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HANDBOOK

HANDBOOK PCS: TOWARDS AN INTEGRATED APPROACH BETWEEN MOROCCO AND ITALY

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Handbook PCS: towards an integrated approach between Morocco and Italy

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Foreword

This handbook has been developed within the framework of transnational Cooperation Project ITALMED Maroc, funded by Ministero Affari Esteri and with the participation of the Livorno Port Authority as implementing body.

In accordance with the project's program and goals, this handbook highlights the main opportunities and the most relevant hindrances towards the development of integrated Port Community System Platforms.

In fact, many ports across Europe and the Mediterranean have implemented PCS platforms, which offer a broad variety of services at different costs and under different regulatory frameworks: the Livorno Port Authority itself has successfully launched its own PCS platform, the Tuscan Port Community System and, according to the European Commission experts themselves, it can be considered the avant-garde *of development of paperless procedures within European ports.*

As a consequence it is of outmost importance that ports in Europe, as well as those in the Mediterranean basin, cooperate to develop and fully exploit the synergies coming from these IT solutions, which can ensure the establishment of efficient and smooth freight corridors beyond port boundaries.

ITALMED Maroc has undoubtedly contributed to the strengthening of such cooperation, through the proactive interaction of partners involved and through the analysis and the scientific evidences carried within this handbook.

In the analysis provided herein, the general overview of PCS solution across Europe as well as a deeper insight into Pas roles is offered as a mean towards a full comprehension of how PCS platforms work and which are the main hindrances for their integration to be faced in coming years.

Development and Innovation Office, Livorno Port Authority

1 Introduction

An integrated and fast exchange of information has become a key competitive factor for ports and port systems, in order to boost seaport competitiveness and also to provide an effective and valuable environment supporting worldwide integrated supply chains. Indeed, nowadays shippers and carriers select individual ports not only based on their cargo handling capabilities, but also on the added value of the services offered.

This has led to an increasing interest towards intelligent technologies (IT) solutions specifically devoted to ports and port systems. However, even if many ports are equipped with advanced IT systems, within-port and port-to-port interoperability between different information systems is often poor or non-existent. Furthermore, many sectors of the port are organized and managed independently, and often even within a single sector duplication of information and the production of printed materials, is enormous. As a result, the effective implementation of IT oriented port and port systems is still an important governance issue.

The general framework that European Union (EU) has chosen to promote the development of IT-oriented ports and port systems is the *e-maritime* concept, whose deployment is included as a relevant pillar of the *Digital Agenda*, i.e. the EU strategy to help digital technologies, including the internet, to deliver sustainable economic growth.

Within this framework, attention has been firstly focused on the interactions between private operators and public bodies and administrations, i.e. to the so-called business-to-government (B2G) transactions, leading to the proposition and to the promotion of the *single window* (SW) concept: a practical declination of the single window concept specifically devoted to all custom transactions is the *e-customs* concept. In addition, in recent years, thanks to some pioneering and seminal applications in important EU ports, also the sector of the transactions between private operators in the port system, i.e. the so-called business-to-business (B2B) interactions, led to the development of the concept of *Port Community Systems* (PCS).

This handbook is intended to provide a brief overview of these topics, firstly from a general standpoint (Chapter 2), then by means of a thorough comparison between the experiences of the *Tuscany Port Community System* (Chapter 3) and of the Moroccan *Port Net* implementation (Chapter 4).

2 An overview of the e-maritime concepts and related main issues

This chapter provides a brief overview of the e-maritime concepts and of the related main issues. This topic has been extensively reviewed recently in some EU-funded projects, which constitute the backbone of this review. In detail, the most recent source is represented by the ERDF MED project MED-PCS "Promotion of Port Community Systems in the Mediterranean traffic", started in January 2013: some of the analyses proposed later on in the chapter are derived from the studies carried out under this project. All other relevant projects/studies will be explicitly recalled when cited throughout the chapter.

The structure of the chapter is the following. Section 2.1 provides the background and the foundation of the relevant concepts of e-Maritime, e-Customs, Single Windows and Port Community System. Section 2.2 deals with the interactions with the customs. Section 2.3 provides an insight on the role of the Port Authorities and on the main business models underlying the implementation of PCS. Finally, Section 2.4 discusses relevant privacy and accessibility issues.

2.1 The European experience: e-Maritime, e-Customs, single window, PCS

2.1.1 The e-maritime concept

As mentioned in the introduction, the general EU *e-maritime* concept is defined[1] as an initiative aimed "*to foster the use of advanced information technologies for working and doing business in the maritime transport sector*". More specifically, a primary aim of the e-maritime concept relates to the integration between within-port and port-to-port IT systems: "*Major European ports have advanced information systems, which deliver considerable quality and efficiency gains. However, the interoperability between port information systems is practically non-existent limiting the potential for new services and economies of scale.*" As a result, through e-maritime initiatives the EU "*envisages promoting interoperability in its broader sense. It aims to stimulate coherent, transparent, efficient and simplified solutions in support of cooperation, interoperability and consistency between Member States and transport operators"*.

Clearly, the e-maritime concept is not just a matter of technologies, as pointed out by the DG-TREN (Directorate-general Energy and Transport) which defines the e-maritime as a "*network interaction amongst all relevant stakeholders within the maritime sector*"[2]. In that respect, the summary report of the public consultation on the EU e-maritime initiative,

[1] Above definitions of e-maritime from EU are available at http://ec.europa.eu/transport/modes/maritime/e-maritime_en.htm.

[2] *E-maritime concept and objective* document, presented by C. Pipitsoulis (EU DG-TREN) at JST 2008 – CETMEF "Journées scientifique et techniques".

carried out in the first 2010 semester, provides interesting insights on the standpoints of all relevant public and private stakeholders potentially involved in the implementation of e-maritime facilities.

A noteworthy result of the survey[3] is that *"there is a consensus that the EU e-maritime initiative is important and worthwhile. There is widespread support and agreement that maritime reporting data should be submitted electronically and only once"*. Interestingly, respondents were asked to rank some domains of e-maritime applications, so as to come up with a final priority list of e-maritime application fields, reported in the following Table 1.

Table 1 – Public EU DG-TREN consultation on e-maritime: priority list ranked by respondents

Rank	Application	Domain
1	Support for national single window, one-stop-shop developments or an European single window including common reporting interface and dynamic integration with existing applications	Administration
2	Establishing cooperative transport networks and integration of short-sea shipping into logistics	Transport/logistics
3	Support for compliance to and enforcement of regulations	Administration
4	Improved interoperable maritime surveillance/monitoring systems for traffic, ship and cargo facilitating EU and national administrations to collaborate in safety, security and environmental risk management in support of proactive or remedial operations	Administration
5	Integrated systems for monitoring, evaluating and managing situations including improved risk assessment and decision support systems	Administration
6	Imporved automation in ship reporting	Ship operations
7	Solutions for more effective and coordinated controls and inspections	Administration
8	Fleet and sip routing and scheduling	Ship operations
9	Integration of port single windows with national and international web portals	Port/terminal operations
10	Delivering and EU system for statistical data on maritime transport	Administration
11	e-learning and e-training for career development both at sea and in land	Training/education

Source: European Union (2010) and MED-PCS project (2013)

A major conclusion drawn by DG-TREN based on such ranking was that "*notwithstanding the importance of the other proposed measures, the technical standardization process and the implementation of National Single Window emerge as measures receiving the highest support. […] With regard to possible applications, the general opinion is that administrative domain applications are more urgent than others*".

However, it is a matter of fact that the private domain of the effective integration of ports, short-sea shipping and logistics was ranked second: in that respect DG-TREN noted that "*there should be carefully evaluation as to whether applications in the business domain require public intervention or could be left for the industry to develop"*. In other words, a policy orientation seems to emerge towards a prioritization of public investments

[3] *Summary report of the contributions received to the e-Maritime public online consultation* (2010) available at http://ec.europa.eu/transport/modes/maritime/consultations/2010_06_27_emaritime_en.htm

and initiative towards administrative issues in the e-maritime framework, leaving the transport and logistics integration as a substantially open market facility: this is a key aspect which will be investigated specifically later on in the handbook.

In general, an important classification of the stakeholders involved in the e-maritime concept is between *public stakeholders* (e.g. for operations regulation and control, system governance, customs, sanitary inspection) and *private stakeholders* (either business operators or final customers). This leads to a consistent classification of the main physical and information transactions between stakeholders: the most common and straightforward for the e-maritime concept are the *business-to-government* (B2G) and the *business-to-business* (B2B) transactions. However, other possible transactions may be common as well, for instance *government-to-government* (G2G) interactions between public bodies, or information provided to final consumers either by public or private bodies, i.e. in the form respectively of *government-to-consumer* (G2C) or *business-to-consumer* (B2C) transactions.

