)				
1.1.5	Backend Integration ABB	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
2	Semantics, Processes and Documents				
2.1	eDocuments SAT				
2.1.1	Document Packaging ABB (ASiC)	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
2.1.2	Document Routing ABB (SBDH)	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
2.1.3	Document Provisioning ABB	Technical Readiness	Enablement in progress	Technical Readiness	Technical Readiness
2.2	Semantics SAT	Technical Readiness		Technical Readiness	Technical Readiness
3	Identity, Security and Trust				
3.1	eSignatures SAT				
3.1.1	eSignature Creation ABB	Technical Readiness	Technical Readiness	Technical Readiness	Technical Readiness
3.1.2	eSignature Validation ABB	Technical Readiness	Technical Readiness	Technical Readiness	Technical Readiness
3.1.4	eSignature Mobile ABB				
3.2	eID SAT				
3.3	Attribute Provider SAT				
3.4	Trust Establishment SAT				
3.4.1	Trust Network - Mutual Recognized Certificate	Technical Readiness	Technical Readiness	Technical Readiness	Technical Readiness
3.4.2	Trust Network - PKI ABB				
3.4.3	Trust Network - Trust Service Status List ABB				
3.5	Non Repudiation and Traceability SAT				
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Technical Readiness		Technical Readiness	Technical Readiness
3.5.2	Timestamping ABB				

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.4.1 Business Registration	WG5.4.2 Activity Registration	WG5.5.1 Citizen Lifecycle	WG5.5.2 eAgriculture
1	eDelivery & e-Interaction				
1.1	eDelivery SAT				
1.1.1	Messaging Exchange ABB	Technical Readiness	Technical Readiness		
1.1.2	Addressing of Entities ABB	Technical Readiness	Technical Readiness		
1.1.3	Service Location ABB (SML/BDXL)	Technical Readiness	Enablement in progress		
1.1.4	Capability Lookup ABB (SMP)	Technical Readiness	Enablement in progress		
1.1.5	Backend Integration ABB	Technical Readiness	Technical Readiness		
2	Semantics, Processes and Documents				
2.1	eDocuments SAT				
2.1.1	Document Packaging ABB (ASiC)	Technical Readiness	Technical Readiness		
2.1.2	Document Routing ABB (SBDH)	Technical Readiness	Technical Readiness		
2.1.3	Document Provisioning ABB				
2.2	Semantics SAT	Enablement in progress	Enablement in progress		
3	Identity, Security and Trust				
3.1	eSignatures SAT				
3.1.1	eSignature Creation ABB	Technical Readiness	Real Transactions	Real Transactions	
3.1.2	eSignature Validation ABB	Technical Readiness	Technical Readiness		
3.1.4	eSignature Mobile ABB				
3.2	eID SAT	Real Transactions	Technical Readiness	Real Transactions	Technical Readiness
3.3	Attribute Provider SAT				
3.4	Trust Establishment SAT				
3.4.1	Trust Network - Mutual Recognized Certificate	Enablement in progress	Technical Readiness		
3.4.2	Trust Network - PKI ABB				
3.4.3	Trust Network - Trust Service Status List ABB	Technical Readiness	Enablement in progress		
3.5	Non Repudiation and Traceability SAT				
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Technical Readiness	Technical Readiness		
3.5.2	Timestamping ABB				

4.3. Pilot Readiness at MS Level

The following figure and the related table below present an overview of the status of pilot readiness for each SAT at national level.

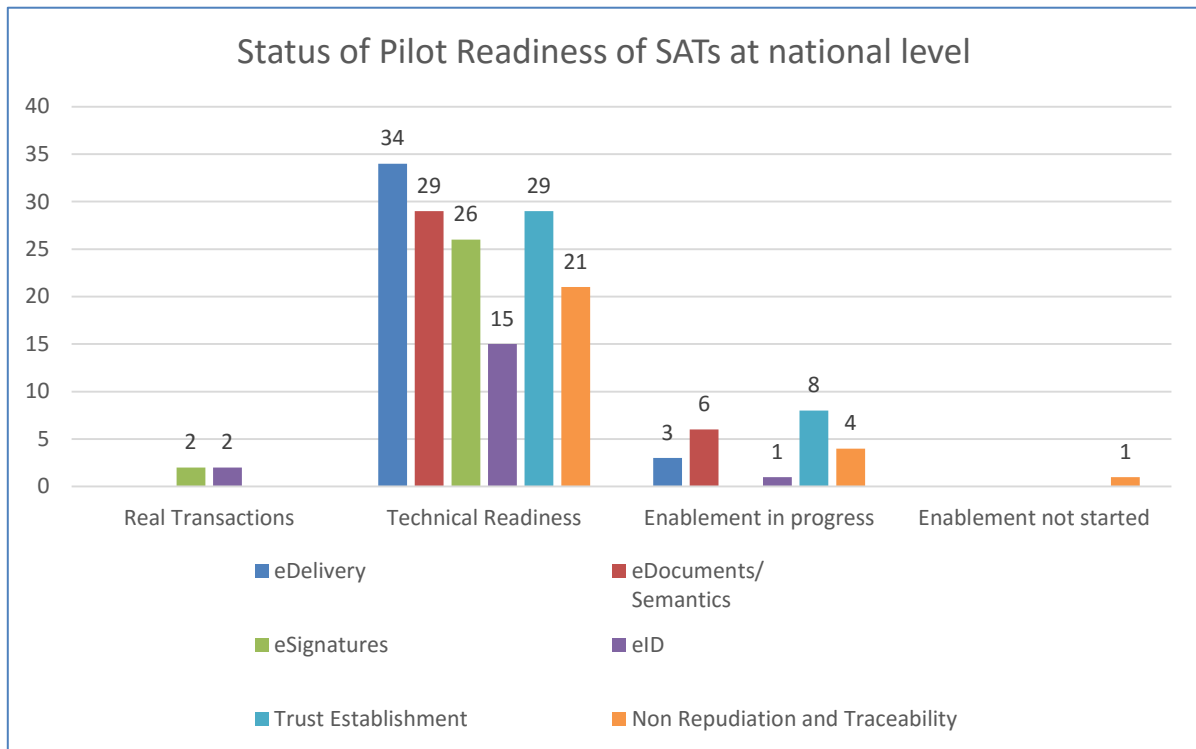


Figure 22: Overview of Pilot Readiness of SATs at national pilot level

SAT readiness states at MS Level	eDelivery	eDocuments/Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Real Transactions	0	0	2	2	0	0
Technical Readiness	34	29	26	15	29	21
Enablement in progress	3	6	0	1	8	4
Enablement not started	0	0	0	0	0	1
SUM	37	35	28	18	37	26

Table 10: Data - Overview of Pilot Readiness of SATs at national pilot level

4.4. Pilot Deployment Maturity at Domain Level

The following figure and the related table below present an overview of the status of pilot deployment maturity for each SAT at domain level.

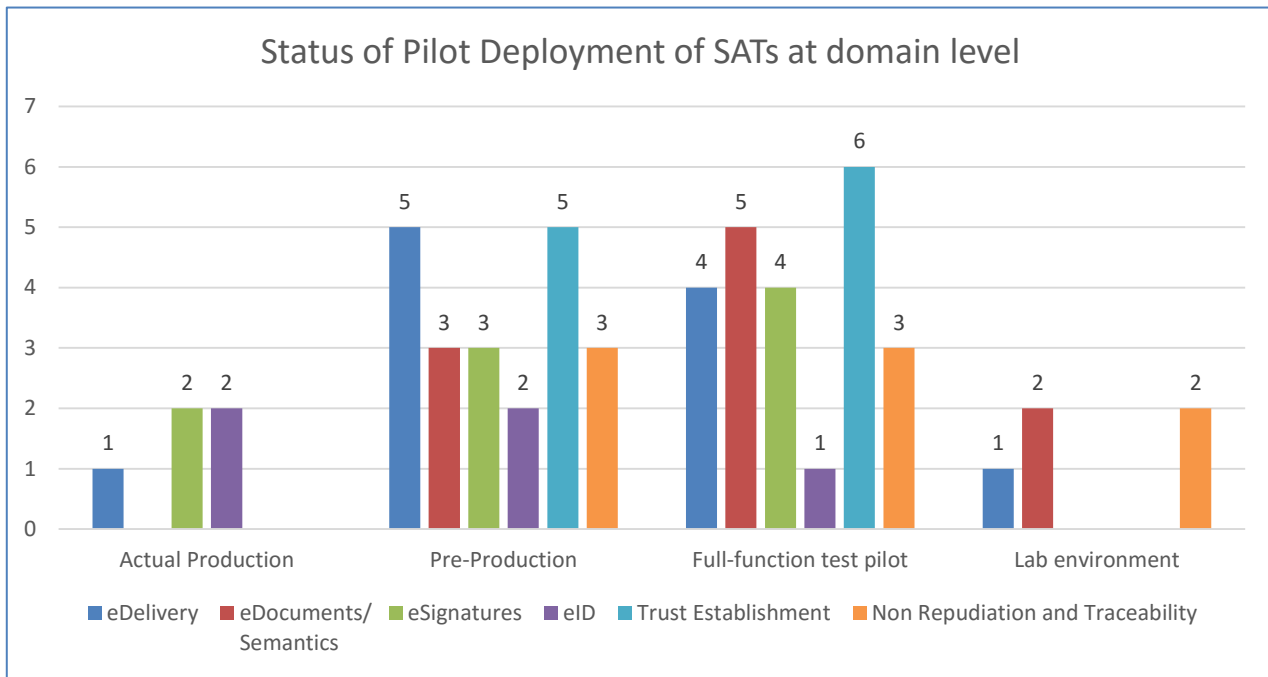


Figure 23: Overview of Deployment Maturity of SATs at domain level

SAT deployment states	eDelivery	eDocuments/Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Actual Production	1	0	2	2	0	0
Pre-Production	5	3	3	2	5	3
Full-function test pilot	4	5	4	1	6	3
Lab environment	1	2	0	0	0	2
SUM	11	10	9	5	11	8

Table 11: Data - Overview of Deployment Maturity of SATs at domain level

The following figure presents the deployment maturity for each SAT at domain pilot level for each domain pilot.

