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CORRIDOR 24 INFRASTRUCTURES AND OPERATIONAL SERVICES SUPPORTING NEW PORT STRATEGIES.

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CORRIDOR 24 INFRASTRUCTURES AND OPERATIONAL SERVICES SUPPORTING NEW PORT STRATEGIES.

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ABSTRACT

Port authorities around the world are modifying their nature and their role in the last decade: acquiring more and more an active role in the governance of logistics systems and often adopting managerial and entrepreneurial behaviours. Not all the national legal frameworks are adapting in the same way and at the same time to the out coming context, and port authorities of different countries actually have different tools and capabilities to face the global competition. One common supporting tool of port authorities evolution and strategies could be identified into ICT infrastructures. Based on this hypothesis, the paper aims at highlighting potential opportunity of an interoperability platform for interconnecting existing ICT modules and its implications in terms of port authorities' competitiveness. Corridor 24 Genoa Rotterdam is the concrete case analysed within the context of the European Research Project MoS 24 "ICT based co-modality promotion center for integrating PP24 into the Mediterranean MoS Motorways of the sea".

Keywords: Port strategy, ICT interoperability, governance and management of logistics platform, port authority.

1. BACKGROUND

MoS24 European Pilot Action, now close to its second year of life, is based on the following assumption: a fundamental requirement to re-equilibrate the corridor freight traffic by promoting and activating co-modality is to interconnect existing ICT systems making them interoperable. Project's ambitious goal is to create a unique ICT multimodal Corridor between northern and southern Europe, consistently with the main objective of the EU transport policy (White paper, 2011) regarding the transfer of loads from road to alternative modes, i.e. rail, sea and river.

First outcomes from MoS24's research activities raised numerous different issues, within which some interesting thoughts regarding logistic system governance and port authorities' strategies. Interesting ideas for further research emerged regarding port authority evolution and new competitive scenarios for ports and their logistics systems.

Based on these preliminary outcomes this work aims to demonstrate the strategic role of ICT in port and logistic systems' growth and development. Another aim is to identify and analyse constraints and requirements that inhibit the full exploitation of ICT's opportunities. At this aim this paper is structured as follows: literature analysis and theoretical framework related to port strategy and ICT's supporting role are presented in the first section, MoS 24 analysis outcomes are summarized in the second section highlighting available areas for improvements thanks to ICT contribution. Section three focus on opportunities to develop a common interoperable ICT infrastructure taking into considerations its implementation (operational as well as managerial and governance implications). Final considerations and thoughts for further research are collected in the final section.

2. EVOLUTION IN PORT STRATEGIES

In the last decade deep changes have taken place in the maritime transport industry and in the development of the transport logistics chain in particular. These trends deeply affect the field of port strategy and competitiveness.

Port regionalisation (Notteboom, Rodrigue, 2005), port system competitiveness (Moglia, Sanguineri, 2002), port competition and hinterland connections (Notteboom, Winkelmans, 2002) and port internationalisation strategy, are some of the recent research lines requiring the broadening of port strategy area (Brooks & Cullinane, 2007; Musso & Ghiara, 2008; Musso & Ferrari, 2011). In this perspective port strategy has to encompass not only port activities in a strict sense but all activities affecting the transport of goods, including different transport modes and hinterland connections.

One consequence is the proliferation of the subjects which play an active role in terms of port competition affecting efficacy and efficiency of port logistic and transport system. Stakeholders involved in the logistic chain are numerous, each one with different needs and expectations: from the terminal operators to the customs agency, inspection services, road and rail carriers, the administrators of the yards, the operators in charge of loading and unloading goods, the management of the inland terminals and of the dry ports etc.. The overall competitiveness of the logistic chain depends on the coordination level and the synergy created between single participants. port authorities are conscious about this and are investing in networking activities at different levels.

Moreover port authorities are more and more adopting behaviour and tools coming from strategy and management disciplines. They extend their functions beyond local jurisdiction, develop an entrepreneurial behaviour by managing relationships with different participants and stakeholders (Verhoeven, 2010), they actively interact with their hinterlands also investing directly in the hinterland and they are acquiring a facilitating role through the development of strategic partnerships with inland ports (Van Den Berg & De Langen, 2011; Cuypers, 2011), dry ports and co-operation or "co-opetition" with other seaports.

Some port authorities are also involved in internationalization strategy, investing substantial resources abroad: financial resource, as in the case of Rotterdam (Rotterdam port authority, 2011), or know how and technology, as in the case of Dover and Antwerp (Notteboom, 2008).

Port Authorities around the world are modifying their nature and their role, acquiring more and more an active role in the governance of logistics systems and often adopting managerial and entrepreneurial behaviours (Carbone & De Martino, 2003). Not all the national legal frameworks are adapting in the same way and at the same time to the out coming context, and port authorities of different countries actually have different tools and capabilities to face the global competition. Italian port authorities are disadvantaged because of the Italian legislation, that only now is trying to adapt itself to the new context. At the same time Italian port authorities, and Genoa port authority (GPA) in particular, have been working for years from the bottom to acquire and to see recognized their strategic role in the logistic platform development, governance and management.
In this new competitive scenario ICT could surely play a strong supporting role accompanying the evolution path of Port Authorities and sustaining their growth strategies. ICT has played and is continuing to play a similar role in numerous other industries where it is recognized as a critical success factor for integration of supply chain with positive implication in terms of companies' competitiveness (Tridas & Kekre, 2002;), examples are in the airlines industry (Buhalis, 2004), automotive industry (Volpato & Stocchetti, 2002), garment industry (Cepolina, 2011), tourism industry (Tahayori & Moharrer, 2005).
In the port field scientific literature is less rich, while more attention is paid by public bodies and by the European Union in particular. In the last ten years, more than thirty European research projects have been financed by EU considering ICT solutions applications in the European ports (Port Integration, 2011). ICT was recognized as a critical success factor contributing to connect ports with their hinterlands (Almotairi et al., 2011), improving high value added services, increasing logistics and transport system efficiency and competitiveness (Ducruet & Van der Horst 2009; UCTAD, 2006; Port Integration, 2011).

