Introduction to Logistics and the current state trade procedures

Styliadis, Theodore
Koliousis, Ioannis
Department of Maritime Studies
University of Piraeus
Introduction

- Changes in the European market (e.g. enlargements, deregulation) have created new challenges and opportunities for logistics companies based in Europe

- One of these challenges concerns transport integration

- Multimodal operations and logistics are introduced as a potential factor to achieve integration, optimization of transport costs and delivery time, increase safety of the goods during transportation

- The objective of the presentation is to consider the role of Motorways of the Sea in the content of multimodal logistics chains in Europe
Agenda

- Definitions
- Evolutions & Challenges in the transport chain
- Multimodal transport chain integration through IT tools
- European challenges for an integrated transport system
- Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
- e-solutions for integrated transport and effective door-2-door multimodal chains
- Conclusions
Definitions

**Logistics** (CSCMP Council of Supply chain management professionals): Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of conforming customer requirements.

**Integrated Supply chain management** (Chopra and Meindl): Management of all flows between and among stages in a supply chain to maximize total profitability.

**Transportation** (adapted from Apics, American Production Inventory Control Society): The function of planning, scheduling and controlling activities related to mode, vendor and movement of goods and people.

**Intermodality** (European Commission): A characteristic of a transport system whereby at least two different modes are used in an integrated approach in order to complete a door-2-door transport sequence.

**Physical distribution** (Apics): The activities associated with the movement of material, usually finished goods or service parts, from the manufacturer to the customer.

**Integrated transport systems** (Cooper and Ellram): Consider supply chains from a system’s perspective by looking across the entire supply chain, rather than just at the next entity or level with an aim to increase transparency and alignment of the supply chain’s coordination and configuration, regardless of functional or corporate boundaries (overall system approach).
Agenda

• Definitions
• Evolutions & Challenges in the transport chain
• Multimodal transport chain integration through IT tools
• European challenges for an integrated transport system
• Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
• e-solutions for integrated transport and effective door-2-door multimodal chains
• Conclusions
Evolutions & challenges in the transport chain:

Maritime transport is the backbone of international trade

- Economies of scale trends lead to
  - Larger ships calling at fewer ports (hub & Spoke)
  - Shipping lines serving regional, largely non local traffic
  - Increased utilization of intermodal and/or feeder services

- Global maritime transport chains require more efficient and more coordinated intermodal transfers
  - Sustainable transport networks
  - Minimization of economic and environmental mis-benefits
  - Utilization of IT solutions and innovations
Vessel Gigantism

Evolution of Container Ships

TEU: twenty-foot equivalent units, length x width x depth below water in meters

- Early container ship (1956-)
  500 – 800 TEU, 137x17x9m

- Fully Cellular (1970-)
  1,000 – 2,500 TEU, 215x20x10m

- Panamax (1980-)
  3,000 – 3,400 TEU, 250x32x12.5m

- Panamax Max (1985-)
  3,400 – 4,500 TEU, 290x32x12.5m

- Post Panamax (1988-)
  4,000 – 5,000 TEU, 285x40x13m

- Post Panamax Plus (2000-)
  6,000 – 8,000 TEU, 300x43x14.5m

- New Panamax (2014-)
  12,500 TEU, 366x49x15.2m

- Triple E (2013-)
  18,000 TEU, 400x59x15.5m

Adapted with permission from The Geography of Transport Systems, Jean-Paul Rodrigue
Hub & Spoke system
Catchment area (hinterland) of Port of Rotterdam
...an extended intermodal chain
Agenda

• Definitions
• Evolutions & Challenges in the transport chain
• Multimodal transport chain integration through IT tools
• European challenges for an integrated transport system
• Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
• e-solutions for integrated transport and effective door-2-door multimodal chains
• Conclusions
Complexity of intermodal supply chains

- The number of intermediary links involved is greater.
- Complexity of freight transport information exchange in a multimodal context.
- Coordination & cooperation is much more difficult.
- Safety / security issues.
- Growing need for solutions supporting the entire door-to-door maritime logistics chain.
Intermodal Transport system goals

- Safe, secure and efficient level of service to users
- Travel time variability and duration should be minimized
- Resources optimization
- Elimination of unnecessary stops and route deviations
Intermodal transport integration

- Intermodal transport can be considered as the qualitative indicator of integration among the different modes of transport; the higher it is, the higher the integration and complimentarity among them.
- The higher the transport integration the higher the supply chain integration.
- Each transport mode, presents inherent positive economic and operational characteristics...
- ...If combined effectively, transport system’s efficiency can be enhanced.
- IT solutions can further enhance multimodal integration, leading in a more effective and economically viable use of the transport system.
Intermodal Transport service requirements

• The essential requirements for transport services are:
  • Availability of relevant, timely and accurate information
    • Data from many sources must be fused
  • The information must be accessible and usable
    • Effective query and search capability is essential
  • Privacy and anonymity must be assured

• Many disparate systems must be integrated

• ... to provide interoperable services
Coordination, cooperation and increased efficiency through “state of the art” information technology systems

- Technology has reached a point where “bits” can replace “ball points” at every part of the transport Chain.
- Gradual removal of cumbersome manual processes
- Companies of all sizes in the supply chain and logistics sector have access to mature, sector-specific end-to-end software solutions
- Increased automation of both internal and external workflows
- The transport system becomes more efficient through IT solutions
Information exchange to battle the complexity of door-2-door transport chains

• Timely and quality information to feed intelligent processes is critical for an integrated transport chain management.