In that respect, the above mentioned survey evidenced that "a *large number of respondents stress that it is essential to establish an open, comprehensive and regular coordination with all stakeholders involved at European and international levels"*: this has practical consequences on the implementation of e-maritime compliant facilities, since at least a national coordination would be desirable. It also suggests that a key factor for the success of an e-maritime initiative seems to be represented by the involvement of all the relevant stakeholders. Secondly, "*given the complexity of the initiative and the desired priority for administrative applications, a step-by-step approach should be considered"*: this is a clear suggestion towards designing gradual road maps of implementation of e-maritime applications.

This classification reflects the two major e-maritime declination clusters, which are the *single window* concept mainly conceived for B2G transactions, and the *port community system* concept related to B2B and B2C transactions.

In that respect, it is worth noting that, according to the EU project SKEMA[4], the main governance aspects fostered by EU towards the implementation of the e-maritime concept are related mainly to the B2G sector, since it is stated that "*greater coherence between different policy areas and approaches is particularly needed: (a) to avoid duplication of regulatory powers of different national or regional authorities in the Member States and to create a one-stop-shop approach in each Member State; (b) for reliable and comparable statistics to inform maritime policy making on all levels; (c) to facilitate closer coordination on maritime surveillance between and within Member States.*" However, it is also underlined that "*Member States have, in turn, made a commitment to make information available on a website which detail the way in which maritime strategies have been*

[4] http://www.skematransport.eu/

developed and the dialogue with stakeholders. Such coherence would greatly facilitate the development of e-Maritime solutions. Conversely e-Maritime capabilities will facilitate the development of new forms of governance frameworks".

2.1.2 The Single Window concept

According to the *European Port Community System Association* (EPCSA[5]), the single window "*is a complex community undertaking which facilitates trade*". More in detail, the *United Nations Centre for Trade Facilitation and Electronic Business* (UN/CEFACT) provides the following definition: "*A Single Window is a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfill all import, export, and transit-related regulatory requirements (the information exchange is B2G, between trade and government). If information is electronic, then individual data elements should only be submitted once. The Single Window is a practical application of trade facilitation concepts intended to reduce non-tariff trade barriers and deliver immediate benefits to all members of the trading community.*" Along this line, the Recommendation n° 33 by UN/CEFACT and the EU TAXUD/1241/2005 *Single Window at the Community Level* documents define a single window as a facility that:

- expedites and simplifies information flows between trade and government;
- allows the lodging of standardized information;
- provides 'one' point of entry (for all cross-border trade transactions);
- allows submission of information only once through electronic non redundant data fields;
- facilitates trade, bringing gains to all parties involved.

Similarly, the review by PORTEL[6] defines a port single window as a "*system which provides local level information about the vessel to the authorities on a port level, that has B2G (Business to Government) character*".

From the above definitions, it is clear that the single window concept is aimed to facilitate international trade through allowing to transmit the relevant information only once, i.e. via just a single information transfer to a common interface. Such interface acts as a unique inter-administrative body, which centralizes all data provided by each private operator and, in turn, sort, share and distribute them to all relevant public stakeholders. In that respect, the DG TAXUD explicitly states: "'*In the interests of facilitating business, while at the same time providing for the proper levels of control of goods brought into or out of the Customs territory of the Community, it is appropriate that the information provided by economic operators is shared, taking account of the relevant data protection provisions, between Customs authorities and with other agencies involved in that control,*

[5] Detailed documents available at www.epcsa.eu
[6] SKEMA 7th FP project SST–2007–TREN–1 - SST.2007.2.2.4 deliverable "*E-marittime – Inventory of PSW and PCS*".

such as police, border guards, veterinary and environmental authorities, so that the economic operator needs to give the information only once ('Single Window') and that the goods are controlled by those authorities at the same time and at the same place ('one-stop-shop')".

Therefore, a single window acts as a platform which can be accessed by private operators (e.g. freight forwarders, shipping companies, multimodal transport operators) in order to carry out all import/export procedures through a single electronic data/documents transmission. Clearly, the absence of a single window would lead to a substantial fragmentation of the import/export process, resulting in higher costs in terms of time and resources used by all sides involved in the procedures. Normally, additional tracking and monitoring functions are implemented also within a single window, so that each private operator may check instantaneously the status of his/her data processing.

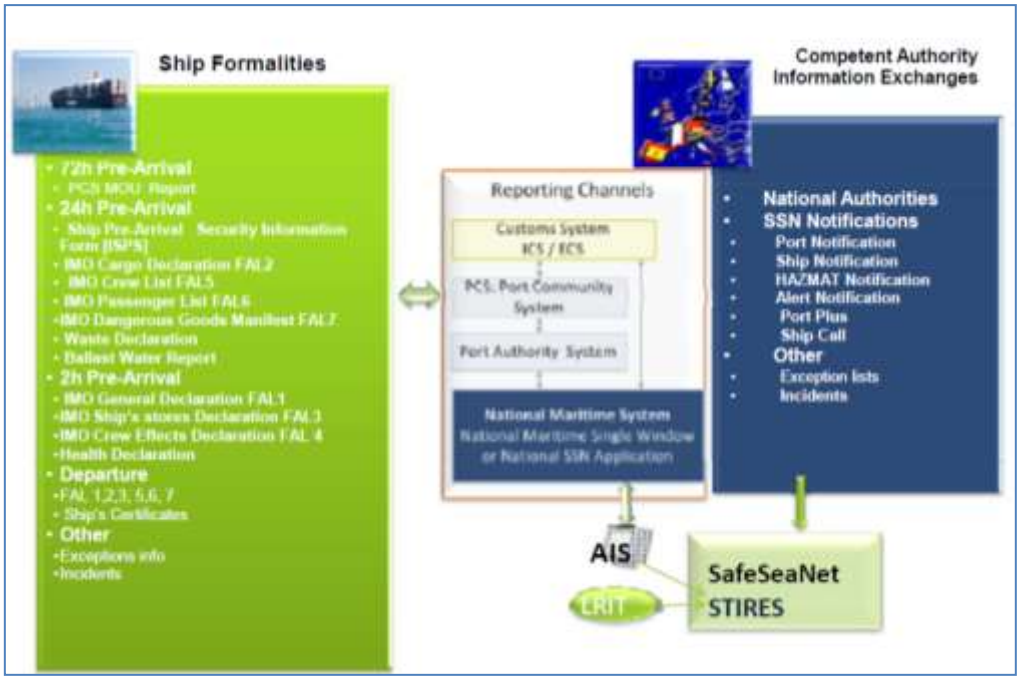
Importantly, the single window concept embeds (and therefore should not be confused with[7]) two relevant trade facilitation frameworks, that is:

- the *e-custom* concept, which represents the cluster of all activities related to the custom processing of import/export goods;
- the *maritime single window* concept acting at national level in response of Directive 2010/65/EC.

Furthermore, depending on the geographical coverage of the single window implementation, the concepts of *port single window, regional single window, national single window* may be encountered as well.

In that respect, it is worth recalling the *EU Directive 2010/65* aimed to facilitate maritime transport and reduce the administrative burdens for shipping companies, through a simplification and an harmonization of all reporting formalities resulting from legal acts of the EU and of Member States. Specifically, the directive 2010/65/EU aims to simplify and harmonize the administrative procedures applied to maritime transport by establishing a standard electronic transmission of information and by rationalizing reporting formalities for ships arriving in and ships departing from EU ports. Notably, as explicitly recalled in the following Figure 1, the cooperation between competent authorities (e.g. customs, border control, public health, transport authorities, and so on) and to/from private operators should make the most efficient use of electronic data transmission and information exchange systems, in the light of the achievement of an European maritime transport space without barriers. More specifically, EU Member States shall accept the fulfillment of reporting formalities in electronic format and their transmission via a single window no later than June the 1st 2015.

[7] For more detail see the document *Good Practice Collection 3-01/II - Overview of e-maritime initiatives in selected European Ports* released in the context of the PortIntegration project (www.portintegration.eu).



Source: C. Pipitsoulis. European Commission (2011)

Figure 1 – Administrative procedures in accordance with 2010/65/EU

This single window, linking SafeSeaNet[8], e-Customs and other electronic systems, shall be the place where all information is reported once and made available to various competent authorities and to the Member States.

2.1.3 The Port Community Systems concept

In general, providing an universally agreed definition of Port Community System is not an easy task, due to the heterogeneous approaches available in the literature.