Moreover ICT will be the main target of European Union funding in the future years (Ruijters, 2012). Because infrastructural initiatives have long term timelines not coherent with forecasted freight traffic, Europe will focus future investments into ICT and enabling technologies to increase efficiency, safety and competitiveness of current freight transport infrastructures.

1.1 Port authority strategy and constraints matrix

Previous considerations highlight issues of great relevance and interest for further research by the academic and scientific community. Few attempts have been made till now, between them we remember the interesting taxonomy for port authorities internationalization strategies, distinguishing between active (traditional) and passive (unconventional) strategies (Dooms et al., 2012).
Aiming to overlap this literature gap, we have developed an original matrix matching port authority growth strategy options and main constraints which they may run into during the strategy's implementation. Based on managerial literature analysis on growth strategies and internationalisation strategies (Grant, 1992; Porter,1998; Johanson & Mattson, 1988; Kaufmann, 1995; Contractor & Lorange 2002; Grandinetti & Rullani, 1996) and based on MoS24 preliminary outcomes an original attempt to classify Port Authorities' strategies has been developed (Table 1).

Port Authorities' growth strategies are classified by increasing degree of complexity and commitment. They range from marketing collaborations and institutional networking activities, non-equity form of alliances characterized by low degree of complexity, to joint venture which occupy an intermediate level of complexity and commitment, to foreign direct investment and merger and acquisition, equity form of alliances characterized by great complexity and high resource commitment.
Table 2 also shows main constraints which have an impact on different port authorities' strategy options. They come out from literature analysis and from MoS 24 experience. They have been classified into five categories and they include: organization specific constraints (stakeholder management, bargaining power) as well as country-specific constraints (hybrid nature, legislative framework and financial autonomy).

Table 1 – Matrix of port authority' Strategy and Constraints. Source: our elaboration

Constraints / **PA Strategies**	Stakeholders management	Hybrid nature	Contracting clout	Legislative framework	Financial autonomy
Communication					
Institutional networking					
Import export of port specific know-how					
Research projects					
Commercial representation abroad					
Joint venture projects					
Foreign direct investment (FDI)					
Merger/Acquisition					

The proposed matrix, based on MoS 24 experience, has been tested on the Genoa port authority case study (see par 1.2). We use it to verify how much Italian country specific constraints impact on strategic behaviour of Genoa port authority and how much it is affected by organization-specific constraints. Moreover matrix application highlights ICT contribution in overcoming obstacles and constraints affecting strategies adoption and implementation (par. 1.3).
We expect country specific constraints significantly inhibit more complex strategic options (FDI and M&A in particular) and we have tested how much ICT could support port authorities.
The herein proposed matrix needs to be tested more, validated and implemented on different port authority case studies in our further research, we would also test it to compare strategic behaviours of different PA within the same country and to compare strategic behaviour of port authorities in different countries but within the same logistics and transport corridor.

1.2 Genoa Port Authority strategy

The new emerging coordination role for the port authority (Verhoeven, 2010) does not always seem coherent with external environmental factors legal, political, social, technological and economic. These factors are not always moving in the same direction. In the GPA case, and in Italy in general, the first three factors, that are country specific factors, are hindering port authority's corporation process in comparison to what is happening in other European countries. At the same time the last two factors, technological and economic, that are global factors, push to global competition offering new strategic opportunities and supporting tools.
GPA's hybrid character, incorporating private characteristics and public goals as well as the actual model of governance do not fully represent the roles, responsibilities and strategic developments of Port Authorities. Italian port authorities' system is actually involved in a complex and evolving legal environment, including:

- Art. 46 of the Law 2011/214 dealing with the integrated logistics systems
- Art. 62 of the Law 2012/27 regarding the completion of the Italian Logistic Platform
- Bill on the "Framework law on inland terminals and territorial logistics platforms" (Disegno di legge A.S. n. 3257 - "Legge quadro in materia di interporti e di piattaforme logistiche territoriali")
- Art. 6 of the Law 1994/84 with reference to the PAs competences in the field of the promotion and development of intermodality, logistics and transport networks
- Directive 2010/65/EU dealing with Reporting Formalities.

The out coming legal framework promotes the operative and organizational integration along logistic systems and the infrastructural improvement connecting port with dry ports and inland terminals. Although the new legal framework identifies a specific role of port authorities in the territorial logistic platform development, it misses to assign them concrete operative tools and to clearly define an enabling governance system (Brooks & Cullinane, 2007; Musso & Ferrari, 2011). In these terms the legal framework doesn't completely fit with the changes described. These require regulation, control and stimulus of all the elements that are part of the complex transport chain in the port by the subject in charge of port governance.
GPA has been operating in the last years to become the coordination and promotion subject for the Italian north west logistic platform, trying to fill these normative and governance gaps.
At this aim GPA adopted strategic behaviours, such as communication, institutional networking, import/export of institutional know how and research project, to build and straighten relationships with all subjects involved in the logistic platform and relative local public administrations, collecting their needs and involving them into projects and activities.
GPA is involved in numerous European research projects (MoS 24, Code24, Tiger, Tiger Demo, Losamedchem, Miele) and initiatives at local and international level, which all deal with port infrastructures, port technological development and port operational models and practices. Within other initiatives, we remember SALA (North West Italy Logistic System) a Foundation constituted by port authorities of Ligurian Port System (Genoa, LaSpezia, Savona ports), local public authorities, Ligurian and Piedmont Regions with the objective of coordinating, promoting and optimising infrastructure investments, implementing marketing activities and developing a shared logistics plan.

These activities demonstrate the strong commitment and the actual investment put into practice for the development of a highly competitive logistics system in the north west of Italy, in which the port of Genoa plays a strategic gate role (Ferrari, Parola & Gattorna, 2011).
Table 2 shows the application of the matrix of port authority strategy and constraints to the GPA case. Grey squares represent main constraints affecting different strategic behaviours.