WP5 DOMAIN PILOTS e-SENS SAT DEPLOYMENT / READINESS March 2017	eDelivery	eDocuments/ Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
5.1.1 eTendering	Actual Production	Pre-Production	Pre-Production		Full-function test pilot	Pre-Production
5.1.2 Virtual Company Dossier (ESDP/VCD)	Full-function test pilot	Full-function test pilot			Full-function test pilot	
5.1.4 eInvoicing	Pre-Production	Full-function test pilot			Pre-Production	
5.2.1 ePrescription/Patient Summary (eP/PS)	Pre-Production			Pre-Production	Pre-Production	Pre-Production
5.2.2 eConfirmation	Pre-Production	Pre-Production	Pre-Production		Pre-Production	Pre-Production
5.3.1 Matrimonial matters and parental responsibility	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
5.3.4 European Account Preservation Order (EAPO)	Lab environment	Lab environment	Full-function test pilot		Full-function test pilot	
5.3.5 Mutual Legal Assistance/ European Investigation Order	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
5.3.6 Financial Penalties	Full-function test pilot	Full-function test pilot	Full-function test pilot		Full-function test pilot	Full-function test pilot
5.4.1 Business Registration	Pre-Production	Lab environment	Pre-Production	Actual Production	Pre-Production	Lab environment
5.4.2 Activity Registration	Pre-Production	Pre-Production	Actual Production	Pre-Production	Pre-Production	Lab environment
5.5.1 Citizen Lifecycle			Actual Production	Actual Production		
5.5.2 eAgriculture				Full-function test pilot		
SUM	11	10	9	5	11	8

Figure 24: Deployment Maturity for each SAT at domain pilot level – All pilots

Below follow the tables with the deployment maturity of SATs and ABBs in domains 5.1 and 5.2, in domain 5.3 and in domains 5.4 and 5.5.

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.1.1 eTendering	WG5.1.2 VCD/ESPD	WG5.1.4 eInvoicing	WG5.2.1 ePresc/PS	WG5.2.2 eConfirmation
1	eDelivery & e-Interaction					
1.1	eDelivery SAT					
1.1.1	Messaging Exchange ABB	Actual Production	Full-function test pilot	Pre-Production		Pre-Production
1.1.2	Addressing of Entities ABB	Actual Production	Full-function test pilot	Pre-Production		Pre-Production
1.1.3	Service Location ABB (SML/BDXL)	Actual Production	Full-function test pilot	Pre-Production	Pre-Production	
1.1.4	Capability Lookup ABB (SMP)	Actual Production	Full-function test pilot	Pre-Production	Pre-Production	
1.1.5	Backend Integration ABB	Actual Production	Full-function test pilot	Full-function test pilot		Pre-Production
2	Semantics, Processes and Documents					
2.1	eDocuments SAT					
2.1.1	Document Packaging ABB (ASiC)	Pre-Production	Full-function test pilot			Pre-Production
2.1.2	Document Routing ABB (SBDH)	Pre-Production	Full-function test pilot	Full-function test pilot		Pre-Production
2.1.3	Document Provisioning ABB	Pre-Production	Full-function test pilot	Not deployed		Pre-Production
2.2	Semantics SAT		Full-function test pilot			
3	Identity, Security and Trust					
3.1	eSignatures SAT					
3.1.1	eSignature Creation ABB	Pre-Production				Pre-Production
3.1.2	eSignature Validation ABB	Full-function test pilot				Pre-Production
3.1.4	eSignature Mobile ABB					
3.2	eID SAT				Pre-Production	
3.3	Attribute Provider SAT					
3.4	Trust Establishment SAT				Pre-Production	
3.4.1	Trust Network - Mutual Recognized Certificate	Full-function test pilot	Full-function test pilot			Pre-Production
3.4.2	Trust Network - PKI ABB	Full-function test pilot	Full-function test pilot	Pre-Production		
3.4.3	Trust Network - Trust Service Status List ABB	Full-function test pilot				
3.5	Non Repudiation and Traceability SAT					
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Pre-Production			Pre-Production	
3.5.2	Timestamping ABB	Pre-Production				Pre-Production

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.3.1 Family Law	WG5.3.4 EAPO	WG5.3.5 MLA	WG5.3.6 Financial Penalties
1	eDelivery & e-Interaction				
1.1	eDelivery SAT				
1.1.1	Messaging Exchange ABB	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
1.1.2	Addressing of Entities ABB	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
1.1.3	Service Location ABB (SML/BDXL)				
1.1.4	Capability Lookup ABB (SMP)				
1.1.5	Backend Integration ABB	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
2	Semantics, Processes and Documents				
2.1	eDocuments SAT				
2.1.1	Document Packaging ABB (ASiC)	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
2.1.2	Document Routing ABB (SBDH)	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
2.1.3	Document Provisioning ABB	Full-function test pilot	Lab environment	Full-function test pilot	Full-function test pilot
2.2	Semantics SAT	Full-function test pilot		Full-function test pilot	Full-function test pilot
3	Identity, Security and Trust				
3.1	eSignatures SAT				
3.1.1	eSignature Creation ABB	Full-function test pilot	Full-function test pilot	Full-function test pilot	Full-function test pilot
3.1.2	eSignature Validation ABB	Full-function test pilot	Full-function test pilot	Full-function test pilot	Full-function test pilot
3.1.4	eSignature Mobile ABB				
3.2	eID SAT				
3.3	Attribute Provider SAT				
3.4	Trust Establishment SAT				
3.4.1	Trust Network - Mutual Recognized Certificate	Full-function test pilot	Full-function test pilot	Full-function test pilot	Full-function test pilot
3.4.2	Trust Network - PKI ABB				
3.4.3	Trust Network - Trust Service Status List ABB				
3.5	Non Repudiation and Traceability SAT				
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Full-function test pilot		Full-function test pilot	Full-function test pilot
3.5.2	Timestamping ABB				

WP5 DOMAIN AND NATIONAL PILOTS e-SENS SAT/ABB DEPLOYMENT/READINESS March 2017		WG5.4.1 Business Registration	WG5.4.2 Activity Registration	WG5.5.1 Citizen Lifecycle	WG5.5.2 eAgriculture
1	eDelivery & e-Interaction				
1.1	eDelivery SAT				
1.1.1	Messaging Exchange ABB	Pre-Production	Pre-Production		
1.1.2	Addressing of Entities ABB	Pre-Production	Pre-Production		
1.1.3	Service Location ABB (SML/BDXL)	Pre-Production	Lab environment		
1.1.4	Capability Lookup ABB (SMP)	Pre-Production	Pre-Production		
1.1.5	Backend Integration ABB	Lab environment	Pre-Production		
2	Semantics, Processes and Documents				
2.1	eDocuments SAT				
2.1.1	Document Packaging ABB (ASiC)	Lab environment	Pre-Production		
2.1.2	Document Routing ABB (SBDH)	Lab environment	Pre-Production		
2.1.3	Document Provisioning ABB				
2.2	Semantics SAT	Lab environment	Lab environment		
3	Identity, Security and Trust				
3.1	eSignatures SAT				
3.1.1	eSignature Creation ABB	Pre-Production	Actual Production	Actual Production	
3.1.2	eSignature Validation ABB	Full-function test pilot	Pre-Production		
3.1.4	eSignature Mobile ABB				
3.2	eID SAT	Actual Production	Pre-Production	Actual Production	Full-function test pilot
3.3	Attribute Provider SAT				
3.4	Trust Establishment SAT				
3.4.1	Trust Network - Mutual Recognized Certificate	Lab environment	Pre-Production		
3.4.2	Trust Network - PKI ABB				
3.4.3	Trust Network - Trust Service Status List ABB	Pre-Production	Pre-Production		
3.5	Non Repudiation and Traceability SAT				
3.5.1	Non-Repudiation (Evidence Emitter) ABB	Lab environment	Lab environment		
3.5.2	Timestamping ABB				

4.5. Pilot Deployment Maturity at MS level

The following figure and the related table below present an overview of the status of pilot deployment for each SAT at national level.