Many definitions of Port Community Systems may be found in the literature, not always consistent amongst each other. According to Capgemini "*a Port Community System can be defined as an entity delivering information to supply chains operating in the port. The PCS is responsible for: data supply, data control, data distribution, and data conversion*." Similarly, PORTEL[9] defines a PCS as **"***a tool to exchange messages in port environment, having a commercial and logistic nature, that has B2B character"*. Notably, both definitions highlight the PCS capability to enable the unification of the relevant B2B transactions, that is complementing the concept of single windows.

However, the PCS concept is intuitively interconnected with the SW concept defined in section 2.1.2, with a level of integration which may overcome the simple B2B complement to the B2G nature of the single window. This aspect is explicitly reflected in some other definitions. For instance, according to the EPCSA, a PCS is *"a neutral and open electronic*

[8] *SafeSeaNet* is the vessel traffic monitoring in EU waters.

platform enabling intelligent and secure exchange of information between public and private stakeholders in order to improve the competitive position of the sea and air ports' communities […] *it optimizes, manages and automates port and logistics efficient processes through a single submission of data and connecting transport and logistics chains".* Furthermore, "*a PCS provides for the electronic exchange of information between all ports and logistics sectors and is acknowledged as the most advanced method for the exchange of information within a single or national port community infrastructure. A PCS has the ability to act as a National Single Window or to integrate into a National Single Window which European Member States are developing in response to recent Directives and policy from the European Commission. A PCS is therefore pivotal in the Single Window concept and will reduce duplication of data input through efficient electronic exchange of information*".

According to these wider definitions, a PCS acts as the only access point for a business operator, which is interfaced directly also with the B2G functionalities of the single window. In that respect, through a smart and effective electronic information exchange and a secure data repository, a PCS may support for instance the following activities:

- customs declarations and procedures;
- import/export of containerized, bulk, Ro-Ro and general cargo trade;
- tracking and tracing along the legs of supply chains related to ports;
- dangerous goods trade;
- access control;
- transport statistics and calculation of key performance indicators.

Interestingly, even if with remarkable differences between ports, all PCS offer terminal control facilities (e.g. gate-in/gate-out access control); furthermore, very common offered services include:

- vessel arrival/departure management (e.g. schedules, call announcement);
- berth request, shipping instructions and berth allocation;
- cargo loading/unloading: summary declarations, manifests, dangerous cargo;
- declaration, loading & unloading lists, transshipments;
- basic information services (apart from container status): statistics, port directory.

Less frequent but remarkable services refer to:

- truck/rail arrival pre-notification;
- truck fleet scheduling and control system (including event reporting at client's warehouse facility);
- stowage plans;
- container damage/repair reports;

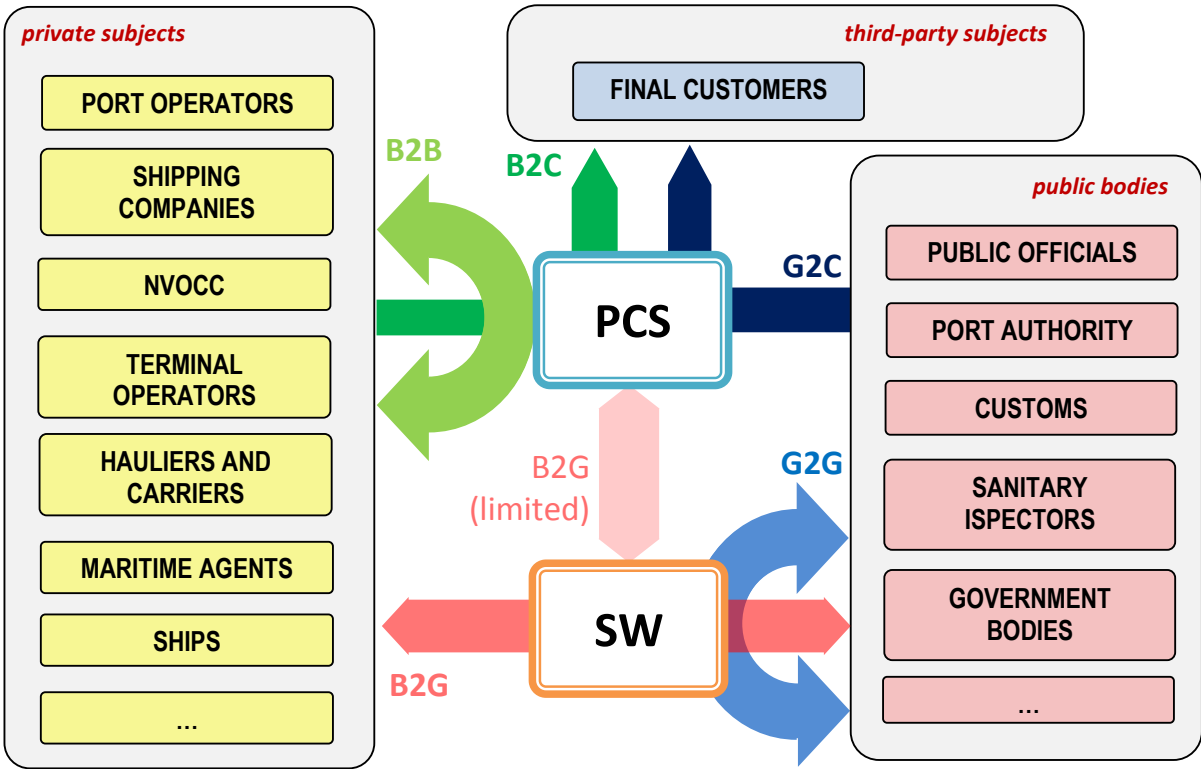
- integration with national/international platforms;
- billing/invoicing.

In general, most of operational PCS in EU process container flows – mostly in import trade, i.e. from seaside towards landside – and dangerous goods. There are few examples of bulk goods processed by PCS and no recognized examples of Ro-Pax traffic.

Finally, it is worth mentioning that, due to its nature, a PCS should face more challenging implementation issues with respect to a single window. In that respect, the most common problems cited in the relevant literature are:

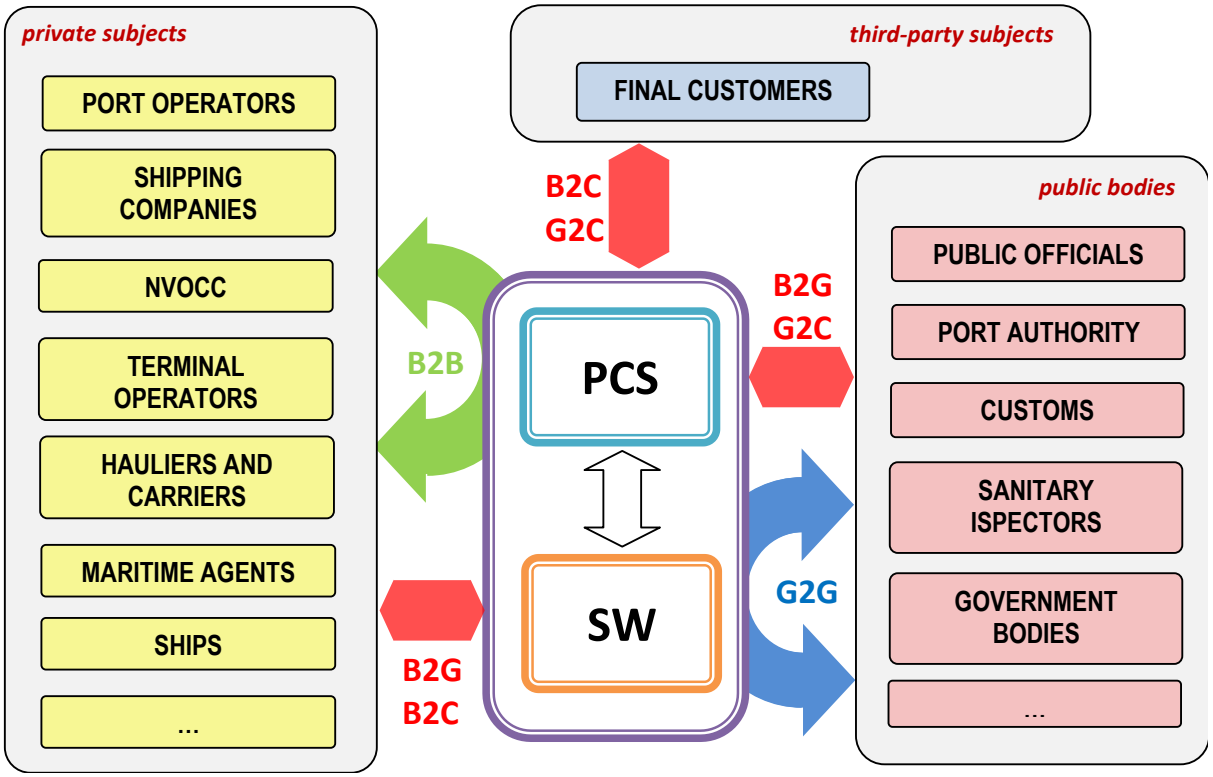
- normally, a PCS is not designed from scratch, being rather a **superposition over preexisting systems**: this may influence substantially the road map for the implementation of a PCS and its overall architecture;
- a PCS should be characterized by a **modular and interoperable architecture**, since it is expected to evolve as new companies ask to be integrated or as new port processes/supply chains are added;
- as in all IT implementations, the development of a PCS should be coupled with a consistent **business process reorganization** of the private subjects involved in port operations;
- all **safety, sharing and sensitivity issues** related to data transmission by private bodies may represent relevant barriers to the effective implementation of a PCS.