Table 2 – Matrix of port authority' Strategy and Constraints: Genoa port authority. Source: our elaboration

Constraints / **PA Strategies**	Stakeholders management	Hybrid nature	Contracting clout	Legislative framework	Financial autonomy
Communication					
Institutional networking					
Import export of port specific know-how					
Research projects					
Commercial representation abroad					
Joint venture projects					
Foreign direct investment (FDI)					
Merger/Acquisition					

As expected Italian country-specific constraints actually deeply affect Genoa port authority strategies, inhibiting strategic behaviour with high complexity degrees. Table 2 shows grey squares in correspondence of joint venture projects, FDI, merger and acquisition. On the other hand, GPA seems to be able to overcome its country-specific constraints regarding less complex strategic behaviour thanks to the supporting role offered by ICT as explained in the next paragraph.

1.3 ICT contribution in GPA's strategy

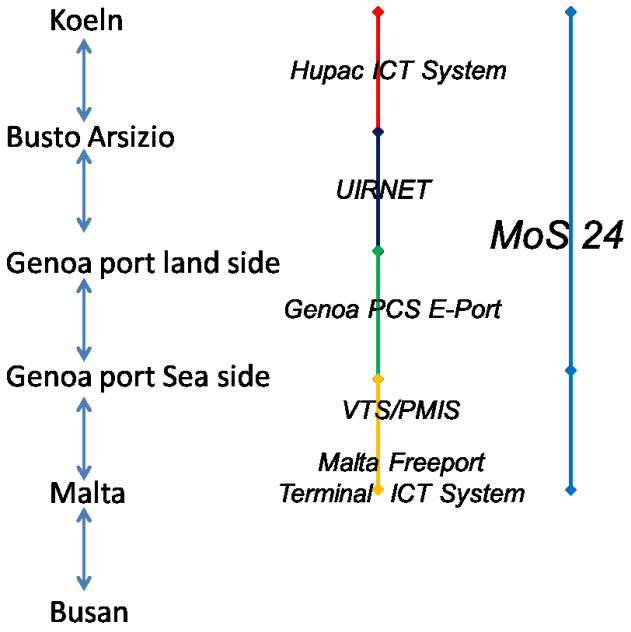
GPA's strategy analysis highlights ICT critical role in overcoming country specific constraints as well as in supporting port authority's growth strategy, networking activities and strategic alliances development. ICT factor seems, in fact, to be one of the most powerful enablers not only by the technological point of view, but also by the relational one. Enabling data sharing and information flows, ICT is a strong networking and communication tool. Well aware of these potentialities GPA has been working in the ICT fields for years. Particular emphasis is given to information processing and information transmission and sharing between subjects involved into the logistic platform. This matter is of interest for all members involved and it seems to play a strategic role to foster the overall efficiency and competitiveness of the logistics system. Combining the re-organization process and technological developments ensures in fact the rationalization of data interchange and accelerates traffic flow. This goal is consequently shared by many of GPA's initiatives since the E-port system development was

started in 2006. The system is a virtual infrastructure that would allow the tracking of goods handled in the Port and dialogue between operators and between them and the government. An essential element in the "success" of E-port is its capacity to integrate the system with other technological assets already operating in the port of Genoa. Starting from the E-port system concept, covering the entire port, GPA is continuing, studying and developing its extension to inland port and logistics platform within MoS24 and Miele projects. MoS24 and Miele projects both have the goal of promoting the computerization of the bureaucratic procedures that hinder intermodal transport.

3. ICT INTEROPERABILITY OBSTACLES ANALYSIS ALONG CORRIDOR 24

To fully exploit ICT opportunities and potentialities, the main goal of MoS24 research project is the integration of existing ICT infrastructures along the corridor 24 in a common shared interoperable platform. To reach a comprehensive understanding and knowledge of the current situation along the Corridor 24, a survey of existing systems and operational services has been developed, photographing the actual situation, to identify requirements to make existing ICT subsystems compatible and interoperable. It encompasses demand and supply analysis highlighting interoperability requirements of different subjects involved in the operational services and identifying interoperability issues related to platform's implementation.

Fig. 1 – ICT platforms interoperability. Source: MoS 24, Genoa 4th March 2013



The outcomes complain about the lack of coordination and planning. In the past two decades ICT systems have proliferated along the corridor without any shared strategy with few exceptions. Each different subject, or group of subjects, moved independently creating customized ICT systems based on their specific goals and needs. The lack of governance emerges also analysing European research projects studying the matter: actually there are more than 30 projects proposing suggestions and possible solutions, with the concrete risk of overlapping and waste of resources (Port Integration, 2011).

A specific analysis of ICT interoperability bottlenecks along the Corridor has been developed within five MoS24's partners, representing different subjects operating along the corridor: port authority, public municipality, private transport operators (an intermodal transport operator and a private railway company) and the "motorway of the sea" organization. Bottlenecks' classification has been identified and proposed to support the detection activity and the resulting bottlenecks cataloguing. The classification articulates bottlenecks in the following categories: infrastructural (insufficient rail access…), organizational (delays, insufficient punctuality of train arrivals…), technical (old signalling technology……) and bureaucratic (limitation based on agreement with local authorities…).

Additional information includes project partner proposing identification and geographical localization, which allows drawing considerations about single partner responsiveness and sensitiveness to specific problems and about eventual bottlenecks concentration in particular geographic areas or logistic nodes. For each bottleneck, a brief description is required in terms of its implications on efficacy, efficiency and costs. Some final information relates to key players identification, crucial information for the documentation process analysis and for software planning and design.

The analysis produced 30 different bottlenecks (table 3) with a prevalent weight of the infrastructural class. This class collects 14 bottlenecks, the organizational class follows with 7 bottlenecks, the technical class registers 6 bottlenecks and the bureaucratic class with 3 bottlenecks.