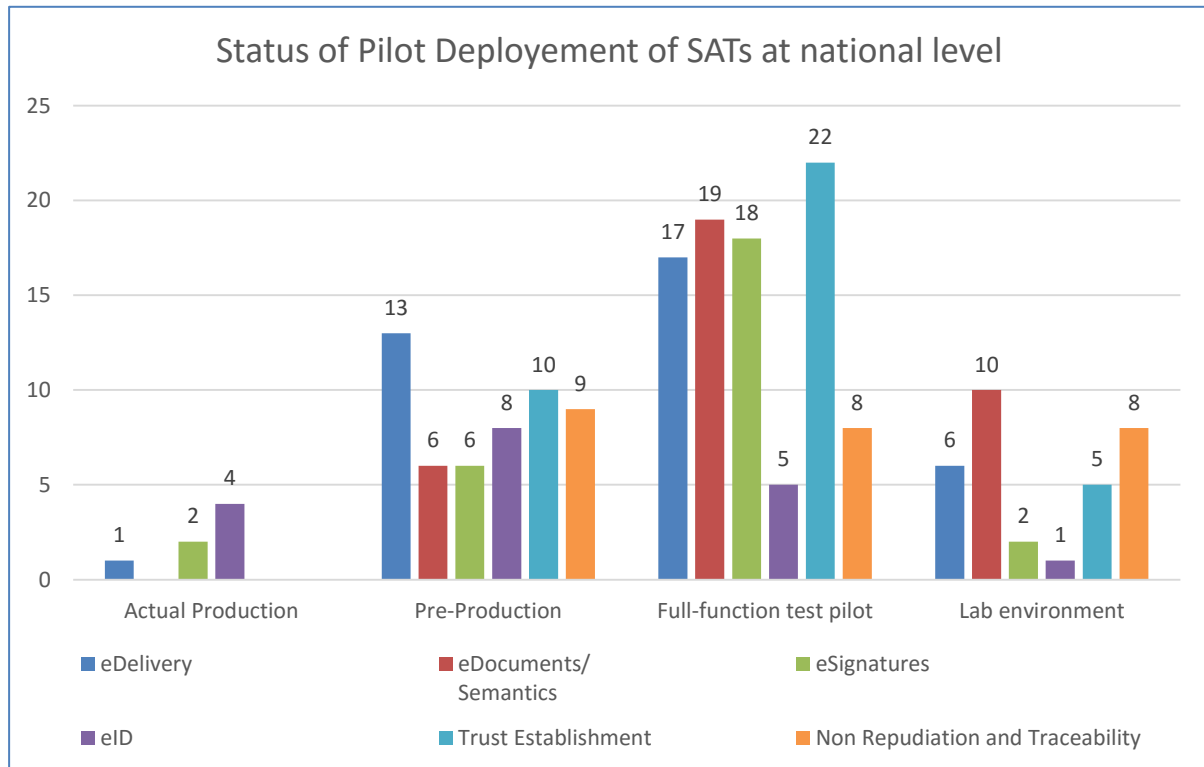


Figure 25: Overview of Deployment Maturity of SATs at national pilot level

SAT deployment states	eDelivery	eDocuments/Semantics	eSignatures	eID	Trust Establishment	Non Repudiation and Traceability
Actual Production	1	0	2	4	0	0
Pre-Production	13	6	6	8	10	9
Full-function test pilot	17	19	18	5	22	8
Lab environment	6	10	2	1	5	8
SUM	37	35	28	18	37	25

Table 12: Data - Overview of Deployment Maturity of SATs at national pilot level

5. Processing and Consolidation of Pilot Evaluation Data from Domains and MS/ACs

5.1. Introduction

As it is mentioned in previous chapters, the pilot evaluation process for Y4 includes the following steps:

1. Data collection based on the templates for domain and national pilot evaluation.
2. Consolidation and processing of pilot evaluation data from Domains and MS/ACs.
 - 2.1 Calculation of average rates (where applicable) **for each domain pilot** and **for each national pilot** for the several approaches of pilot evaluation included in the pilot evaluation framework.
 - 2.2 Calculation of **average rates per pilot** (where applicable) based on the calculated average rates in step 2.1 and/or **consolidation of main evaluation comments** per pilot.
 - 2.3 Calculation of **overall average rates** (where applicable) **from all pilots** based on the calculated average rates in step 2.2.
3. Conclusions and suggestions.

As regards the **first step** of the evaluation process, all pilot evaluation data at domain pilot evaluation level and at national pilot evaluation level are available on WP5 wiki.

This chapter is related to the **second step** of the evaluation process. More specifically, it presents **for each pilot** an overview of the **results of step 2.2** of the evaluation process mentioned above it also includes links to more detailed data on WP5 wiki. Finally, a last section includes the results of **step 2.3** of the evaluation process.

As regards the **third step** of the evaluation process, final conclusions are presented in the last chapter. Moreover, there is also a final report for all WP5 pilots which summarizes the main results, value and benefits, outcomes and impact as well as overall recommendations. This report is included in **chapter 4 (e-SENS Achievements: Pilots)** of **deliverable D1.12 (Public Project Final Report)**. Furthermore, the main **results** and **conclusions** on **sustainability plans of pilots**, based on the questionnaire on sustainability assessment which is part of the pilot evaluation framework, are presented in **chapter 7 (Sustainability and Governance)** of **deliverable D1.12**.

Regarding the second step of the evaluation process mentioned above, the following table presents an association between the evaluation approaches of the pilot evaluation framework and the related sections in the pilot evaluation templates for domain and national pilot evaluation. The last column of the table below includes, comments on the processing of pilot evaluation data. The results of that processing are presented in the next sub-sections. For more details see the corresponding domain and national pilot evaluation reports which are available on WP5 wiki.

Evaluation Approach	Processing of pilot evaluation data - Step 2 (Comments on the processing of pilot evaluation data in the context of the second step of the evaluation process)
A. Goals based evaluation	
A1. Achievement of domain goals	Processing of pilot evaluation data at domain pilot level, includes, for each pilot, a summary of the self-evaluation carried out at domain pilot level.
A2. Achievement of National KPIs	Processing of pilot evaluation data at national pilot level includes a consolidation of the KPI Ambition level and Achieved level for KPI5.3 and KPI5.4 for all piloting countries that have participated in the pilot. The consolidated data on achievement of national KPIs are incorporated at the corresponding page of the domain pilot evaluation on the wiki.
B. Outcomes based and process based	
B1. e-SENS's vision and market adoption	<p>Processing of pilot evaluation data for that criterion includes the following steps/ levels of aggregation:</p> <ol style="list-style-type: none"> 1. Step 2.1: Calculation of average rates for each domain pilot and for each national pilot. 2. Step 2.2: Calculation of average rates per pilot (based on the corresponding average rates calculated in step 2.1). 3. Step 2.3: Calculation of overall average rate from all pilots (based on average rates calculated in step 2.2). <p>Additional processing in the context of step 2.2 includes consolidation and presentation of main comments included in pilot evaluation reports. The consolidated data for each pilot are incorporated at the corresponding page of the domain pilot on the wiki.</p>
B2. Project execution in an e-SENS context	Same processing as processing for previous criterion.

Evaluation Approach	Processing of pilot evaluation data - Step 2 (Comments on the processing of pilot evaluation data in the context of the second step of the evaluation process)
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	Same processing as processing for previous criterion.
B4. Pilot execution in production environment	For that criterion, a short description is provided for each pilot whether it run in production environment or not.
C. Evaluation of e-SENS BBs used in pilots	<p>Processing of BB evaluation data includes the following steps/ levels of aggregation for the three categories of BB evaluation (Product-oriented, Pilot Goals-oriented and Adoption-oriented):</p> <ol style="list-style-type: none"> 1. Step 2.1: Calculation of average rates for each BB for the three categories of BB evaluation. (The average rate for each BB is calculated for each domain pilot evaluation and for each national pilot evaluation). 2. Step 2.2: Calculation of average rates for each BB per pilot for the three categories of BB evaluation (based on the corresponding average rates calculated in step 2.1) as well as calculation of the overall average rate for each BB per pilot based on calculated average rates of the three categories of BB evaluation. 3. Step 2.3: Calculation of average rates for each BB from all pilots (based on the corresponding average rates calculated in step 2.2). <p>Additional processing in the context of step 2.2 includes consolidation and presentation of main comments included in pilot evaluation reports. The consolidated data for each pilot are incorporated at the corresponding page of the domain pilot on the wiki.</p>
D. Sustainability assessment	The main results and conclusions on sustainability plans of pilots are included in chapter 7 (Sustainability and Governance) of deliverable D1.12. (Project Final Report) .

Table 13: Comments on the processing of pilot evaluation data in the context of the second step of the evaluation process

5.2. eTendering

5.1.1 eTendering		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	The eTendering pilot achieved its domain goals to make cross border tendering easier and to connect tendering systems via the standardized European building blocks provided by e-SENS and according to the new Directives on Public Procurement. The pilot has set up a network of tendering system: Tenders Electronic Europe which allows businesses to use their preferred tendering system (interface) to get engaged in a tendering procedure. Due to time and resource limitations, they focused on the most relevant steps in the procedure. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	All MS piloting in eTendering achieved their ambitions set in terms of infrastructure and impact, except from Norway which initially had the ambition of three tendering systems (Merzell, Cloudia and Amesto) but of various reasons only Merzell continued and achieved its KPI. A consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	4,01	MS agree that the pilot increased awareness and motivation of using standards in eProcurement and could lower barriers of cross border and cross-community transactions. However domain profiling remains necessary. Also, the pilot used, improved and extended existing technical solutions. Technical post-pilot conditions for production have been established but additional technical work is required to use solutions in production environment. We should mention here that there are some doubts at least from a part of the market as expressed by Vortal and also other platforms that were engaged by the pilot but did not finally implement. For more details see here .
B2. Project execution in an e-SENS context	3,87	Stakeholders were committed, and the pilot provided new business opportunities for the service providers, the team was efficient and the risks were mitigated. Regarding the scope of the pilot, in the

5.1.1 eTendering		
Evaluation Approach	Average Rate	Comments
		beginning was the full procurement procedure, however only few use cases were managed in proof-of-concept setting. The main reason was the fact that implementing building blocks needed a lot domain profiling. We should mention here that Norway had more challenges because of their self-imposed target to be in production with tender submission by the summer 2016 which meant that they had to prioritise implementing the pilot on the current AS2 PEPPOL network whereas the other countries were focusing on the future AS4 based CEF eDelivery. This is reflected in the ratings of Norway but eventually the pilot was kept together and implemented solutions on both AS2 and AS4. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	3,03	There is no evidence from the responses of the pilot's coordinator and participants that the structured methodology of the Pilot Lifecycle had a direct impact on pilot execution. This can be attributed to the fact that the pilot followed greatly diverging timelines and maturity paths. Regarding support, the project developed in ways that most pilots had access to technical specialists within the pilot teams so they didn't really need to interact much with WP6 for pilot support purposes. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment. Extensive pilot testing has been carried out among pilot participants. For more details see section pilot testing on the wiki.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	In general the BBs have been rated higher in product oriented evaluation as well as in pilot goals oriented evaluation than in adoption oriented evaluation. Domain profiling was required to adopt the BBs for the pilot.
D. Sustainability assessment	N/A (Qualitative data).	The piloting organizations (ministries, service providers of tendering system, service providers of gateways) are willing to move from technical piloting to production piloting and it is important to keep the implementers' community alive to continue work. There is the legal basis for the use case (EU regulations on public procurement and eIDAS). eTendering pilot results will be handed over to OpenPEPPOL which will be the governance structure to manage changes and support implementers. Service providers will maintain their own implementations and (test) environments.