A formal representation of the integrated structure of a PCS and of a single window, in the two possible cases of complementarity and full integration, is reported respectively in the following Figure 2 and Figure 3 respectively.



Source. MED-PCS project (2013)

Figure 2 – PCS and SW functional scheme: case of complementarity



Source. MED-PCS project (2013)

Figure 3 - PCS and SW functional scheme: case of full integration

More specifically, in the first case the PCS and the SW act as two separate systems, the former mainly devoted to the B2B and B2C transactions and the latter to the B2G and G2G transactions: this situation may occur, for instance, when the e-custom implementation embedded into the single window concept is not open to input from third party systems[9]. Thus, there is a remarkable time saving and effectiveness increase thanks to the presence of IT implementations in the port, but the full e-maritime concept is not entirely satisfied, since private operators may still face the presence of (at least) two access points for data entry.

In the second case, instead, the full interface between the PCS and the SW allows obtaining a real overall integration in the sense of the e-maritime principles. A noteworthy practical example of such integration is reported by EPCSA in its White paper[10], with reference to the cargo manifests: "*cargo manifests have traditionally been received by the PCS primarily for port operational purposes and for Customs fiscal controls. Almost 100% of manifests are now received electronically into the PCS, predominantly using the UN/EDIFACT CUSCAR message, replacing the seven copies that were previously circulated around the port on paper! A screen input facility is available for the very few*

[9] This occurs, for instance, in Italy due to specific regulations.
[10] http://www.epcsa.eu/downloads-links/epcsa-documents/white-papers-and-consultations

companies that do not have the capability to send data electronically. However, the data included in the manifest received by the PCS enables it to fulfill other regulatory requirements on behalf of the ports and carriers, while enabling the carriers to submit data only once".

There are obvious many variations of those simplified schemes, which however capture quite precisely the inner nature of the possible IT system architectures for ports. Interestingly, some interviews carried out in the context of the SKEMA 7th FP EU project revealed that the two most perceived benefits from the introduction of PCS are the reduction of the administrative burden ("very positive" impact for about 50% of respondents), an increase of the efficiency of the maritime transport ("very positive" impact for about 40% of respondents) and a generally better security ("very positive" impact for about 40% of respondents). Only marginal were instead the perceived benefits for the job quality and the changes in the modal share.

Finally, as reported in the literature[11], there is common agreement about the key critical success factors of a PCS implementation, listed in the following order: logistics procedures know how; strong financial capacity; confidentiality and neutrality; involvement of all stakeholders of the logistics operation; believing PCS benefits everyone; involvement of the public bodies; public-private partnership (PPP).

2.2 Relationship with the Customs

The complex of laws and regulations relevant for the e-Maritime concept in general and for the PCS implementation in particular is very wide and covers different frameworks, as explicitly stated in the Action 8 of the EPCSA guide[12]. In broad terms, the overall legal frameworks should include European, Member State and regional/local acts and rules, in addition to Data Protection Acts, Marine Acts and Directives, Customs Acts and procedures released by worldwide and international bodies. A good and rather exhaustive review in that respect is reported in a document released in the context of the *PortIntegration* project[13], to which the reader may refer for further details.

For the purposes of the handbook, it is interesting to review the Italian case study. In fact, due to its inherent complexity and to the presence of several subjects involved, the concept of Single Window in Italy has been implemented in different ways, depending on the entity entrusted with the management of the different information flows. By way of an example, practical declinations of this approach are the *Port Management Information System* (PMIS) managed by the maritime authority and the e-customs system *Automation Integrated Customs and Excise* (AIDA) managed by the customs.

[11] Milà G.S. (2011). *Keys to successful PCS*. Presented at IAPH World Ports Conference, Busan, May 2011
[12] http://www.epcsa.eu/content/download/123/618/EPCSA%20GUIDE%20web.pdf
[13] PortIntegration project (2011). *Environment for the application of ICT Technologies in European Ports*.

2.2.1 The AIDA system

The AIDA system[14] is the IT system of the Italian Customs, implementing the EU e-customs concept, which allowed the computerization of the overall customs document flows for import and export. The system has been operating since November 2003 and nowadays processes about 11 million customs declarations per year, of which only 4% is presented on paper. The system supports electronic customs clearance of goods and allows the dialogue with economic operators and enterprises, other public administrations and EU countries. It was designed in full compliance with the single windows and one-stop-shop concepts and, among others, exhibits the following benefits:

- full compliance with the relevant European Directives;
- integration with the customs systems of other Member States;
- high level of availability, efficiency and effectiveness;
- communications with users through secure connections;
- real-time operations.

This system was implemented on the basis of four processes, namely:

- informatization and reengineering of the services processes and the correlated activities to become partner of the requirements and opportunities of the simplification arising from Information and Communication Technology (ICT);
- single window/one-stop-shop (processes integration and control unification);
- formation/information online;
- telematic access generalized to supplied services and managed information.

The straightforward positive effects on private operators and on custom offices are represented by a remarkable reduction of the time required for customs operations, a reduction in the stopping time of goods at the customs, and online transactions processing for all customs regimes.

In order to protect the safety of citizens and facilitate legitimate trade and the competitiveness of enterprises from one side, and to avoid unnecessary increase in related national and EU budgets from the other side, the system aims to achieve a balance between speed and effectiveness of trade controls. This objective is pursued through complex internal forms of risk analysis for preventing frauds and falsifications of goods.

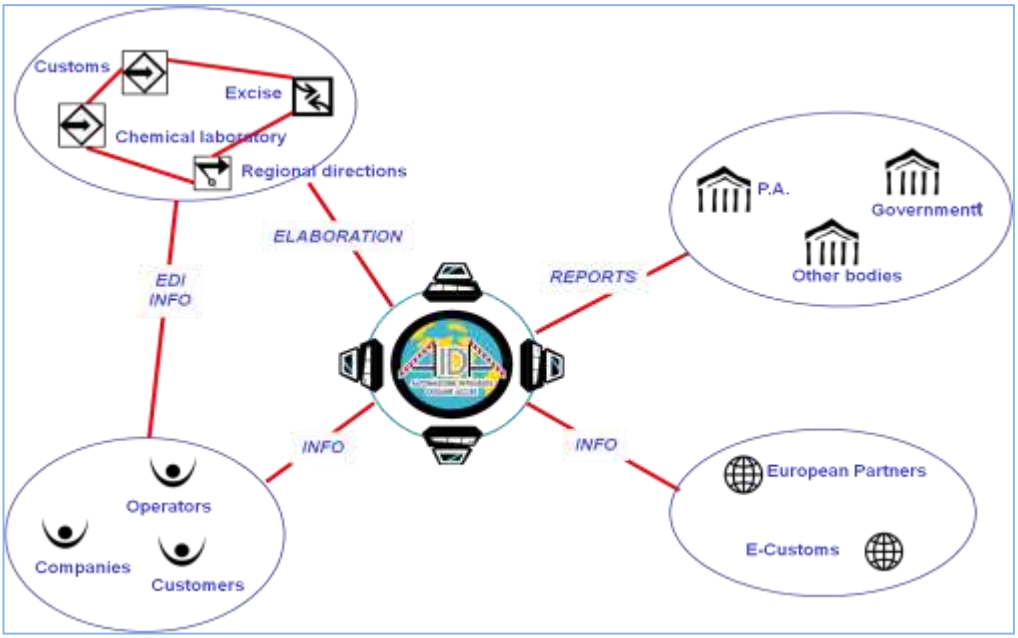
Recently, the adoption of the single windows concept for Italy has been boosted specifically by the DPR[15] 242/2010, which establishes the procedural pattern to be followed for carrying out the customs procedures. In more detail, the annexes to the DPR 242/2010 contain a list of various documents required for carrying out import and export transactions together with the respective time deadlines. The Customs Authority plays a

[14] The content of this section is taken partly from official documents and presentations of the AIDA system.
[15] DPR in the Italian legislation is a regulation directly released by the Prime Minister.

major coordinating role: customs officers will indeed provide control and subsequent discharge of various approvals, permits, licenses and no-obstacles requests presented by operators, which must be issued by the competent authorities in accordance with the specified deadlines. In particular, with reference to the customs declaration, the customs office to which the declaration is submitted, will send all data needed for starting the procedures of its own competence through electronic transmission to the competent authorities, and will communicate the related outcomes again through electronic transmission to the customs office which shall define the customs procedure. This leads to the establishment of an interoperable system embedding all electronic transmissions between all administrations involved in the process. A special backup "manual" procedure should be developed in case of unavailability of such electronic transactions.