The four classes identified and suggested seem to have a good level of representativeness also if in some cases bottlenecks are transversal to different classes. Less significant appears the geographical localization of the bottlenecks. Half of them in fact results to be relative to all the European Union without particular reference to any specific class. Moreover the geographical localization variable seems to be correlated with the project partner proposing the bottleneck: partners' sensibility to their specific reality and operational context influences strongly this variable. This outcome suggests that the majority of problems found are more general and involve a wider context than the corridor 24. Their improvement or solution could then have positive implications not only for project partners and subjects oparating along the corridor but for a much larger number of subjects within the EU borders.

It's possible to highlight a difference between private and public subjects. While private subjects show, as expected, a narrower and more operational perspective focused on their specific area of business, rail transport and intermodal transport. Public subjects have a more political and social perspective outlining wider problems which involve different subjects and transport modes.

Table 3 – Synthetic preview of bottlenecks analysis. Source: MoS 24 Report activity 1.1

Partner Bottlenecks Class	Port authority	Public Municipality	Private Transport Operators	Motorway of the See Org.
Infrastructural				
Rail line Terzo valico dei Giovi	■			
Diesel and electrified rail tracks			■	
Capacity problems			■	
Inland terminal capacity			■	
4 metre profile			■	
Expansion of the Luino - Chiasso axis			■	
Inadequacies related the shipping of goods through ports, roads and other combination				■
Port road accesses	■			
Road and rail congestion of the post delivery corridor		■		
Different electrification systems			■	
Different allowed weight on the rail network			■	
Maximum speed allowed and different breaking systems			■	
Different profiles on the network according to loading unit			■	
Port rail network electrification	■			
Organizational				
Languages problems			■	
Passenger trains priority			■	
Financial costs of infrastructures and other operations		■		
Strikes and demonstrations		■		
MoS new lines lunch and maintenance		■		
Rail track allocation			■	
Port documentation process	■			
Technical				
Wagons management		■		
Structural or spot infrastructural intervention		■		
700-metre long trains		■		
Trains up to 2.000 tonnes		■		
Strict regulations for dangerous good		■		
Shunting operations		■		
Bureaucratic				
Safety certification non harmonization		■		
Documentation process		■		
Administrative procedures and health control			■	

Interesting is the key players analysis. More than fifteen different subjects have been cited, the most frequent are public authorities and public organization in general at different hierarchical levels (European, national and regional). They are mentioned with reference to all four class of bottlenecks and they refer to the following categories: national safety

agencies, infrastructure management, national rail agencies, national customs, national and international legislators and sanitary administration. This outcome could be read as a lack of governance: interviewed subjects complain about inefficiency and time lost due to the high bureaucracy and to the numerous administrative requirements needed for transport processes.
One bottleneck, the documentation process, has been mentioned both by public and private subjects and plays a role into many other bottlenecks (those related to interoperability of European infrastructure and to intermodality). Documentation process analysis has pointed out specific hindrances affecting the documental flow related to the transport chain and suggested possible interventions to improve efficiency along the chain.

3.1 The documentation process: the import documental process analysis

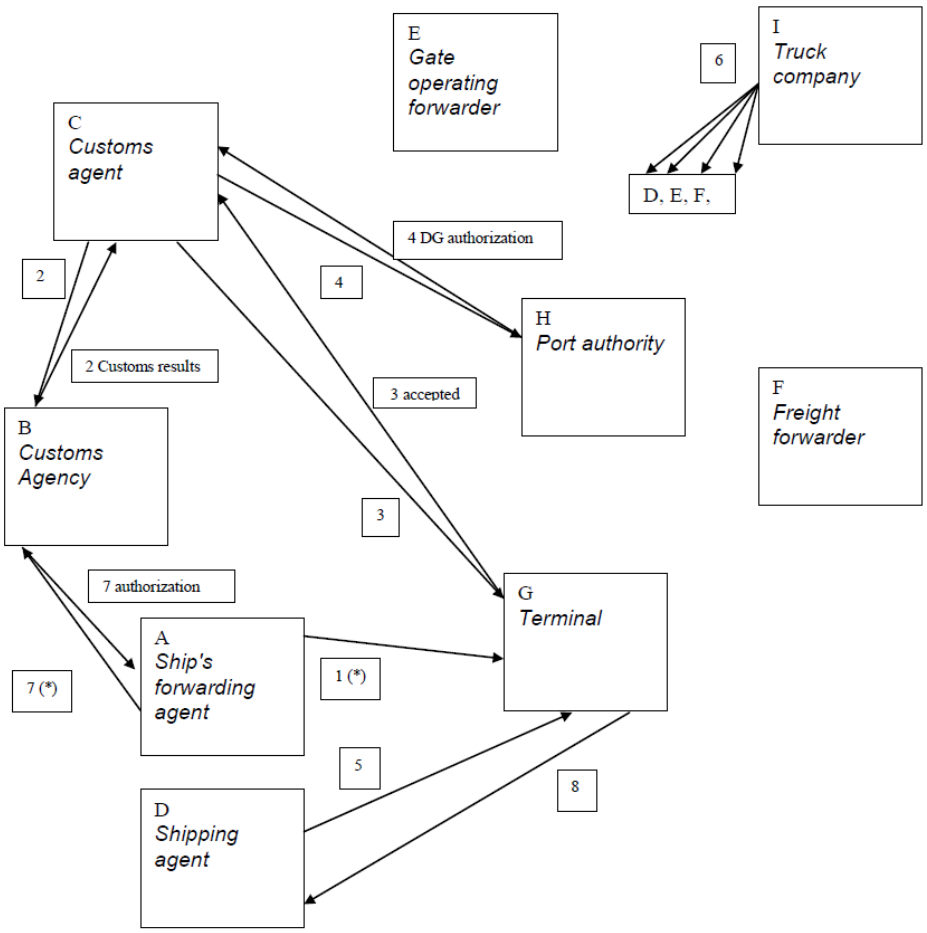
This area has been identified as highly critical due to the strong impact on the overall logistics efficiency. In these terms any achievable improvements in this area could result into substantial concrete upgrading of the overall logistic system competitiveness. ICT solutions could play a critical success factor by this point of view contributing to increase the integration level of each logistical node within the local systems and the national telematic assets.
Documentary processes related to the transportation cycle have been analysed, splitting them into relevant steps of the logistic chain and representing the flow of the documents accompanying the cargo along the transport. The document flow has been divided into different parts coinciding with the relevant steps and nodes of the transport cycle: maritime, port, road, rail and intermodal, making evident the various and complex connections among them.