5.1.1 eTendering		
Evaluation Approach	Average Rate	Comments
		<p>Service providers, branch organizations (EUPlat), European expert group on eprocurement (EXEP), all pilot participants are willing to further promote the results.</p> <p>CEF for further funding. The pilot results are already included in the CEF 2017 call.</p> <p>Relevant stakeholders are: EXEP (Multi-Stakeholder Expert Group on eProcurement), OpenPEPPOL, CEN TC440, DG GROW, CEF, potential new projects related to eProcurement.</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 14: eTendering pilot – Overview of results of processing of domain and national pilot evaluation data

5.3. Virtual Company Dossier (ESPD/VCD)

5.1.2 ESPD/VCD		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	ESPD/VCD pilot achieved its goals to evolve the PEPPOL pre-award Virtual Company Dossier (VCD) in order to match requirements of the new Directives 2014/24/EU and 2014/25/EU on public procurement including the European Single Procurement Document (ESPD) and the e-Certis system operated by DG GROW. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	Italy achieved most of its ambitions set in terms of infrastructure and impact. Out of the three platforms (AVCpass, Consip and INTERCENT-ER eProcurement Platforms), only AVCPass was finally left aside because it is undergoing a deep evolution following the new national regulation of the public tenders. Details on the KPI achievement of Italy is presented here .
B. Outcomes based and process based		

5.1.2 ESPD/VCD		
Evaluation Approach	Average Rate	Comments
B1. e-SENS's vision and market adoption	4,5	The pilot increased awareness and motivation of using standards since a common data model based on international standards was designed and implemented for ESPD/VCD. The pilot contributed towards lowering barriers of cross border and cross-community transactions since ESPD is part of the new Directive on Public Procurement and its use is compulsory for the above-the-threshold bids on a cross border pan European basis. The pilot defined processes that use eDelivery standard for cross border transactions of ESPD/VCD. The E-SENS ESPD/VCD specs are major input and enabler to cross border transaction implemented in projects like ESPDint (CEF project) and other pilot projects (e.g. TOOP). The specs of e-SENS ease the adoption to open standards and show how to implement them. For more details see here .
B2. Project execution in an e-SENS context	3,84	Stakeholders were committed and the team was very efficient. However, due to the fact that the ESPD data model was owned by an external stakeholder (DG GROW), made the schedule very volatile and the scope of the pilot eventually changed due to external dependencies and some partners will finally pilot in the ESPDint project (CEF). For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4,54	The structured methodology of Pilot Lifecycle could not really be applied since the pilot followed diverging timelines and maturity paths due to external dependencies. Regarding support, the pilot had access to technical specialists within the pilot team so they didn't really need to interact much with WP6 for pilot support purposes. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment. A fundamental step in this direction will be made with the actions awarded a grant by the Commission under the CEF Calls. For more details see here .
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	In general the BBs have been rated higher in product oriented evaluation as well as in pilot goals oriented evaluation than in adoption oriented evaluation. Documentation provided for the REST API of eCertis 2.0 service was poor.
D. Sustainability assessment	N/A (Qualitative data).	The piloting organizations are willing to move from technical piloting to production piloting.

5.1.2 ESPD/VCD		
Evaluation Approach	Average Rate	Comments
		<p>There are already CEF funded projects that will implement an ESPD/VCD solution in production environment (2016-EU-IA-0037, 2015-IT-IA-0108, 2016-IT-IA-0038).</p> <p>The pilot results (e-SENS VCD reference implementation) was part of the CEF May 2016 call and will be used for implementation in the CEF ESPDINT project.</p> <p>VCD BIS will be handed over to OpenPEPPOL.</p> <p>Relevant stakeholders are: EXEP (Multi-Stakeholder Expert Group on eProcurement), OpenPEPPOL, DG GROW, CEF, potential new projects related to eProcurement, eCERTIS governance group, prequalification agencies.</p> <p>ESPD is an obligation contained in the latest Directive on Public Procurement. The use of e-CERTIS, an EC operated central service maintained by the MS, is at the moment providing legal compliance assurance in cross-border provision of qualifications.</p> <p>The pilot links also to the Once-Only Principle, as applied within the eProcurement domain (TOOP project, ISA² action on Once Only in eProcurement).</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 15: ESPD/VCD pilot - Overview of results of processing of domain and national pilot evaluation data

5.4. eInvoicing

5.1.4 eInvoicing		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	eInvoicing pilot achieved its domain goals to get up and running on the 4-corner module using PEPPOL profile of CEF eDelivery by getting complied with PEPPOL standards for eInvoice and to handle large

5.1.4 eInvoicing		
Evaluation Approach	Average Rate	Comments
		amounts of messages and large files. The cost for upgrading to AS4 was acceptable and the volumes sent were according to the user stories. There was one participant that was totally new to the 4-corner module and cost for upgrading was done according to their estimations. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	All MS piloting in eInvoicing achieved their ambitions set in terms of infrastructure and impact, except from Greece which initially had the ambition to connect with the ESIDIS system. The AS4 Access Point has been deployed that was able to submit and receive invoices, according to the PEPPOL BIS 4a. The appropriate registrations were made in the national SMP Service. The connection with the ESIDIS System was not established during the pilot. Instead, a Mock Service, emulating the ESIDIS System was deployed. As regards goals based evaluation at national pilot level, a consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	3,87	MS agree that the pilot contributes towards increasing awareness and motivation of using standards and lowering barriers of cross border and cross-community transactions by using BB's in e-SENS in the 4-corner module and the possibility to use AS4. It was fairly easy to set up the 4-corner module and sending eInvoices between the participants in the eProcurement setup. As regards pilot contribution to a broad market adoption of e-SENS standards in the MS's country/region, it is questionable If the introduction of AS4 lowers the barriers of adoption since AS2 is already in the market for eInvoicing. Moreover, post-pilot conditions for production have been established since OpenPEPPOL has made the 4-corner module with AS4 used for pre-award communication. For more details see here .
B2. Project execution in an e-SENS context	4,09	Stakeholders were committed, the team was efficient and the risks were mitigated. Building Blocks were still being developed when already first steps for implementation should have been started. Deployment of e-SENS BBs proved as more challenging than originally expected. Guidelines and standards were clear enough so that the deployment was still manageable. For more details see here .

5.1.4 eInvoicing		
Evaluation Approach	Average Rate	Comments
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	3	There is no evidence from the available responses that the structured methodology of the Pilot Lifecycle had a direct impact on pilot execution. For most of the participants EPLM was considered not really relevant to the specific pilot. Regarding support, the pilot had access to technical specialists within the pilot team so they didn't really need to interact much with WP6 for pilot support purposes. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot run only in a test environment. Details on transactions that have been done in test environment among the piloting countries are available on the wiki .
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	In general the BBs have been rated higher in product oriented evaluation as well as in pilot goals oriented evaluation than in adoption oriented evaluation. Document Provisioning ABB was evaluated from Slovenia but was not finally used in the pilot.
D. Sustainability assessment	N/A (Qualitative data).	<p>The pilot explored the feasibility of using the AS4 based CEF eDelivery infrastructure for the exchange of invoices.</p> <p>Relevant stakeholders are: OpenPEPPOL and CEF eDelivery and eInvoicing DSIs. eInvoicing is already supported by the CEF. CEF eInvoicing call in 2016 funded projects for implementing eInvoicing over eDelivery.</p> <p>The eInvoicing Service Providers (e.g. those using the PEPPOL network) will in the foreseeable future have to make sure that they have to comply with the eRDS specification because the eIDAS regulation applies to them. Within this context a possible migration of OpenPEPPOL AS2 to AS4 which is in progress but not foreseen for the immediate future may become quite relevant.</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 16: eInvoicing pilot - Overview of results of processing of domain and national pilot evaluation data