Importantly, the implementation road map was also dealt with by the DPR 242/2010, which established appropriate public engagement and consensus meeting schemes (e.g. service conferences to be carried out by regional directors of the Customs authority),so as to proceed with the synchronization and the harmonization of the opening hours of governmental offices involved into the Customs Single Window. In turn, operational representatives of the Customs Single Window have been appointed for each relevant involved department.

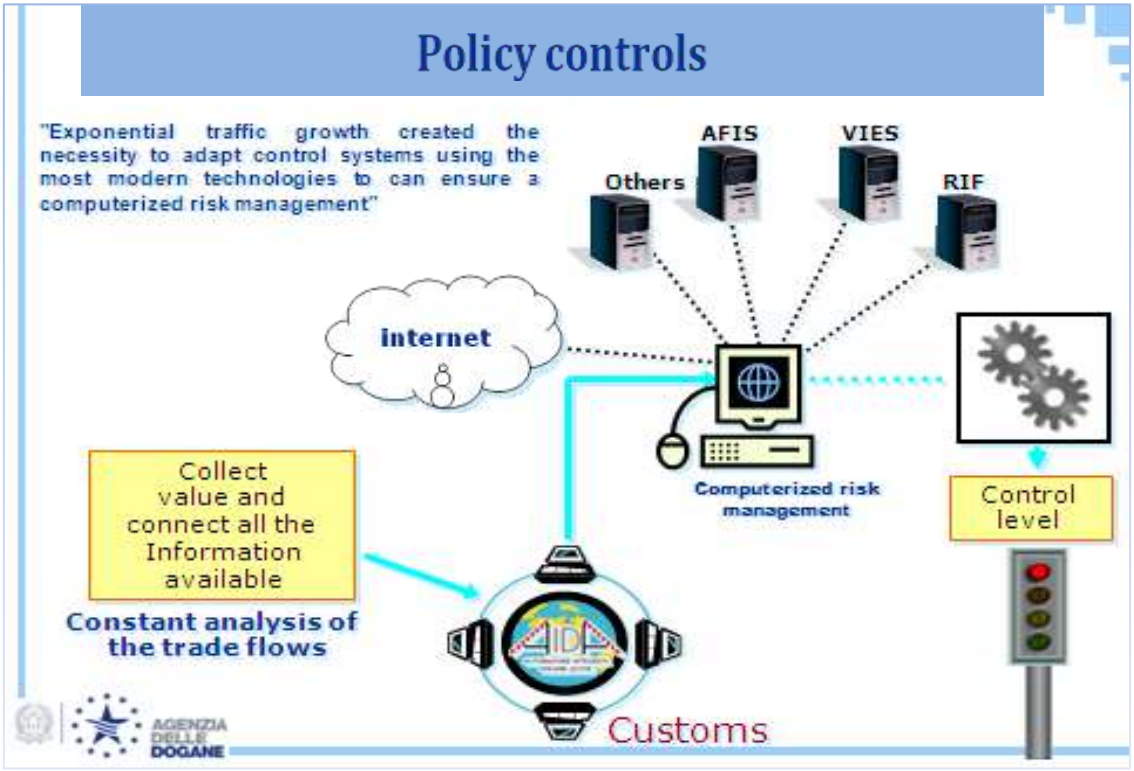
At a glance, the following Figure 4 shows how AIDA is capable to offer an online custom clearance service with different controls integrated and communicates the information received from the customs documents directed to the national and community bodies and administrations. More specifically, the AIDA system allows traders to electronically submit documents and declarations including import-export declarations, national and EU transit declarations, summary of intra-EU sales and purchases, declarations of arrival and departure of goods by sea and by air, declarations of electricity/gas consumption, and so on. In response to each declaration/submission, the user receives the corresponding elaboration result and, where possible, authorized users may fulfill electronically all customs obligation without any additional steps using electronic signature systems.



Source: Italian Customs Agency and MED-PCS project

Figure 4 – Formal representation of the structure of the AIDA system

It is also worth mentioning the general *policy control* rules underlying AIDA, officially presented as reported in Figure 5, wherein attention is given to different subjects at risk that are subsequently checked.



Source: Italian Customs Agency and MED-PCS project

Figure 5 – Formal layout of policy controls underlying AIDA

The main aim of the policy controls is to evaluate the subjective risk of each transition through a *computerized risk management*. Practically, customs declarations are directed to four different control channels – identified with the colours green, yellow, orange and red in increasing magnitude of risk – defined to the basis of a *risk profile* coming from a combination of various elements related to the customs declaration under analysis. Such system is combined with a white list/black list subjective profile which also influences substantially the control declaration.

As recognized by the AIDA system manager themselves, there are *some gaps* which need to be filled in order to be entirely compliant with the implementation of the national single window concept:

- integrating all relevant port community stakeholders to the telematic services offered by AIDA;
- updating the PCS so as to facilitate the circulation of the information provided by automated customs processes among actors in the port cycle, i.e. using the A3 documents as the key element to speed up the overall process;
- integrating port security systems with the AIDA customs systems in order to make gate controls telematic, both at the entrance (i.e. automatic verification of the so-called "customs readiness" of the goods) and at the exit (i.e. using road/rail controlled corridors up to the logistic node of final destination;
- achieve a full integration of the PMIS and AIDA national single window components, so as to avoid any possible duplication of data inputs by external business users;
- bring to efficiency the pre-clearance functions through a more effective communication and dialogue with the Italian maritime authorities;
- address key changes in the national and EU legislation framework in order to support fully (and not hinder) the telematic processes;
- a remarkable more effective dialogue with the IT systems of the private operators in container terminals, for the real-time verification of containers within the terminal on the basis of the customs operations carried out. In that respect, the experience of Italian ports is that of a *poor interaction* between AIDA and container terminal IT systems.

2.2.2 The PMIS system

The PMIS system allows shipping agents, through a web interface accessible from the Internet, to carry out easily and free of charge all administrative tasks connected with the arrival/departure of ships, otherwise requiring paper-based time consuming transactions. Furthermore, the PMIS allows also the management of authorizations for the trade of

dangerous goods on ships, and permits various users to monitor traffic in ports and to obtain real-time information on the entire voyage of the ship in a context of integrated data sharing at national level.

The PMIS system is used by the staff of the Italian maritime authority both in processing all administrative duties related to the arrival and departure of ships and for the supervision of the traffic within the port waters. The PMIS consists of a web application allowing operators of the port community to interact with it, either through specific web-pages accessible using the most common browsers, or through a direct connection between IT systems, which can exchange data using services exposed by the PMIS via web-services technologies. The latter communication channel allows therefore a potential B2B integration between processes of port operators through the exchange of XML documents and the http protocol: such B2B channel facilitates the subsequent development of new value-added services that third parties may be interested in developing and proposing in the various ports.

The PMIS system allows operators of the port community to interact directly with the functionality of the PMIS. More properly, the PMIS provides users with port community features similar to those used by the operators of the Italian maritime authority, so that agents and other professionals in the supply chain can enter the necessary data to carry out the practices of arrival and departure of the ship and ask for the necessary permissions using the Internet.

Port community operators can access their accessible services either by direct connection to the PMIS modules to which they have the access rights or through the VTS (Vessel Traffic Service) portal, which is the privileged entry point to all PMIS portals installed in Italian ports. It is worth noting that, even if the data management capabilities are similar for both operators and Italian maritime authority officers, the way in which the PMIS aggregates and presents the information to the two main types of users is tailor made on the peculiar operational characteristics of each of them.

The internet portal of the PMIS enables the exchange of documents, data and information between the maritime authorities and other public and private stakeholders, therefore with a primarily B2G scope. Importantly, emphasis is also towards intermodal traffic, cabotage (motorways of the sea) and passenger traffic.