The import processes is one of the most complex documentary process and it is represented below. Participants involved (public and private) are represented with a chart, which shows the documental connections between the subjects (figure 2). For each connection the number of the document exchanged following the number used above is reported, and each subject is distinguished by an alphabetical letter.

Document involved into the import process are: arrival goods declaration (MMA), customs declaration, delivery order, dangerous good authorization, withdrawal booking authorization, arrival advance notice, gate entry and full and empty containers, regular summaries of existing containers.
Documentation process analysis pointed out the following interesting hindrances affecting the documental flow. More integration is required among different existing systems that embrace the different phases of the logistic process; for instance, in the case of the port of Genoa: the Port Community System, the Customs System and VTS Systems (i.e. E-Port, AIDA, VTS/PMIS, UIRNet). Italian Rail Net Manager (Rete Ferroviaria Italiana), require a complex and redundant set of documents for the train circulation that would need a reorganization, rationalization and informatisation. Concerning rail transport, the informatisation of the waybill and the possibility of linking it via ICT to Customs related

documents. Similarly, in the intermodal transport the inadequate informatisation of the waybill together with the train list and the possibility to attach via ICT the shipping order in export. The improvement of the informatisation of some documents concerning road transport and related to the Customs procedure, with particular reference to the possibility of doing the validation of the documents via ICT Systems.

Figure 2 – Actors of the Import process. Source: MoS 24 report activity 1.1



One of the main issues emerging from the analysis of the documentary processes is the strategic role that can be played by the ICT Systems. The importance of ICT in the development of integrated logistics systems is directly connected to the central role that Public Bodies involved in the process can play in coordinating the different private players and in defining the element of qualitative control of the different system components performances (Baccelli, Percoco & Tedeschi, 2008; Verhoeven, 2009).

One of the most important results is the need for some regulatory adjustments in the documentation and operational processes capable of moving the whole logistic chain towards the shared objectives of a competitive, reliable and effective system. In other terms, information technology (and integration processes) have to be put at the service of the entire system re-engineering process. Again, it means broadening the type of traffic involved in the process and reinforcing the relations with the different players (public bodies and private operators) involved in the system operations. Information technology plays an important role

in absorbing the "organisational stress situations" that he complexity and articulation of the logistic system faces. It means underlining that ICT in our context has to be addressed, and it is the MOS 24 case, to project and carry out "open" technological infrastructures able to promote and facilitate the coordinated integration among the different public and private components which operate in the logistic chain.
For the situations that have been recognised, an important element seems to arise: a good ICT integration level extends the capacity of intervention of the single components; it is the case of the north Italy logistic chain where port community systems, VTS, Telematic Customs Systems, Inland Terminal telematic systems can be prospectively be represented as a whole system capable of enriching the efficacy and effectiveness of the different components and determining an immediate and direct impact on the quality of the services offered to the users and operators.

4. ICT INTEROPERABLE INFRASTRUCTURE DEFINITION AND IMPLEMENTATION

In the logistic sector there are several ICT companies offering a wide variety of software packages supporting business processes. The aim is to ease the management decision making process and help the final user with their tasks. The most common applications include route planning, container loading, cost tracking, loading calculations, accounting, cargo loading and training. Consequently ICT systems currently consist of a combination of applications from many different software vendors using different software platforms/processing hardware and interfaces. As such they are not necessarily compatible and do not, as a whole, offer optimized performance or result in the most efficient use of information for decision making.
To identify systems that can be used to develop a full-scale integrated ICT demonstrator, existing ICT systems have been distinguished by their application contexts: maritime, rail and road contexts. Moreover analysis covers systems used by National Customs of the countries crossed by corridor 24 plus Malta and Spain and a selection of the existing logistic platforms to support multimodal logistic management and electronic document handling.
The aim of the analysis is to identify and describe those systems that, if integrated and interconnected, could provide real benefits to the intermodal transport chain in terms of environmental and economic impact, time savings and reduction in road congestion (Quinet, 1998; Bonnel, 2004; Savy, 2007).
Analysis showed that there are no trans-national ICT platforms that offer integrated services to the intermodal transport and maritime transport. The only platform that offers services along the whole corridor to different players is the Cesar system, but it's mainly aimed to railway transport and road transport. There is no interconnection with any maritime system (Reynaud, 1996; Swiss Federal Office of Transport, 2010; CER, 2010).
In Benelux ports (Antwerp, Rotterdam, Amsterdam) the Port Community System (PCS) systems offers a great added value and a great level of integration but, also as widely used, they are local systems. Customs offers a high level of automation but there is no integrations among different EC countries systems and still regulatory and operative differences persist at the end.

In Italy there is a wide variety of systems that offers many services to intermodal transport but there is no integration among them. In the port of Genoa, where many different software are present, the exchange of information between them is presently absent.
Finally some services are missing. For instance there is no integrated platform that offers the possibility to do ticketing for combined transport.
These preliminary considerations underline once again the importance of facilitating the exchange and sharing of information between the authorities and control bodies such as customs and security and between all the operators involved in the intermodal transport chain. To this aim the single window approach seems to represent a critical success factor.
Figure 3 shows the structure of the platform to be implemented, which provides a framework for the integration of all the existing functions and systems. MoS24 platform will allow simplifying all the procedures and speeding up the overall logistic process while respecting safety and security constraints. The platform can be outlined as shown in the following schema.