5.5. ePrescription/Patient Summary

5.2.1 ePrescription/Patient Summary		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	ePrescription/ Patient Summary pilot achieved its objective to further enhance the existing solutions of cross-border access to health services within the EU, supporting the implementation of Directive 2011/24 on the application of patients' rights in cross-border healthcare. e-SENS succeeded in making the ICT infrastructure inherited by epSOS more sustainable and more stable by using CEF BBs such as eID, Non-repudiation, Capability and Location Lookup. It provided these BBs for integration to the OpenNCP reference implementation framework for a National Contact Point for eHealth (NCPeH) used in CEF call for the eHealth DSI. Their implementation by MSs is on the way of being funded by CEF Calls, paving the way for operational services. On top of technical outcomes, recommendations for relevant policy level actions, such as eID solutions supporting eIDAS, have been also handed over to the Member States community of the Joint Action supporting the eHealth Network (JAsEHN). For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	All MS piloting in the pilot achieved their ambitions set in terms of infrastructure and impact. Luxembourg implemented e-SENS eID levels 1-3 but not tested as country B. Luxembourg was not able to pilot eID with eIDAS within the timeframe of the e-SENS and the lack of technical human resources available to contribute to other BB integration, motivated Luxembourg consortium to discontinue the whole e-SENS eHealth pilot in September 2016. A consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	4,04	Awareness and motivation of using standards was well established already before joining e-SENS. The pilot contributed towards lowering barriers of cross border and cross-community transactions through proposing eIDAS based solutions for patient identification. A number of services and BBs were adopted

5.2.1 ePrescription/Patient Summary		
Evaluation Approach	Average Rate	Comments
		as extensions to the Open NCP. The eIDAS analysis demonstrated the need for additional review and interventions to the current eHealth infrastructure. The pilot focused on open standards although much of these standards pre-existed as an eHealth community culture. Post-pilot conditions for production have been established since several change requests have been handed over as well as a set of recommendations for MS; CEF deployment wave 2 foresees the MS will implement eIDAS based eID solutions. Regarding facilitation of market innovation, in general e-SENS is focusing on the infrastructure layer and additional eHealth specific assets are needed before market innovation can be supported. Austria did not answer B1 questions. For more details see here .
B2. Project execution in an e-SENS context	3,57	Stakeholders were committed and e-SENS has been particularly successful in helping to understand eIDAS related organisational issues, leading to a number of Recommendations to MS. The team was efficient and the risks were mitigated. There were delays with some Building Blocks. Austria and Luxembourg did not answer B2 questions. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4,27	EPLM had low impact. For most of the participants EPLM was considered not really relevant to the specific pilot. Regarding support, the pilot had access to technical specialists within the pilot team for specific BBs and for others interacted with WP6 for pilot support purposes. Austria did not answer B3 questions. For more details see here .
B4. Pilot execution in production environment	N/A	The eP/PS pilot run in pre-production environment. Pilot testing has been carried out among pilot participants. For more details see section pilot testing on the wiki.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	Feedback was not complete, e.g. no feedback for Trust SAT. In general the BBs have been rated higher in product oriented evaluation as well as in pilot goals oriented evaluation than in adoption oriented evaluation.
D. Sustainability assessment	N/A (Qualitative data).	CEF funding for most of the e-SENS piloting countries. Relevant stakeholders: CEF eHealth DSI, DG SANTE, CONNECT, eHealth Network (the political body of MS). OpenNCP is part of the CEF eHDSI managed by DG SANTE.

5.2.1 ePrescription/Patient Summary		
Evaluation Approach	Average Rate	Comments
		IHE Europe might be the entity in charge of keeping test tools aligned to the new specifications. This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.

Table 17: eP/PS pilot – Overview of results of processing of domain and national pilot evaluation data

5.6. eConfirmation

5.2.2 eConfirmation		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	The developed, tested and piloted service is according to the initial UC and pilot blueprint and provides citizens of Netherlands and Estonia access to necessary healthcare during a temporary stay in those countries. Two out of four domain pilot goals were fully achieved, one goal was partially achieved and one goal was not achieved because of technical problems. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	The MS piloting in eConfirmation achieved their ambitions set in terms of infrastructure and impact, except from Estonia which started with the ambition of 3 systems, but finally one hospital did not pilot because of high development cost. As regards goals based evaluation at national pilot level, a consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	4,22	The pilot increased awareness and motivation of using standards since a common PRC data model was approved and adopted by Austria, Estonia, Netherlands, Poland and Slovakia. The pilot used open

5.2.2 eConfirmation

Evaluation Approach	Average Rate	Comments
		standards, however it should be noted here that a main barrier for adoption is the legal viability which needs to be decided in the Administrative Commission (AC). See corresponding discussion here . The eConfirmation pilot ended up the e-SENS project with an operational and running system that can act as prototype and demonstrator for interested partners in fellow MS. Investments to achieve a fit for purpose level can be done only, if more MSs will join the initiative. Estonia and the Netherlands generate too less digital traffic amongst each other to justify these investments. For more details see here .
B2. Project execution in an e-SENS context	3,97	Although more stakeholders showed interest in participating, due to low internal prioritization of eConfirmation, only two MS finally piloted eConfirmation. We should note here, that the pilot did not have sufficient technical expertise despite its high cost to fully understand and profile BBs like eDelivery and as a consequence, the evaluation of BBs was different than with the other pilots. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4,34	EPLM was followed. However, the radical change in the contributors' teams (only two countries finally piloted) lowered the impact. BB support was provided. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot ran in pre-production environment. The number of transactions performed are 19 from Estonia to Netherlands and 20 from Netherlands to Estonia.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	No statistically significant difference in rating of BBs in product oriented evaluation, in pilot goals oriented evaluation and in adoption oriented evaluation.
D. Sustainability assessment	N/A (Qualitative data).	A taskforce has been formed to investigate whether eConfirmation can be adopted by partners from other MS. If they have no results by August 1st 2017, they will stop the taskforce.

5.2.2 eConfirmation		
Evaluation Approach	Average Rate	Comments
		<p>There is legal viability issue because eConfirmation provides an electronic Provisional Replacement Certificate (ePRC) which is not accepted yet as legally equal to the EHIC and the paper based PRC. This needs to be discussed and decided in the Administrative Commission (AC).</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 18: eConfirmation pilot - Overview of results of processing of domain and national pilot evaluation data

5.7. Matrimonial matters and parental responsibility

5.3.1 Matrimonial matters and parental responsibility		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	The implementation of the use case demonstrated that a digital procedure is feasible in the field of family law to ease the life of numerous citizens and that the e-CODEX infrastructure can be reused. This is very important since it is an area with high number of cases involving citizens, but with no easy access to justice. The goals were modified underway due to the complexity of the procedure, the part of the procedure related to international child abduction was not implemented. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	The MS piloting in Matrimonial matters achieved their ambitions set in terms of infrastructure and impact and a consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		

5.3.1 Matrimonial matters and parental responsibility		
Evaluation Approach	Average Rate	Comments
B1. e-SENS's vision and market adoption	3,75	The pilot showed that the standards can be also used in the area of family law. Also, the pilot contributed towards lowering barriers of cross border transactions since it showed, through successful testing results that cross border communication involving different communities can work. Finally, the pilot showed, through successful testing results that cross border communication reusing the e-CODEX infrastructure can work in different legal domains. For more details see here .
B2. Project execution in an e-SENS context	3,48	Stakeholders on technical side were committed. On the business side the question is more difficult to answer. Also, in terms of realization of organizational benefits, it proved that digital exchanges can be applied to family law and the potential organisational benefits are therefore extremely high. The technical teams rapidly made testing possible once the business process modelling had been defined. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4	Contribution of direct support from technical experts from WP5 WGs and WP6 who are responsible for the design and implementation of BBs (2nd level support) was very good. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment, due to organisation issues which were not solved before the end of the project. However, the pilot was fully tested with success.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	Positive rating of BBs in product oriented evaluation, in pilot goals oriented evaluation and in adoption oriented evaluation. We should note that the e-justice domain reuses the e-CODEX infrastructure influenced by e-SENS and e-CODEX was running in parallel with e-SENS for 3 years.
D. Sustainability assessment	N/A (Qualitative data).	The potential of the use case is enormous and it could change the life of many European residents. The domain activities are being sustained and extended within the Me-CODEX project. As stated in the COSI conclusions, long term sustainability should be carried out by eu-LISA. Among the artefacts that need to be sustained are the schemas, the technical exchange infrastructure (Gateway and Connector), and the Circle of Trust Agreement.

5.3.1 Matrimonial matters and parental responsibility		
Evaluation Approach	Average Rate	Comments
		<p>Relevant actors: EC, Council, MS, judicial professionals. CEF could provide funding. EC relevant for the sustainability of the use case: DG Justice, DG Home, DG DIGIT. This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 19: Matrimonial matters and parental responsibility pilot - Overview of results of processing of pilot evaluation data

5.8. European Account Preservation Order (EAPO)

5.3.4 European Account Preservation Order (EAPO)		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	<p>The implementation of this use case demonstrated that a digital procedure is feasible despite the complexity of the procedure and that the e-CODEX infrastructure can be reused. More work is needed due to the before mentioned complexity and the fact that the procedure is rather new which makes many organisational aspects unknown. Unfortunately due to the complexity of the EAPO procedure, the pilot did not show in a full production environment nor between a large numbers of countries. For more details see here.</p>
A2. Achievement of National KPIs	N/A (Qualitative data).	<p>France achieved its ambition. Netherlands did not provide any information on evaluation of the pilot. KPI achievements for France are presented here.</p>
B. Outcomes based and process based		

5.3.4 European Account Preservation Order (EAPO)		
Evaluation Approach	Average Rate	Comments
B1. e-SENS's vision and market adoption	4	The pilot increased awareness and motivation of using standards since it showed the potential of using the standards on this procedure (EAPO). Also, the pilot contributed towards lowering barriers of cross border transactions since it showed that cross border communication involving different communities could be possible despite the complexity of the procedure. Finally, the pilot showed, that cross border communication reusing the e-CODEX infrastructure can work in different legal domains. For more details see here .
B2. Project execution in an e-SENS context	4	Both technical and business stakeholders were committed to the project. Also, in terms of realization of organizational benefits, although they did not run in production environment it proved that digital exchanges can be applied to this procedure and the potential organisational benefits are therefore extremely high. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4	Contribution of direct support from technical experts from WP5 WGs and WP6 who are responsible for the design and implementation of BBs (2nd level support) was very good. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment due to organisation issues which were not solved before the end of the project. However, the pilot was fully tested with success.
C. Evaluation of e-SENS BBs used in pilots	No input available.	Positive rating of BBs in product oriented evaluation, in pilot goals oriented evaluation and in adoption oriented evaluation. We should note that the e-justice domain reuses the e-CODEX infrastructure influenced by e-SENS and e-CODEX was running in parallel with e-SENS for 3 years.
D. Sustainability assessment	N/A (Qualitative data).	The potential of the use case is enormous and it could change the life of many European residents. The domain activities are being sustained and extended within the Me-CODEX project. As stated in the COSI conclusions, long term sustainability should be carried out by eu-LISA. Among the artefacts that need to be sustained are the schemas, the technical exchange infrastructure (Gateway and Connector), and the Circle of Trust Agreement.