The PMIS can be divided into three main functional areas, that is:

- Italian maritime authority data;
- control of maritime traffic;
- administrative procedures.

For the purposes of this review, it is worth mentioning that the functional area of the control of the maritime traffic involves mainly the archive of transactions carried out by

ships in port and at anchor, as well as the presentation of the position of vessels in an electronic map of the port in real time, in a situation in the past and anticipated future situation. The most relevant administrative transactions processed within a PMIS are:

- management of the journey the ship;
- berth request and berth planning and allocation;
- documentation to be presented to the Italian maritime authority;
- management of the declarations of dangerous goods onboard the ship;
- landside management of dangerous goods;
- solid waste management;
- carrying out activities required by the Memorandum of Understanding of Paris on port state control (PSC);
- interface with the Italian SIGEMAR and BDN systems;
- management of custom manifests;
- specific functions for the motorways of the sea;
- summary of historical data printed in summary and detail;
- B2B services, i.e. communication and integration among the services provided by the PMIS and the possible use of commercial operators;
- functions to interface with other PMIS for the exchange of data and documents.

From the above list it is clear that the functionalities offered by a PMIS are only partially related to a single window concept (i.e. devoted to B2G transactions), leaving instead room for also potentially complex B2B transactions. In that respect, a PMIS may be regarded as architecturally equivalent to a PCS.

2.3 Business models in PCS implementation and the role of Port Authorities

In general, the straightforward benefit coming from a PCS/SW implementation for all port operators is a more efficient data processing, with higher response speeds and a substantial removal of all paper documents, resulting in an higher port competitiveness. Furthermore, a PCS allows increasing the safety and security performance of the port and, from a social standpoint, may help achieving more sustainable transport chains.

Importantly, *the nature of the focal organization and the business model underlying the PCS implementation influences the main perceived benefits*: for instance, a PCS development driven by a public body (e.g. a port authority) may be primarily related to the increase of the overall competitiveness and attractiveness of the port, whilst a private driven implementation (e.g. by a group of big operators) may be related substantially to an inner optimization just of the directly controlled processes.

2.3.1 PCS implementation

The key role of the focal organization and of the business model for the successful development of a PCS is explicitly recognized by EPCSA, which states that "*various business and functional models can be used for the design of a successful Single Window/PCS system. Whether implemented at the regional, national or international level, a major factor in accomplishing a Single Window/PCS project is a strong leading body to promote its benefits. These efforts, combined with strong political support and the appropriate project-centric organization and resources, are the elements required for a Single Window project to succeed*".

In order to assess those aspects, the MED-PCS project recently reviewed the portfolio of the most significant European PCS implementations, in order to identify the *focal organization*, i.e. the main body in charge of promoting and carrying out the PCS implementation. In that respect, three main subjects may be identified:

- national/regional government bodies;
- private operators active in the port environment (bottom-up approach);
- port authorities (top-down approach).

The first case refers to a situation wherein relevant public governments (national and/or regional) are directly the main promoters of a PCS. Importantly, even if this scheme is quite common in single window implementations due to their prevailing B2G nature, their main involvement in PCS development is substantially marginal, and principally limited to a start-up financial support. Rather, there are national governments which, under the umbrella of the EU e-maritime policy, try to "force" the implementation of PCS by other bodies through specific acts and regulations, often related to prior single window/e-custom initiatives.

The second case refers to a situation in which private members of the business/logistics community of a port need to improve the performance of the port environment. This is a typical bottom-up approach with a private major company – or a small group of medium to big size private companies – acting as focal organization for the development of a PCS-like system. The key driving factor may be represented normally by the need for implementing advanced IT solution, e.g. in the presence of complex transport procedures (such as in the trade of dangerous goods) or in response specific security requirements by trade customers. Other common driving factors for a bottom-up implementation of a PCS-like system are also represented by vertical and/or horizontal integration strategies, e.g. when a shipping company controls a port container terminal and possibly also some landside facilities. There are various examples of PCS implementations fostered by private operators in EU.

The third case refers to the design and the implementation of PCS within the strategic planning and the supervision of the relevant Port Authorities, who implement e-maritime

schemes with the consensus of the private operators of the port communities, i.e. in a classical top-down implementation approach. In that respect, two different private engagement schemes may be found: the former deals with a voluntary participation of the private operators, which may choose either to join the system or to continue with the traditional paper-based operations; the latter is characterized by the obligation to comply with the PCS as a necessary condition for using the port facilities. Clearly, the voluntary participation is not entirely effective, since the traditional system and the PCS should coexist, leading to a significant mitigation of the expected improvements offered by a PCS; on the other side, forcing private operators towards a given PCS may result in a loss of competitiveness of the port if the management and operational change implied by the PCS is too costly for the private operators. Notably, the majority of implementations of PCS in EU ports are fostered by this type of focal organization.

Clearly, the adoption of one of the three above mentioned schemes is conditional also on the size of the port and of the related main private business players. As a rule of thumb, it may be observed that large ports usually host large private operators, which have the capability to foster a bottom-up approach. On the contrary, medium to small ports may develop a PCS normally only if the port authority is strongly committed towards this objective. In addition, the role of the national/regional government is strictly related to the strength of the public administration in each specific country: emblematic examples are the PCS implementations in France – with a strong and solid public background – and in England – entirely left to the initiative of private bodies.

Finally, in terms of network of PCS, it is important to underline that the issue of identifying a focal organization is still an unsolved issue, due to the absence of practical examples. Current initiatives suggest that the port authorities may act as focal organizations towards the establishment of PCS networks, as in the case of the MED-PCS project. A noteworthy specific situation is also represented by quite close ports that may decide to join a common PCS: in such cases, normally the largest involved port acts as focal organization, as in the case of the Portbase system in Rotterdam which currently manages some operations in the nearby Amsterdam port.

A PCS characteristic strictly related to the type of focal organization fostering the PCS development is represented by the *business nature* of the shareholders of the PCS manager/supervisor company. In that respect, three main types of PCS operators may be identified:

- private;
- public;
- mixed public/private.

The private shareholder scheme complies with the above mentioned bottom-up approach: in other words, if private operators boost the development of a PCS, it is quite

straightforward to expect private shareholders such as shipping agents, shipping companies, freight forwarders, brokers, terminal operators, stevedores and so on. Sometimes, private associations of entrepreneurs (e.g. chamber of commerce) and banks act also as relevant shareholders.

The public shareholder scheme is instead coupled with the top-down implementation approach, which normally envisages the port authorities and possible other public bodies as main shareholders. In countries with a proactive participation of national public authorities, the presence of state-owned corporations as main shareholders is also a common situation.

The mixed public/private scheme is aimed at achieving a full acceptance and/or an active participation of private companies in a top-down PCS implementation. In that respect, probably the most advanced and complex scheme of public-private partnership is represented by the SOGET experience in France.

An interesting analysis can be carried out by comparing the focal organization and the business model of some PCS implementations, as reported for some remarkable case studies in the following Table 2. Interestingly, most of the implementations involve contemporarily PCS and SW functionalities, but with a remarkable heterogeneity in terms of nature of the focal organization and of business models adopted.

Finally, there are many potential public and private bodies that may act as stakeholders of whatever PCS/SW facility: port authorities, customs, shipping companies and agents, freight forwarders, terminal operators (container, roll-on, roll-off and bulk), stevedores, brokers, warehouse operators, inland carriers (truck, barge, rail), empty container depots, importers/exporters, NVOCC, sanitary inspector, and so on. However, in general, in most of observed case studies Customs, Port Authority, Freight Forwarders, Shipping Lines and Agents, Terminal Operators, Customs Brokers are the main users of the PCS.

Table 2 – Focal organization and business model of some remarkable PCS/SW implementations in Europe

Country	Port	Name of system	Type of system	Name of focal org.	Type of focal org.	Business model
France	Le Havre	AP+	PCS+SW	Soget SA	mixed	PPP
Germany	Hamburg	DAKOSY	PCS+SW	DAKOSY	private	bottom-up
Belgium	Antwerp	Porthus.net	PCS+SW	Port-I-Com	mixed	PPP
Netherlands	Rotterdam	Portbase	PCS+SW	Portbase	public	top-down
Italy	Livorno	TPCS	PCS+SW	Port authority	public	top-down
Italy	Venice	LOGis	PCS	Port authority	public	PPP
Italy	Genoa	E-Port	PCS+SW	Port authority	public	PPP

In general, as noted by EPCSA[16], in terms of the types of PCS clients "*the number of clients differs and ranges from about 280 to 2.000, with most of them being importers or exporters, forwarders, terminals, on-carriage operators, ship agencies or brokers. The number of end users ranges from about 500 to more than 7,500 but this does not seem to be related to the size of the PCS or to how many PCSs are being operated*".