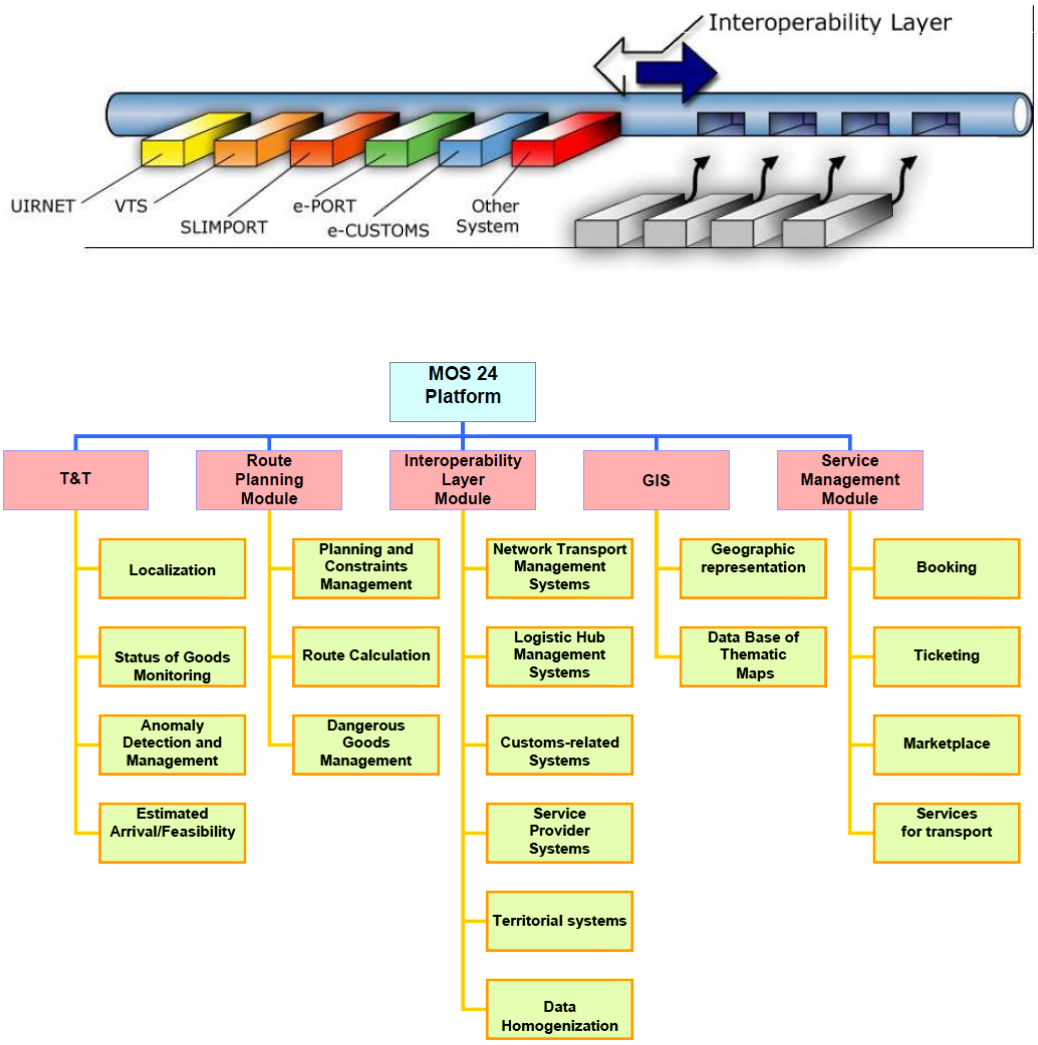


Figure 3 – Structure of MoS 24 platform. Source: MoS 24 project

4.1 The Single Window Approach

The Single Window Approach has the aim of facilitating trades and it is able, thanks to the single and common information and communication interface, to transmit various types of information and to associate all kinds of requirements essential for the achievement of operational and authoritative-commercial procedures.
This goal is particularly ambitious due to the number of subjects involved and their different characteristics (public and private bodies etc.). In the matter of logistics processes in fact there are many different subjects involved who interact in different times and places: the trader or his representative who sends/receives the goods; public/institutional and private bodies involved in the transport system. If we are able to summarize all these activities in one "single window", transport operations would be more efficient and time and costs would be reduced. A relevant role is played by those actors (institutional bodies and private operators) that work in port. The former categories, “Institutional bodies”, that acquire typically authoritative roles, are represented by:

- the Customs Agency, due to the formalities concerning contentious and collection of customs duties and taxes and in general controls on arriving/departing goods;
- the Maritime Authority in reliance on ship fulfilments, safety, security and handling of dangerous cargo;
- the Revenue Authority with reference to the monitoring activities on customs gates and barriers and also physical inspections and border controls;
- the port authority that takes care about the fulfilments that are related to the authorization for the in/out transit of dangerous goods.

All subjects, defined as other authoritative bodies, that have specialized burdens related to particular types of goods (maritime health, phytopathology, veterinary, agecontrol, port chemical, forest guard, etc.)

The second category, which is represented by “private operators”, is generally classified into different basic components:

- forwarding agents (including forwarding companies, ship forwarder and customs broker);
- shipping agents;
- road haulers;
- terminal operators;
- multimodal transport operators (MTO);
- insurance companies;
- banks.

4.2 Operational implications

The proposed approach raises a number of operational issues to make existing subsystems compatible and interoperable in a full scale ICT project perspective, between them: software and hardware systems capability of exchanging information, secure infrastructure to transmit

data, systems' capability to understand the data shared in the same way. Moreover, system needs to be able to match data in different languages, organisations may need to alter their internal ICT systems to be able to cooperate and share information efficiently (it requires high commitment, common purpose and shared goals.....).
Another issue refers to the standardization of the developed tool. Effectiveness of this kind of tool is in fact strictly related to the number of subjects adopting it and available to share information. To avoid the risk of the proliferation of the same kind of tool and the related waste of resources, international public bodies and EU in particular could opt for an official recognition of a single unique standard tool for all the European zone.
MoS 24 intends primarily providing a service to shippers or forwarders, allowing the organization of transportation, booking, document exchange and tracking & trace in a single-window logic. The following table shows the association between roles and functions of the platform.
The final tool will give transporters the relevant data about routes and means of transport, transit time and polluting emission to allow them to choose alternatives to road use. Figure 5, shows a use case of MoS24 platform related to feeder transport. It will work reinforcing the link between infrastructure and services along the Corridor 24 and its extension to MedMoS, by meeting the needs and requirements of the transport market demand with regard to transport-related ICT services.