5.3.4 European Account Preservation Order (EAPO)		
Evaluation Approach	Average Rate	Comments
		<p>Relevant actors: EC, Council, MS, lawyers, CEHJ. CEF could provide funding. EC relevant for the sustainability of the use case: DG Justice, DG Home, DG DIGIT. This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 20: EAPO pilot - Overview of results of processing of pilot evaluation data

5.9. Mutual Legal Assistance (MLA) / European Investigation Order (EIO)

5.3.5 Mutual Legal Assistance (MLA) / European Investigation Order		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	<p>The pilot successfully demonstrated the potential benefits of using a secure, reliable and fast channel to communicate between judicial authorities in different MS. Pilot goals have been achieved. More countries were successfully on boarded and the business process and the schemas modelling adjusted to fully reflect the European Investigation Order. It was also demonstrated how a reference implementation could be used for countries not having a backend application. For more details see here.</p>
A2. Achievement of National KPIs	N/A (Qualitative data).	No input was provided by the piloting MS regarding their ambition KPIs.
B. Outcomes based and process based		

5.3.5 Mutual Legal Assistance (MLA) / European Investigation Order		
Evaluation Approach	Average Rate	Comments
B1. e-SENS's vision and market adoption	5	The pilot shows the real benefits of digital tools to secure cross-border communication between judicial authorities. The pilot solution is being used in other projects to make cross-border justice communication more secure and reliable. For more details see here .
B2. Project execution in an e-SENS context	4,33	The pilot has high organisational benefits because it eases cooperation between judicial authorities and handling of requests. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4	Contribution of direct support from technical experts from WP5 WGs and WP6 who are responsible for the design and implementation of BBs (2nd level support) was very good. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment.
C. Evaluation of e-SENS BBs used in pilots	No input available.	No input was provided on the BB rating.
D. Sustainability assessment	N/A (Qualitative data).	<p>The potential of the use case is enormous. The domain activities are being sustained and extended within the Me-CODEX project. As stated in the COSI conclusions, long term sustainability should be carried out by eu-LISA. The activities related to this use case are also being continued within the Commission launched e-Evidence project. Among the artefacts that need to be sustained are the schemas, the technical exchange infrastructure (Gateway and Connector), and the Circle of Trust Agreement.</p> <p>Relevant actors: EC, Council, MS, legal professions.</p> <p>CEF could provide funding. EC relevant for the sustainability of the use case: DG Justice, DG Home, DG DIGIT. The sustainability depends on the breakthrough of e-Justice meaning getting a long term maintenance solution adopted for the e-CODEX results.</p>

Table 21: MLA / EIO pilot - Overview of results of processing of pilot evaluation data

5.10. Financial Penalties

5.3.6 Financial Penalties		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	The pilot successfully demonstrated the potential benefits of using a secure, reliable and fast channel to communicate between authorities in France and the Netherlands regarding financial penalties. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	No input available.
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	4	The pilot showed through successful testing results that cross border communication reusing the e-CODEX infrastructure can work in different legal areas. For more details see here .
B2. Project execution in an e-SENS context	4,17	The organisational benefits are huge since today the sending of fines, if sent at all, is done by normal postal service without a clear knowledge of how the fine is being taken up. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4	Contribution of direct support from technical experts from WP5 WGs and WP6 who are responsible for the design and implementation of BBs (2nd level support) was very good. For more details see here .
B4. Pilot execution in production environment	N/A	The pilot did not run in production environment.

5.3.6 Financial Penalties		
Evaluation Approach	Average Rate	Comments
C. Evaluation of e-SENS BBs used in pilots	No input available.	No input available.
D. Sustainability assessment	N/A (Qualitative data).	<p>The potential of the use case is enormous and it could change the life of many European residents. The domain activities are being sustained and extended within the Me-CODEX project. As stated in the COSI conclusions, long term sustainability should be carried out by eu-LISA. Among the artefacts that need to be sustained are the schemas, the technical exchange infrastructure (Gateway and Connector), and the Circle of Trust Agreement.</p> <p>Relevant actors: EC, Council, MS, legal professions. CEF could provide funding. EC relevant for the sustainability of the use case: DG Justice, DG Home, DG DIGIT.</p> <p>The sustainability depends on the breakthrough of e-Justice meaning getting a long term maintenance solution adopted for the e-CODEX results.</p>

Table 22: Financial Penalties pilot - Overview of results of processing of pilot evaluation data

5.11. Business Registration

5.4.1 Business Registration		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	<p>The pilot aimed at demonstrating the way a new business can be registered in another country through an electronic service using national credentials, a secure communication channel and following a structured procedure assisted by clear guidelines and without the need of physical presence. In overall, the goal has been achieved and the pilots developed proved that the use of the e-SENS BBs can help reduce the obstacles that hamper the above described procedure.</p>

5.4.1 Business Registration		
Evaluation Approach	Average Rate	Comments
		However, more work needs also to be done on Semantic Interoperability in order to ensure that the end user can easily understand the requirements and the way they can be fulfilled. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	The MS piloting achieved their ambitions set in terms of infrastructure and impact. Slovenia went beyond its ambition (from 2 to 5 systems implementing e-SENS BBs). A consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	3,74	The pilot increased awareness and motivation of using standards in order to lower the barriers and make cross border business registration easier and less cumbersome. Moreover the pilots implemented reused and extended existing technical solutions that can be used at both national and cross-border level. Experience from previous projects has been taken into account and the existing solutions have been improved and adjusted to the MS technical and operational requirements. Implementation of eID and eSignature permits to applicants to use national credentials in order to be identified and authenticated in a foreign country, whereas eDelivery guarantees secure and reliable cross border communication. The solutions will be further elaborated in CEF project NOBLE and TOOP. It should be noted that there is lack of harmonization in the different process of the business lifecycles. For more details see here .
B2. Project execution in an e-SENS context	3,41	Stakeholders were committed, however the lack of maturity in some BB created problems in work plan and schedule. The effort of deploying and adapting the eID BB was under-estimated. For France, as a stakeholder that joined the project later, there was complex organization of all the documentation. For more details see here .

5.4.1 Business Registration		
Evaluation Approach	Average Rate	Comments
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	4,06	Participants are rather satisfied from the structured project methodology. In the later phase of the project, when the maturity of BBs was higher, the support was of higher level. For more details see here .
B4. Pilot execution in production environment	N/A	Only Norway went live in production. This happened for a very short period of time (namely 5 days) but it stopped for national reasons. It should be mentioned that in all countries, the reasons for not going live are due to national, mainly administrative and legal issues, and not to the technical inadequacy of the implemented solution; pre-production use is the main proof of the technical completeness of the pilots. Once existing barriers are overpassed, the pilots are ready to go in production.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	No significant difference in product oriented evaluation, pilot goals oriented evaluation and adoption oriented evaluation of ABBs.
D. Sustainability assessment	N/A (Qualitative data).	Legal, administrative and organizational obstacles at both National and European level should be lowered in order for the pilots to go live. A solid legal framework must be established at EU level. Semantic interoperability should be addressed. Uptake by new projects (NOBLE, TOOP) can extend the functionality offered, lowering the burden for end users. The implementation of eIDAS will help establishing a trusted network for the provision of cross border services and boost the communication between the Public Administrations. Relevant stakeholders: Business Persons, Business Registers, Points of Single Contact, Competent Authorities, EUGO network, DG GROW (units responsible for Business Mobility), CONNECT, DIGIT ETSI may help by providing standards for eRDS interconnection. This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.