2.4 Privacy and accessibility of ICT platforms

It is important to underline two important technological aspects which may represent significant barriers towards a fluid and full PCS implementation, that is the *data security* and the *data recovery* issues. In particular, the data security issue refers to the protection of the data processed by a PCS both from sharing between PCS members and to/from external users (authorized or potential hackers): in that respect, there is a common understanding that intrusion protection usually adds a significant overhead to operating costs. Sometimes, the need to guarantee an adequate data security level forces the implementation of PCS based on local closed network systems rather than on open (obviously protected) web-based systems. The data recovery issue refers instead to the actions envisaged in order to recovery the PCS under the situation of a failure (either accidental or malicious): again, this may potentially impact significantly on operating costs, due to the need of guarantee specific backup servers. In addition, there is some diffidence towards cloud-based storage systems, which are often psychologically recognized by PCS user not adequate to solve data recovery problems.

[16] http://www.epcsa.eu/downloads-links/epcsa-documents/white-papers-and-consultations

3 The Moroccan experience: the PORTNET system by ANP

3.1 History, structure and objectives

The PORTNET project was launched in 2008 by Morocco, in the context of international commercial competition and intense growth of Moroccan port traffic. Specific preliminary study and detailed specifications were carried out by the end of 2009. Then, the implementation and starting activities were launched at the beginning of 2010, with the following road map:

- establishment of the technical platform
- messages and single window development
- test and acceptance by each function and each actor
- starting with Casablanca Port as test bed

The first implementation ran for the first time at the Port of Casablanca in March 2011. Since the end of 2012, Portnet has been operating in the 10 principals Moroccan's commerce ports managed by ANP. For 2013 one of the main objectives was the exploitation et development of new services, particularly with banks (import license).

The project is driven though the e-government program, and it contributes to the implementation of national strategies of foreign trade, port development and increase of overall logistics performance. In more detail, the PORTNET project is an information exchange platform, which serves the Moroccan port community, and its main goals are the following four:

- procedure facilitation
- information and action anticipation
- connecting with partners
- compliance with international standards.

In terms of **procedure facilitation**, the PORTNET project contributes to facilitate of formalities, simplifies and automates international trade procedures. In particular, the single window allows to treat dematerialized and safe procedures by using the electronic signature. The PortNet project helps therefore to:

- optimize the transit time of goods and stay of ships
- reduce logistics costs by optimal scheduling stops before arrival

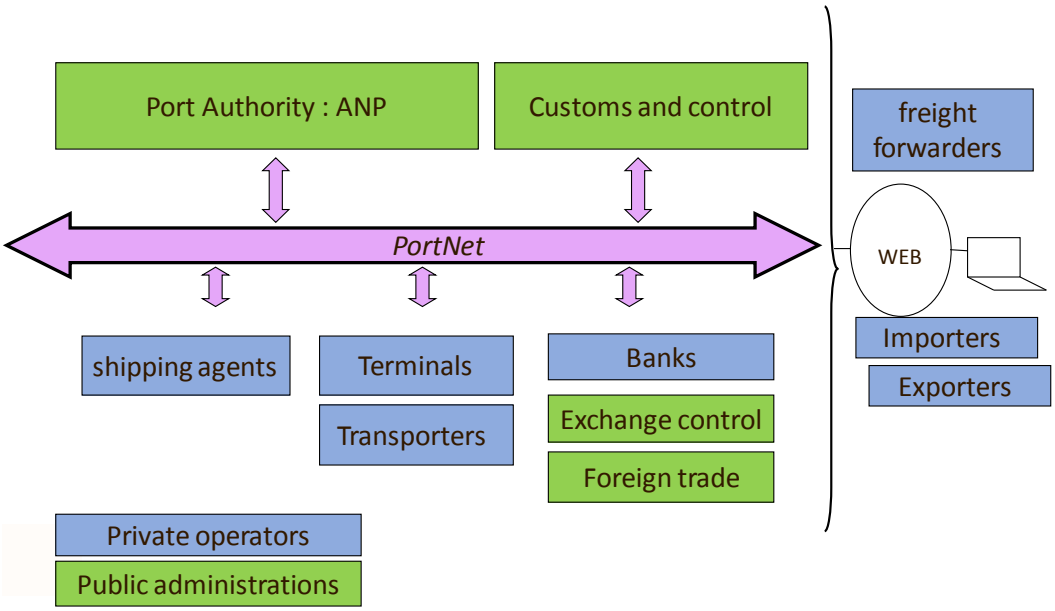
In terms of **information and action anticipation**, exchanging data in real time is doe through a single window on the Internet www.portnet.ma and a data Exchange protocol based on an EDI system. In general, it allows rich functionalities, such as:

- a secured professional space,

- calls planned, in progress, completed
- tracking Cargo and formalities
- control monitoring by public agencies

As a result, the transmission of information in advance allows each public and private actor to prepare the stops and optimize processing time in port.

In terms of **connecting with partners,** sharing information in real time with all the actors in the chain allows to optimize the processing time of port and commercial operations. A functional structure of PORTNET is reported in the following Figure 6.



Source: PORTNET project

Figure 6 – Structure of PORTNET communications

Finally, in terms of **compliance with international standards**, PORTNET complies with 33th United nations recommendation which calls for the establishment of a "single window" of foreign trade[17]. PORTNET is also compliant with:

- World customs organization standards
- international Maritime Organization standards
- International data exchanges standards(EDIFACT)

These international standards are an essential assets to the success of the project

[17] United Nations' recommendation No. 33 declares that «The need for simplification and harmonization is particularly evident in the preparation and submission of the extensive range of information and documents required by governmental authorities to comply with import, export and transit-related regulations Recommendation Number 33 addresses this problem by recommending to Governments and traders the establishment of a "Single Window", whereby trade-related information and/or documents need only be submitted once at a single entry point to fulfill all import, export, and transit-related regulatory requirements».

because it allows to capitalize on the experience of other countries that faces the same challenges of international trade.

3.2 Achievements and future enlargements

The running technical platform of PORTNET is located at the port of Casablanca, together with:

- the web site www.portnet.ma accessible 24 hours a day, 7 days week
- a help and assistance service supports user demande and incidents
- a project team works on new online service

Project's realization also covers specific training in each new service implementation, user guide published on the web site for each users group, a public online space to consult statistics and public information on ships and goods. Currently, the following service are in operations:

- Call management (arrival, departure, …)
- Manifeste
- customs Declaration
- Containers' traffic management
- Control and removal of goods

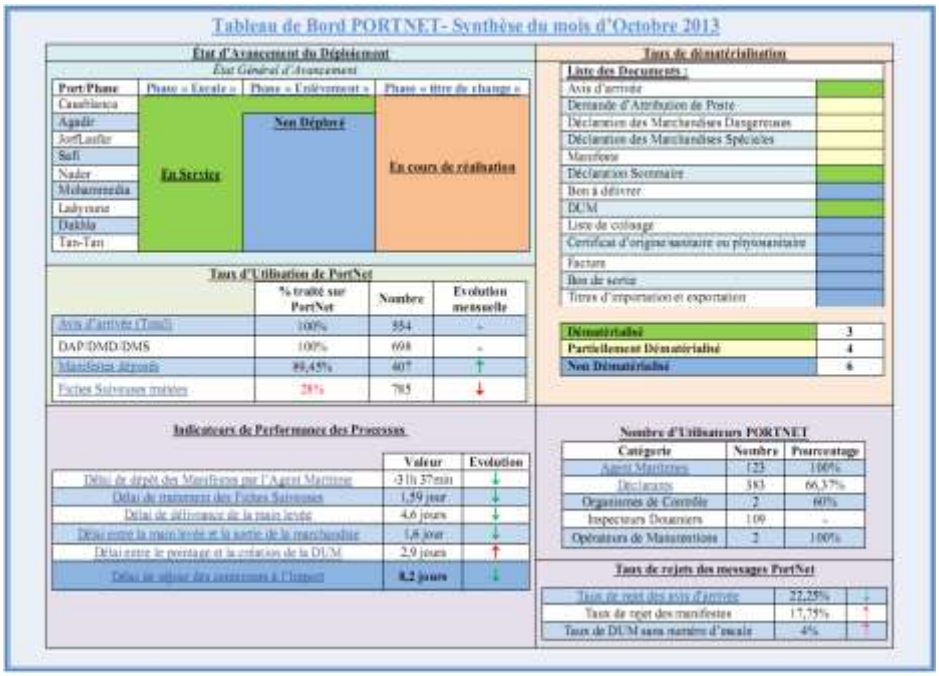
whilst the following further process under construction:

- Importation and exportation license
- Extra containers' traffic management
- Other services

In addition, the PORTNET single window monthly dashboard is published since September 2012 and presents:

- The project progress
- The level of the system utilization
- Dematerialization level of documents
- Performance process indicators especially the period of stay of containers

An example is reported in the following Figure 7.