Table 4 – User functionality matrix. Source: MoS 24 project, deliverable 2.1.Platform design

	Route Planner	Booking Services	Tracking & Tracing	GIS	Reporting	User Management	Configuration tools
Forwarder	✓	✓	✓	✓	✓		
Consignor	✓	✓	✓	✓	✓		
MTO			✓	✓	✓		
Haulers			✓	✓	✓		
Shipping Company			✓	✓	✓		
Consignee			✓	✓	✓		
MoS 24 Admin	✓	✓	✓	✓	✓	✓	✓

In the feeder maritime transport scenario it is necessary to transport goods from North Africa to a central European country, via Malta. The forwarder or the consignor connects to MoS platform to plan, book and track the shipment. The voyage of the cargo is composed of several routes that are performed by different modes of transport: railway, maritime transport (feeder) and road transport. Object of the shipment is a container.
MoS24 platform's functionalities refer to planning, booking and tracking and tracing. Regarding planning, the actor in this case is the forwarder or the consignor of the goods, the user log on into the MoS 24 platform, inserts the transport search criteria and the system returns a list of transport solutions. The user selects the best transport solution and selects the hauler, if needed, of the road route.

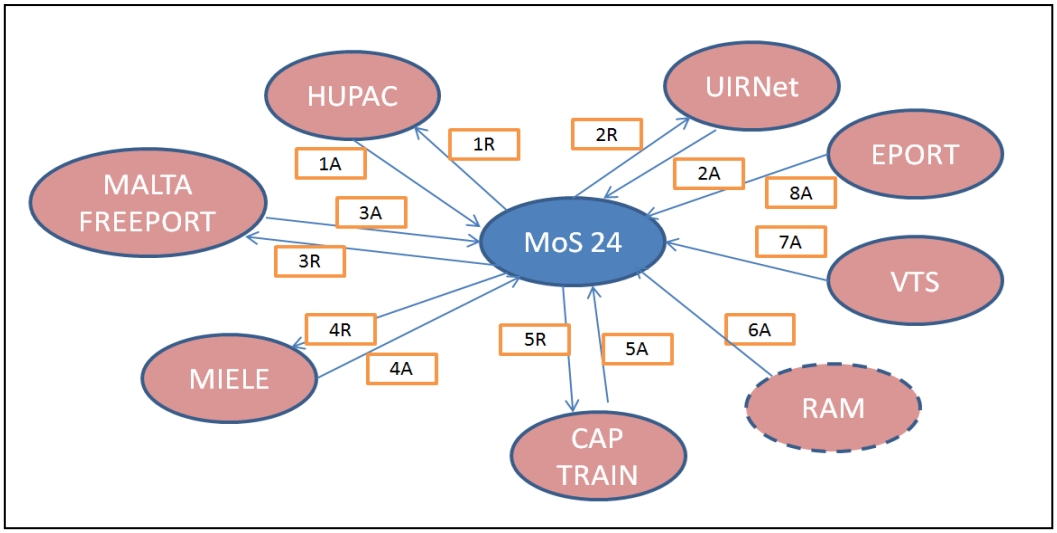


Figure 4 – MoS 24 Platform interfaces (Fedeer transport). Source: MoS 24 project

Regarding the booking functionality, the user (forwarder/consignor) inserts the data of intermodal transport unit (ITU) and confirms the booking action, Mos 24 system connects to the railway system and send the booking data and it creates a transport order for the hauler selected by the forwarder/consignor. The system sends an email to the hauler selected with the transport data, connects to MIELE platform and sends an IFTMBF EDIFACT message to this system with the data to perform the booking on a feeder vessel. The forwarder/consignor gets back from the platform a booking code for each ITU of a shipment and a shipment code and can upload documents needed to the different operators of the transport. The hauler receives an email with the data of the transport order and connects to the platform, confirms the transport order and completes the information about the road transport, adding the missing details. The hauler can download the documents concerning the transport of its interest. The forwarder/consignor checks the booking answers and the voyage status.

4.3 Managerial and governance implications

The need for creating a Platform with a strong independent and neutral connotation raises the problem of identifying the proper organizational, managerial and administrative instruments and schemes. This problem is exacerbated by the presence of numerous subjects, with public and private nature. The co-existence of public and private subjects has implications at two different levels.

By the operative perspective, the implementation of an interoperability ICT platform, asks for data availability and sharing. Private bodies may incur into organizational issues distinguishing sensible strategic data, that have to be protected, from data that have to be shared in the ICT platform. In some cases companies have to modify their ICT systems and their practices and processes to separate these two kinds of data, with relevant economic and organizational implications.

The ICT platform implementation must provide concrete tangible benefits to make acceptable these efforts. In this sense the standardization and the official formalization of the ICT platform are critical success factors. Moreover the official formalization of the ICT platform