Table 23: Business Registration pilot - Overview of results of processing of domain and national pilot evaluation data

5.12. Activity Registration

5.4.2 Activity Registration		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	The pilot aimed to expand the existing functionality already offered by the Points of Single Contact (PSCs) in the European Countries, giving to professionals and enterprises the possibility to electronically register their activities in another country. In overall, the implemented pilots proved that this is feasible and thus the goal has been achieved. However work still needs to be done especially on Semantic Interoperability since it is important to designate the correspondence between the requirements of one country (especially as far as professional qualification goes) and the criteria that can be produced in another one and to provide the applicant with this information. Some work has already be done for some specific professions (namely tourist services provision and health professionals) by four countries (ES, GR, IT, PL) but it needs to be enriched and extended. Integration in eCERTIS could be a viable solution. Work in order to overcome existing legal, administrative and operational obstacles is also needed at both national and EU level. The implementation of the eIDAS regulation as well as other initiatives such as the Digital Single Gateway will help towards this direction. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	The MS piloting achieved their ambitions set in terms of infrastructure and impact, except from Spain. It has only one system with e-SENS BB. A consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	3,6	The pilot increased awareness and motivation of using standards in order to lower the barriers and make it easy for professionals to register to provide services in another country enhancing business mobility across Europe. Moreover the pilots implemented reused and extended existing technical

5.4.2 Activity Registration		
Evaluation Approach	Average Rate	Comments
		solutions that can be used at both national and cross-border level. Experience from previous projects has been taken into account and the existing solutions have been improved and adjusted to the MS technical and operational requirements. Implementation of eID and eSignature permits to applicants to use national credentials in order to be identified and authenticated in a foreign country, whereas eDelivery guarantees secure and reliable cross border communication. The solutions will be further elaborated in CEF project NOBLE and TOOP. For more details see here .
B2. Project execution in an e-SENS context	3,57	Stakeholders were committed. For a non-STORK country as Denmark a lot of help was provided by the STORK colleagues. On a regular basis teleconferences (and face-to-face meetings) have been held in order to keep track of risks and mitigate risks. Regarding eSignature and DSS, the risk of browsers blocking the java script was not mitigated. Current solutions of DSS are not user-friendly. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	2,85	There is no evidence from the available responses that the structured methodology of the Pilot Lifecycle had a direct impact on pilot execution. For most of the participants EPLM was considered not really relevant to the specific pilot. Regarding support, the pilot had access to technical specialists within the pilot team so they didn't really need to interact much with WP6 for pilot support purposes. For more details see here .
B4. Pilot execution in production environment	N/A.	In Poland the pilot runs in productive environment.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	In the eDelivery pilot, for Trust Establishment there has been a change from the exchange of mutual certificates to the Trust Lists as more suitable solution therefore Mutual Certificates have a lower rate than Trust Lists.
D. Sustainability assessment	N/A (Qualitative data).	Legal, administrative and organizational obstacles at both National and European level should be lowered in order for the pilots to go live. Proof of Concept in Semantics using eCertis. Uptake by new projects (NOBLE, TOOP).

5.4.2 Activity Registration		
Evaluation Approach	Average Rate	Comments
		<p>Relevant stakeholders: Business Persons, Business Registers, Points of Single Contact, Competent Authorities, EUGO network, DG GROW (units responsible for Business Mobility), CONNECT, DIGIT ETSI may help by providing standards for eRDS interconnection.</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 24: Activity Registration pilot - Overview of results of processing of domain and national pilot evaluation data

5.13. Citizen Lifecycle (NemKonto, Patient Access, eEducation, Record Matching)

5.5.1 Citizen Lifecycle		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		
A1. Achievement of domain goals	N/A (Qualitative data).	<p>All services were developed, tested and piloted according to the initial UCs and pilot blue prints.</p> <ul style="list-style-type: none"> • Nemkonto: The service has been connected to a wide range of e-SENS participating countries, amongst others Estonia, Sweden, Austria, Norway and Spain. • Patient Access: Member States that did not participate or pilot in STORK were targeted. Original goal to pilot with Denmark was extended by Iceland, The Netherlands, Slovak Republic, Sweden, and UK. • eEducation: The pilot achieved real transactions. • Record Matching: The service has been connected to the Icelandic eIDAS node enabling citizens of all configured MS to use the service (currently Norway, Sweden, Denmark, Austria, Greece and France).

5.5.1 Citizen Lifecycle		
Evaluation Approach	Average Rate	Comments
A2. Achievement of National KPIs	N/A (Qualitative data).	The MS piloting achieved their ambitions set in terms of infrastructure and impact, except from Sweden (no e-SENS BBs implemented in mail systems). A consolidation of KPI achievement for all piloting countries that participated in the pilot is presented here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	4,07	<ul style="list-style-type: none"> • NemKonto: The pilot increased awareness and motivation of using standards since the cross-border authentication has increased the motivation of using eID in the citizen lifecycle domain. There is still work to be done regarding a complete solution to record matching. CEF can be used for deployment. The e-SENS network has had an immense impact on the post-pilot conditions for establishing the eIDAS nodes. • Patient Access: The pilot demonstrated integration of other MSs' eID to a service provider's authentication system. Cross-border authentication has been demonstrated and lowers barriers in the eHealth domain. The pilot was based on the eIDAS eID architecture and also tested with the CEF eID reference implementation. The sustainable successor of the pilot is the Austrian Electronic Health Record "ELGA". Its full production conditions are however lacking notified eID and an amendment of the Austrian law (amendment needed with eIDAS). • eEducation: The eEducation pilot showcases the need for cross-border communication in the field of education and the need for standards. The pilot uses the eID BB and the federated signing (proposed BB) as well as the open source platform Moodle. Regarding post-pilot conditions, the pilot has already run in production environment (on a production learning management system). • Record Matching: The pilot increased awareness and motivation of using standards since the Record Matching pilot adds an important building block to the interoperability layer for seamless public services in Europe, enabling citizens to access their data in MS B. The data were not accessible to them before as there was no match between their eID from MS A and their personal unique identifier used in MS B. Also, the Record Matching pilot adds more value to the cross-border

5.5.1 Citizen Lifecycle		
Evaluation Approach	Average Rate	Comments
		<p>authentication. The Record Matching pilot will be moved into production in Iceland and will become an important part of the central authentication system in Iceland (innskraning.island.is) as it both bridges the service to the eIDAS network and adds important functionality by mapping foreign eID to the Icelandic kennitala. The Record Matching pilot will connect over 200 service providers in Iceland to the eIDAS network, thus greatly innovating the Icelandic market.</p> <p>For more details see here.</p>
B2. Project execution in an e-SENS context	3,68	<p>The stakeholders in the pilot were committed throughout the pilot. The project scope was agreed and monitored during the telco meeting held biweekly. The participants in the citizen lifecycle pilot acted as a community which gave great support to each other in all matters. The development and distribution of the STORK2.0 – eIDAS plugin suffered some delays. For more details see here.</p>
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	2,85	<p>The pilot had access to technical specialists within the pilot team so they didn't really need to interact much with WP6 for pilot support purposes. For more details see here.</p>
B4. Pilot execution in production environment	N/A	<p><u>NemKonto (Denmark, Spain)</u> Ran in pre-production with test identities</p> <p><u>Patient Access (Austria)</u> The patient access service provider (EMS) is a production system (deployment maturity state is "actual production"), but lacking notified eID and thus a legal basis to access actual health data, the cross-border authentications have been routed to test data.</p> <p><u>eEducation (Sweden)</u> The pilot ran in production environment, (Stockholm University, University College of Nesna), in one of the learning management (LMS) production systems with real students taking real university courses for credits.</p> <p><u>Record Matching (Iceland)</u></p>

5.5.1 Citizen Lifecycle		
Evaluation Approach	Average Rate	Comments
		The pilot ran in pre-production environment. The Record Matching pilot will be moved into production in Iceland and will become an important part of the central authentication system in Iceland (innskraning.island.is) as it both bridges the service to the eIDAS network and adds important functionality by mapping foreign eID to the Icelandic kennitala.
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	The early implementations of eIDAS specs had bugs. No eIDAS conformance testing documentation available during pilot lifetime.
D. Sustainability assessment	N/A (Qualitative data).	<p>The main scope was the development of the eIDAS/STORK plugin.</p> <p>The use of the eIDAS/STORK plugin helped the migration from the STORK infrastructure to the eIDAS infrastructure for the countries that participated in STORK for a smoother transition and availability of services.</p> <p>Handover of the plugin to the eID DSI. Inventory with the necessary additional attributes.</p> <p>eEducation already in production between SE, NO with real transactions.</p> <p>Relevant actors: eID DSI, MS services, eIDAS Technical Subgroup, eIDAS Expert Group.</p> <p>CEF funding available.</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 25: Citizen Lifecycle pilot - Overview of results of processing of domain and national pilot evaluation data

5.14. eAgriculture

5.5.2 eAgriculture		
Evaluation Approach	Average Rate	Comments
A. Goals based evaluation		

5.5.2 eAgriculture		
Evaluation Approach	Average Rate	Comments
A1. Achievement of domain goals	N/A (Qualitative data).	All pilot goals have been achieved. For more details see here .
A2. Achievement of National KPIs	N/A (Qualitative data).	KPIs for Netherlands have been achieved. More details are provided here .
B. Outcomes based and process based		
B1. e-SENS's vision and market adoption	3,67	The pilot contributed towards lowering barriers of cross border transactions since it is a new, live and rather large scale tangible proof of cross border usage of national eID's to get access to services of a SP in another MS. Post-pilot conditions for production have been established. For more details see here .
B2. Project execution in an e-SENS context	3,83	All stakeholders committed to the use of the eID BB (eIDAS). Scope was clear from the beginning and didn't change. No scope creep. For more details see here .
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	1,5	EPLM not used. Valuable discussions and contributions of WP5 and WP6 experts. For more details see here .
B4. Pilot execution in production environment	N/A	Not yet in production environment because of security issues but hundreds of users in a similar use case (Belgian users). Details on transactions that have been done in test environment among the piloting countries are available here .
C. Evaluation of e-SENS BBs used in pilots	See calculated average rates here .	The BB proved feasibility of eIDAS. BB will be part of DE and NL eIDAS implementations. Thus long term sustainability is guaranteed.
D. Sustainability assessment	N/A (Qualitative data).	Using eID for registering for subsidies in farmers' portal. Implementation of eIDAS regulation The services piloted are cross-border but owned by the MS that build and host them.