Source: PORTNET project

Figure 7 – Example of PORTNET single window monthly dashboard

4 Integration of Port Community Systems

The general overview reported in Section 2 referred, for the sake of simplicity, to the case of a "single" Port Community System. Obviously, potential integrations and economies of scope may be achieved in the case of a network of connected PCS (*horizontal integration*). In that respect, there are very few examples of networks of PCS, mostly at a very preliminary stage and mainly involving ports within the same country. Another remarkable aspect refers to the possible integration of PCS with inland transport networks (*vertical integration*). In that respect, some PCS were developed among TEN-T European project, thus respecting multimodal transport integration, and however many PCS incorporate specific services to cover for instance rail and barge traffic (e.g. loading and unloading lists for train or barge and arrival and/or discharge notifications).

Consistently, the following sub-sections deal respectively with horizontal and vertical integration in PCS.

4.1 Horizontal integration in Port Community Systems

A remarkable starting point for the analysis of the horizontal integration of PCS is represented by the circumstance that the PCS case studies available across Europe are not represented only by big ports – which however represent the vast majority of

operational PCS/SW facilities in the EU – but also in medium/small size ports. Which are the main driving factors fostering the implementation of a PCS in such contexts? Relevant motivations include the following:

- a medium/small port may be located in the city centre, surrounded by the city and therefore with very limited possibility of further enlargement. Since the capacity becomes a constraint, the PCS may become a necessary condition to speed up all import/export processes and therefore a mean to increase the port throughput;
- a port may be part of a regional cluster with neighboring ports: in such situation, a PCS may allow either obtaining a performance advantage with respect to the other ports in a competing environment, or achieving an IT-based integration with the other ports of the cluster, so as to boost the entire cluster. In the latter case, the entire port regional cluster would share a unique PCS/SW;
- the PCS may allow strengthening the relationship between the smaller port and bigger ports, so as to benefit of their traffics and obtaining a throughput increase.

The above motivations are clear examples of applications fostering the implementation of network of PCS.

A main issue in that respect is related to the technologies for horizontal integration of PCS, so as to enhance the efficiency and effectiveness of their interactions. More specifically, according to the technical literature, an integration between systems *external* to an organization with the internal systems of the organization should be performed, through two main vehicles: *interfaces* and *network integration*.

Building interfaces mean substantially altering the business applications of a firm so as to comply with EDI applications. In particular, technical, organizational, structural and work changes are required and, mostly, changes in workers' roles, responsibilities, necessary skills, experience and knowledge are expected to take place. Achieving a network integration mean defining a common architectural platform wherein a group of firms may interact electronically and connect its IT systems. This process entails the development of standards for electronic interaction together with the corresponding development of the relevant technological infrastructures.

As a consequence, important aspects of the implementation of PCS are represented by the following issues:

- electronic/informatics infrastructure adopted in the port and between ports;
- informatics exchange protocols underlying the involved systems;
- type of transactions processed by the network of PCS.

Interestingly, in order to standardize the flow of information between the relevant actors in a PCS, standard electronic messages are the backbone for the exchange and the

sharing of information: in this context, providing standardizations is a very helpful and effective way to improve the electronic data flow. In that respect, an useful help comes from the World Customs Organization (WCO), who has realized a *data model* representing a framework to which electronic messages related to arrival, departure and transit goods should comply. Ultimately, the WCO data model[18] may support the implementation of a PCS/SW framework by providing a common data model and a set of messages in a standardized electronic format.

Importantly, the WCO data model has been developed in accordance with the regulations and the requirements of relevant international bodies, including the International Maritime Organization (IMO), with specific reference to the *Safety of Life at Sea* (SOLAS), *International Ship and Port Facility Security Code* (ISPS Code) and Facilitation of International Maritime Traffic (FAL) conventions. Obviously, the WCO data model complies also with other regulations by World Customs Organization itself, e.g. the *SAFE Framework of Standard* (FOS) for the safety and security of container tracking. Finally, the WCO data models also derives some standards from the *Committee of Experts on the Transport of Dangerous Goods of the United Nations Economic and Social Council* (UN/ECE).

In terms of data format, the WCO data model is consistent with the international standards *ebXML* (Electronic Business using eXtensible Markup Language), *UN/CEFACT recommendations*[19] (United Nations Centre for Trade Facilitation and Electronic Business) and *UN/EDIFACT*[20] (Electronic Data Interchange For Administration, Commerce and Transport).

4.2 Vertical integration in Port Community Systems

Very often, a single PCS embeds basic vertical integration functionalities (see Section 2). In that respect, it is worth mentioning the UIRNET Italian experience as an example of a sort of "landside PCS" which may be effectively reproduced as a general scheme for an effective integration between PCS, inland transport and logistics platforms.

According to the official presentations, UIRNET "*has the target mission of developing a "suite of basic services" for the transport system in Italy aimed at improving safety and efficiency. These services are intended for the benefit of logistics companies, managers of freight, ports, shopping centers and infrastructure*".

[18] http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/tools/pf_tools_datamodel.aspx

[19] More specifically, the following recommendations are embedded: n° 3 (use of ISO Country code), n° 5 (abbreviations of INCOTERMS), n° 9 (alphabetic code for the representation of currencies), n° 16 (code for ports and other locations LOCODE), n° 17 (abbreviations for terms of payment PAYTERMS), n° 19 (code for modes of transport), n° 20 (code for units of measurement used in international trade), n° 21 (codes for types of cargo, packages and packaging materials).

[20] More specifically, it implements the CUSCAR (Customs cargo report message), CUSDEC (Customs declaration message) and CUSREP (Customs conveyance report message) standards.

The primary mission of UIRNET is the implementation and the management of an integrated logistics platform aimed at improving the safety and efficiency of the transport system in Italy. UIRNET aims to offer services and solutions for the following five types of stakeholders:

- *road carriers* (e.g. own account and hiring road carriers, small and medium enterprises, big national/international carriers) which supply transport services at national and international levels;
- *logistics enterprises*, which may find in UIRNET a valid support to their operations through the interoperability offered by the platform;
- *managers of inland terminals, ports, centers and logistics infrastructures*, which are allowed through UIRNET to perform a constant monitoring of their relevant inbound/outbound flows, so as to provide safer and more efficient services to road haulage;
- *public institutions*, who can indirectly benefit of the positive impacts generated by the increase in safety and efficiency of transport;
- *manufacturing enterprises*, which may find through UIRNET a community of service providers of transport and logistics.

Therefore, the increase of the efficiency of the national logistics system is promoted through:

- the provision of information on travel times, queues and accidents in order to allow companies and haulers to perform the best decisions for their trip planning and execution;
- the opportunity to exchange information and data between logistics operators, in order to allow a more comprehensive and effective integration with respect to the current status;
- the reduction of logistics “dead” times, through telematic facilities allowing managing access control, document exchange and clearing operations, and so on;
- the ability to plan and facilitate the supply/demand matching, with specific emphasis on intermodal forms of transport more efficient than traditional hauler-based solutions.

Furthermore, a specific objective of the UIRNET platform is related to the improvement of the security and of the safety of road transport. In particular, a security increase is achieved through the following activities:

- road transport monitoring through standard tracking and tracing techniques, and dissemination of information related to transport security;
- monitoring of the transport of dangerous goods by standard tracking and tracing techniques integrated with measurements of the most critical state parameters

related to the type of traded goods;

- exchange of information between road transport managers and relevant public and private stakeholders.

With reference to the objective of safety, the following activities are introduced towards:

- driver safety: analysis and supervision of the driving style of the drivers and monitoring of relevant psycho-physical state variables of the driver;
- vehicle safety: services related to monitoring of the safety distance, of the vehicles parked in not protected areas, extension of the tracking/tracing UIRNET service to temporary guest users (UIRNET *light*), improvement of the GPS-based localization services.

Acronyms

AIDA	Automation Integrated Customs and Excise
B2B	Business-to-business
B2G	Business-to-government
EU	European Union
ICT	Information and Communication Technology
IT	Information Technology
PCS	Port Community Systems
PMIS	Port Management Information System
SW	Single window