facilitates the participation and adherence to the platform of the actors involved in the logistics chain, improving its efficacy and efficiency.
By the managerial perspective, the ICT platform has to be managed. The platform operator has to satisfy some requirements to maximise the tool's exploitation.
Four main characteristics have been identified: neutrality, strong co-modal orientation, user-friendly approach and wide coverage (at national and international level). Neutrality is very important to guarantee the same opportunities to all the stakeholders and to pursue the final goal of creating a sustainable efficient and effective transport system, without mediating between different interests. Strong co-modal orientation together with the one stop shop approach should facilitate users' perception of multimodal freight solutions as seamless transport services, whose basic mono-modal segments are organized so that each transport mode can operate within its most suitable ranges of distances, technical constraints and market contexts. A user friendly approach could contribute solving the emerging bottlenecks, the documentation process, simplifying all the administrative and technical procedures needed to plan, book and complete co-modal instead of road-only trips for freight. Wide coverage is a critical success factor for the platform operator to reach all the potential customers, who are distributed in a very vast area.
To identify a subject who meets all the above mentioned characteristics is very difficult, and we believe that a top down assignment could facilitate its recognition and acceptance by all the stakeholders involved.
A second managerial implication refers to the new competitive structure that originates from the set-up of the project. The effective ICT platform presence deeply modifies the competitive game between different transport operators. It could enable direct comparisons between different transport services, offering to loaders a reach number of information about costs, duration, etc.....
This kind of services somehow erodes the current role and function of transports' intermediaries and freight forwarders in particular, who risk losing competitiveness. Taking into account the type of goods and the customers' delivery requirements, freight forwarders in fact arrange the best means of transport, using the services of shipping lines, airlines and road and rail freight operators. In the new potential competitive scenario transports' intermediaries may incur into new difficulties, because they could be bypassed by loaders, who are facilitated and supported in organizing autonomously freight transports.
To continue to play strategic role freight forwarders should modify their traditional supply (clearing and forwarding work) enriching and diversifying it with high value added services, such as warehousing, distribution, inventory management, co-packing, labelling, re-packing, weighing and quality control. They should integrate their services into the entire supply chain system making their expertise part of an integrated whole. Information technology is one of the most powerful enablers that freight forwarders have at their disposal and they could aspire to manage the MoS24 ICT platform. They could manage the ICT platform's interface, satisfying at least three criteria of the four above mentioned. Only an information service offered by a neutral subject, not related to any carrier, can in fact guarantee free-market competition to the final user.
A last managerial consideration emerges from previous analysis. MoS24 ICT integrated platform set-up has strong implications in terms of competitive game between logistics systems and ports logistics systems. Making public and available a high number of information, freight loaders could compare different logistics systems in a more aware way.

The out-coming direct comparison, based on facts, may benefit a port logistics system than another, modifying the current situation and reducing the importance of advantages coming from geographic location and other acquired advantages. In these terms operators who take part into the ICT integrated Platform, and ports in particular, can obtain positive as well as negative effect.

5. CONCLUSIONS

In the past, ports were interfaces between sea and land, administrated as public entities. In such a context there was awareness about their inefficiency, but ports were public monopolies due to the captive nature of the demand for port services. These monopoly situations often offered local stakeholders (governing bodies of port authorities) a protection from outside competition and ports were “effective barriers to trade rather than engines of growth” (Haralambides, 2011).

Today, on the contrary, shippers, carriers and supply chain managers have a large choice in the selection of their routings and every single link and node of the supply chain has to demonstrate the highest efficiency in order to compete. As a consequence port administration need to assume a highly entrepreneurial approach based on innovation, efficiency and market-orientation. Port authorities around the world are modifying their nature and their role, acquiring more and more an active role in the governance of logistics systems and often adopting managerial and entrepreneurial behaviours. Not all the national legal frameworks are adapting in the same way and at the same time to the out coming context, and port authorities of different countries actually have different tools and capabilities to face the global competition.

The focus of the paper is on the hypothesis that a common supporting tool of port authorities strategies could be identified into ICT infrastructures. In this perspective the paper aims to highlight potential opportunity of an interoperability platform for interconnecting existing ICT modules (Mos24 project) and its implications in terms of port authorities’ competitiveness. The project has been developed in the framework of general goals pursued by EU policies, such as: the negative externalities reduction (bottlenecks, congestion, pollution, emissions), the co-modality, the promotion of new technologies for improving the traffic management and information's systems.

In our research a preliminary attempt to classify port authorities’ strategies is presented and tested on Genoa Port Authority as pilot case. Italian port authorities, and GPA in particular, have been working for years from the bottom to acquire and to see recognized their strategic role in the logistic platform development, governance and management. The proposed matrix, based on MoS 24 experience, needs to be validated and tested on different case studies. Our purpose is to adopt port authority’s strategy matrix as hypothesis for further research and studies.

The classification of bottlenecks show the role of ICT in order to solve operational problems in the logistic chain. Furthermore the analysis points out ICT crucial role in overcoming specific constraints as well as in supporting port authority's growth strategies, networking activity and strategic alliances development. The results of Mos24 project show the added value of ICT at operative level and at system level.

At operative level we can see that the bottlenecks identified by private operators are mainly linked to technical problems that can be faced through specific ICT improvements. So in this case the added value of ICT is the capacity to solve specific technical problems. In this perspective we have to point out the importance of private actors involvement into EU projects.
At system level we pointed out the following issues. The information flows were mapped and the analysis shows that - while the level of integration of key business process that are part of this system is low - several actors are currently modernising their systems (see Report Activity 2 – Mos 24). Their main objective is to reduce the administrative task load. The private subjects do not clearly see the advantages of advanced integration of the information flows due to the fact that they are focused on their own tasks. The research pointed out the risk that the IT level increases faster than business integration processes between the public/private actors involved. At system level this could lead to critical inefficiencies.
Here governance plays a crucial role. The consequences for port authorities in terms of governance are relevant. They concern both the spatial dimension of planning and the evolution of planning tools.. With regard to the spatial dimension the PA's planning activity now deals with a larger territory of reference and a different set of institutional and social stakeholders that need to be involved in the decision-making process. With regard to the planning tools, the necessity to identify new tools in order to overtake the administrative boundaries of traditional port planning has been pointed out in the paper.
On the basis of the above mentioned considerations, the port sector can become a sort of testing ground for the identification of new governance tools for the management of complex production system, just like the logistics systems, due to the type and number of actors involved, bureaucratic aspects, etc The port system can represent a testing ground not only for financial federalism, but also for a decentralized governance model for production systems. This is a currently unexplored issue at European level and should become a focus for future policies aimed at "the promotion of new technologies for improving the traffic management and the optimisation of the multimodal logistic chains performance" (White paper 2011).

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