5.5.2 eAgriculture		
Evaluation Approach	Average Rate	Comments
		<p>Relevant actors: eID DSI, MS services, eIDAS Technical Subgroup, eIDAS Expert Group. CEF funding available.</p> <p>This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.</p>

Table 26: eAgriculture pilot - Overview of results of processing of domain and national pilot evaluation data

5.15. Calculation of overall average rates from all pilots

The table below includes calculation of **overall average rates** (where applicable) **from all pilots** based on the calculated average rates in step 2.2 **presented in the previous sections**.

All Pilots	
Processing of pilot evaluation data - Step 2.3 of the evaluation process (Calculation of overall average rates from all pilots based on step 2.2 of processing of evaluation data).	
Evaluation Approach	Average Rate
A. Goals based evaluation	N/A, (see previous sub-sections).
B. Outcomes based and process based	
B1. e-SENS's vision and market adoption	4,03
B2. Project execution in an e-SENS context	3,83
B3. Effectiveness of e-SENS pilot support: e-SENS Pilot Lifecycle Management Methodology (EPLM) and WP5/WP6 support.	3,5
B4. Pilot execution in production environment	N/A, (see previous subsections).
C. Evaluation of e-SENS BBs used in pilots	See table below.
D. Sustainability assessment	N/A (Qualitative data). This part of the evaluation is based on questions provided by WP3 and more detailed analysis has been included in chapter 7 (Sustainability and Governance) of deliverable D1.12.

Table 27: Processing of pilot evaluation data – step 2.3 – all pilots

All Pilots				
Evaluation of e-SENS BBs used in pilots - Step 2.3				
ABB name	Average Rate -(Product - oriented evaluation)	Average Rate Pilot Goals - oriented evaluation)	Average Rate (Adoption - oriented evaluation)	Overall Average Rate
ABB - Message Exchange	4,03	4,33	3,72	4,03
ABB - Capability Lookup	4,37	4,47	4,15	4,33
ABB - Service Location	4,24	4,06	4,26	4,19
ABB - Addressing of Entities	4,66	4,5	4,385	4,52
ABB - Backend Integration	3,64	3,98	3,97	3,86
ABB - Cross Border Authentication	3,91	4,66	3,73	4,1
ABB - Cross Border Attribute Provision	3,92	5	4	4,31
ABB - Local Attribute Provision	4,45	3,8	5	4,42
ABB - eSignature Creation	4,1	4,4	3,86	4,12
ABB - eSignature Validation	4,09	4,19	3,96	4,08
ABB - Federated Signing	4,33	5,00	5,00	4,78
ABB - Document Provisioning	4,14	4,29	3,93	4,12
ABB - Document Packaging	4,1	4,14	4,02	4,09
ABB - Document Routing	3,87	4,23	4,02	4,04
ABB - Non Repudiation	4,23	4,16	4,19	4,19
ABB - Time Stamping	4,53	4,9	4,36	4,6
ABB - Semantic Mapping Service	4	5	3,67	4,22
ABB - Core Vocabulary-Based Data Modelling	5	5	4,33	4,67
ABB - Domain Specific Vocabulary Definition	5	5	4,33	4,67
ABB - Trust Network – Mutual Recognized Certificates	4,35	4,47	4,42	4,41
ABB - Trust Network – PKI	4,71	4,75	4,48	4,65
ABB - Trust Network – Trust Service Status List	4,06	4,33	3,41	3,93

Table 28: Evaluation of e-SENS BBs used in pilots - step 2.3 – all pilots

6. Conclusions

At the end of the e-SENS project it is appropriate, after 4 years, to reflect on this challenging but exciting journey and try to see from some distance what the pilots achieved, how they developed, what went wrong, what could be done differently, what should be done in the future.

e-SENS was different from all previous LSPs. It brought together different communities from mature domains, all with a track record and future plans about building communities of practice and stakeholder around interoperable public services. e-SENS expected these domains not just to co-exist side by side and pilot in parallel silos, but to cooperate and even converge, re-using building blocks and solutions from each other and paving the way for some kind of common future.

It was not easy. It took the e-SENS pilots at least a year, in some cases more, until they were able to find their step and make visible progress. There was friction, even confrontation – notably the two “protocol wars” of Y1 and Y3. The three more mature domains of eProcurement, eHealth and e-Justice all had activities and interests outside the project and were cautious of what to put in and what to keep out. But with time passing and Europe moving forward on board the CEF vehicle that became a reality as the project was advancing, it was increasingly clear to everyone that convergence and re-usability were not just empty words for paying lip service to, but they were starting to become reality with strong policy drive behind them.

The e-SENS pilots worked very closely with many different teams of the CEF. The pilot teams together with the WP6 experts worked with the CEF BB DSI, mostly with eDelivery and eID, less so with eSignatures, because they were the suppliers of solutions their pilots needed and which the pilots were contributing in building through the expression of their requirements. They also worked together with external stakeholders and MS representatives, with the EC policy units and the sector-specific CEF DSIs, because these were the future owners of the pilot solutions.

Looking back at the domains, it was the “big three” that made most of the visible progress. eProcurement entered the project with the aura of the most successful domain ever in terms of real market adoption, yet this very success was a burden when trying on new solutions. Despite the difficulties over four years, the situation at the end of the project is that eProcurement is adopting the “convergence” CEF eDelivery and the AS4 protocol in the pre-award area where system-to-system interoperability is a new idea and opportunity. In fact, the eTendering pilot pioneers new ways of using CEF eDelivery for a time critical transaction with high business value and liability potential, the submission of tenders over a 4-corner model infrastructure. OpenPEPPOL, the domain governance body and sustainable successor of PEPPOL, is preparing to extend its governance and operations to a new area, transforming itself into a federation of communities in the process.

eHealth has always been “special” and claimed the moral and technical high ground. A domain with a long history and direct links to government-level stakeholders presiding over the most sizeable sectors of EU economies in healthcare, eHealth spent the first part of the project without deciding on a scope. But when the CEF eHealth DSI put together an implementation and governance framework together with the MS, eHealth sat down with a practical, problem-solving spirit and found a well-defined scope that used e-SENS BBs to re-factor some of the less robust and least sustainable elements of the current infrastructure. The eHealth DSI has orchestrated a process whereby pilot results have already been getting adopted with a view of getting implemented by the MS with CEF funding.

e-Justice run the e-SENS domain pilot for three years as the little sibling of e-CODEX, the main LSP in the domain which was running in parallel. When e-CODEX finished, it handed over two pilots to e-SENS so that they produce their full results and reach their full potential. e-Justice has a different legal basis from all other domains, through the Council working group that is steering the next steps in a firm and persistent manner. e-Justice has charted its future course with the Council recommendation for adoption by the eu-LISA Agency,

and the establishment of Me-CODEX, an interim project that will pick up the results of e-CODEX and e-SENS projects until eu-LISA has received the proper legal mandate and has built a sufficient operational environment for maintenance and governance of the e-Justice solutions. The role of e-SENS in this roadmap was to develop new use cases and new types of payload and get an injection of fresh solutions from other domains.

But e-SENS had also its little stars. It was these lean and mean eID and eSignature pilots that have provided real transactions and services in production, but they came from the Business Lifecycle and Citizen Lifecycle, not the mature domains. Those are heavier vehicles and follow a certain planned trajectory. It is also interesting that eID was the least piloted BB – the most piloted one was eDelivery. e-SENS helped create new ways of implementing eDelivery, new trust models, new ABB combination and versatile domain solutions. With eID and eDelivery, e-SENS has shown, from an overall perspective, how a two-tier infrastructure is starting to interconnect Europe, all on the eIDAS legal basis.

Perhaps the best cue to the future is the mantle being passed to the new LSP, TOOP. This is starting with excellent conditions and can stand on the shoulders of previous successes, avoid past mistakes, and move forward on a course that re-uses the CEF BBs, influenced also by e-SENS in some ways, in order to implement the Once-Only Principle.

Against this backdrop, it is clear that the e-SENS pilots have provided a very clearly discernible effect and contribution to the trajectory that the piloting domains follow. Which also shows what kind of LSP e-SENS was. The project was established, as a next stage for the various domains achieving consensus on a convergent infrastructure to achieve efficiencies of scale for the nascent multi-domain infrastructure of Europe. Looking at the situation before and after e-SENS, these domains have advanced and their solutions are more harmonized. e-SENS was always intended to be a policy implementation instrument and has been actively and deliberately used as such by EC policymakers.

Which explains why e-SENS remained, to a large extent, closer to the infrastructure and hidden from plain view, connecting the boring nuts and bolts behind the woodwork, the stuff that nobody notices when it works well but everyone complains when it doesn't – or when one needs to pay an exorbitant bill. e-SENS was not so much about tremendously exciting, eye-catching solutions but rather about efficiencies at the infrastructure.

Many around e-SENS expected pilots to get closer to market. They didn't, with few exceptions. It is easy to feel let down but then we must remember that the policy and operational framework worked in ways that created incentives for MS not to go into production inside e-SENS but wait until more funding was available under CEF. And it is just as well – that is the mission of a multi-domain project. In single-domain LSPs, domain interests and priorities prevail and the very justification for an initiative focused solely on domain improvement is to make that improvement visible. A multi-domain project is different; there are priorities that transcend, and even contradict the short-term domain interests. Multi-domain projects bring benefits to the participants but also some immediate cost to be incurred in terms of process and technology re-engineering and loss of full autonomy in technical and governance choices, in exchange for deferred benefits in efficiency. e-SENS was a multi-domain project with the pros and cons that brings. In some ways, rather like Europe itself.

I. References

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