• Intelligent Transport Systems (ITS) are advanced applications which, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated and ‘smarter’ use of transport networks.

• ITS integrate telecommunications, electronics and information technologies with transport engineering in order to plan, design, operate, maintain and manage transport systems.
Reaching integration in the supply chain?

Port Level
- Intra-community Customs
- Paperless Controls
- Electronic Ship Formalities
- Port Community Collaborative Solutions
- Automatic Gate System

Port to Port
- Vessel Georeferenced Alerts
- Port Traceability
- RFID Traceability of Ro-ro Units
- Electronic T2L

Port to Hinterland
- Corridor Strategic Planning
- Rail Transport Management System
- Rail-Port Interfaces
- Rail e-Ways

Door to door
- RFID Traceability for Automotive Logistics
- Short Sea Consolidation e-Services
- Multimodal Paperless Workflows
A typical layout of two ports’ inter-relations

- Exporter
- Forwarder
- Manufacturer

- Importer
- Forwarder
- Manufacturer

- Freight Stations
- Rail
- Road
- Maritime Carrier
- Port Community Systems
- Port
- Customs
- Short Sea Consolidation Centres

- European Monitoring and operation services
- EMSA
- eCustoms
- Directive 2010/65/EU on reporting formalities
- Regulation 177/2010 on new definition of Authorised Regular Shipping Services
- Blue Belt Concept
Current Situation

• Complexity of freight transport information exchange in an multimodal transport context:
  • lack of interoperability along the supply chain
  • need for provision of information several times for different purposes
  • lack of information on multimodal availabilities
  • lack of integration of information from tracking and tracing technologies and intelligent cargo applications

➢ inefficiencies, costs, reduced visibility of freight, perceived complexity for multimodal transport, sub-exploitation of multimodal transport, non-optimized use of existing transport infrastructure….
Issues for transport - Efficiency

• Efficiency:
  • benefits / costs / risks;
  • costs per unit (km, pax, tonne);
  • costs per operating hour; other variable costs e.g crew;
  • indirect costs (externalities);
  • ROI for fixed costs (cost/year)

• Benefit ~ cost / hr; benefit (unit * km = UKT)
Issues For Transport – Sustainability

• Sustainability:
  • energy usage – renewable, finite;
  • emissions – vehicle;
  • energy generation (eg electricity)
  • GHG, Nox – air quality ⇒ medical costs

• Waste
  • distance travelled due to
    • congestion,
    • misrouting,
  • time delays from
    • additional distance
    • other delay
  • additional fuel consumed
Agenda

• Definitions
• Evolutions & Challenges in the transport chain
• Multimodal transport chain integration through IT tools
• European challenges for an integrated transport system
• Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
• e-solutions for integrated transport and effective door-2-door multimodal chains
• Conclusions
European Commission in the White Paper sets clear goals for competitive, resource-efficient and sustainable integrated transport systems

The aim:

• Establish a Roadmap to a Single European Transport Area. Towards a competitive and resource efficient transport system.

The goals:

• New and sustainable fuels and propulsion systems
• Target: 60% reduction of GHG emissions by 2050
• Optimising the performance of multimodal logistics chains, including making better use of more energy-efficient modes
• Increasing the efficiency of transport and infrastructure use through advanced information and communication systems and market-based initiatives
The general goal

- preparing and adapting business communities, transport stakeholders and port authorities’ systems to the requirements of White paper and of Directive 2010/65/EU, providing interoperable electronic documents and messages (i.e. electronic sea waybill) intending to boost the efficiency of door-to-door intermodal chains, facilitating intra-Community trade and increasing European territorial cohesion.

Within the EU internal market obtaining and exchanging information is more achievable than in EU foreign trade:

- The origin and destination of the goods are in the EU.
- All Member States are under the same Customs Union with the same rules.
- Possibility of mutually recognizing different commercial data and documents taking advantage of the free movement of people, goods, services and capital laid down in the Treaty of Rome.
Specific Objectives

- Preparing port management systems, PCS and business stakeholders' systems to efficiently comply with the requirements of Directive 2010/65/EU and with new National Maritime Single Windows.

- Improving interoperability of electronic messages and systems for the exchange of crucial transport documents such as the electronic manifest, sea waybill, rail consignment note and commercial invoice.

- Extending the electronic T2L initiative (electronic proof of Community status of traded goods), piloting its interoperability among Member States and promoting mutual recognition among Member States of the proof of EU Community Status by electronic means.

- Improving the exchange of information of public and private organisations and promoting their operational cooperation to increase the efficiency of supply chains.

- Boosting the development of a network connecting North and South Europe and East and West regions in the Mediterranean area and improving European cohesion by simplifying specific administrative procedures affecting ultra-peripheral and peripheral regions and reducing barriers to intra-Community trade.
Enable interoperability for paperless freight transport in a multimodal context

- Across modes
- Across countries
- Along the whole transport chain: planning, execution, monitoring and reporting

=> Zero paper documents, zero waiting time at hubs, technology independent
Seeking interoperability in all dimensions
Interoperability in practice

- Paperless in B2B communication, allowing the different organizations involved in freight transport to plan, execute and control freight movements seamlessly.
- Paperless also in B2A communication, providing a single window for business reporting to administrations, but also a means for information exchange among administrations within EU.
- The main objective is to facilitate the use of different transportation modes in combination and on their own in order to obtain an optimal and sustainable utilization of freight transport resources in the EU.
Agenda

• Definitions
• Evolutions & Challenges in the transport chain
• Multimodal transport chain integration through IT tools
• European challenges for an integrated transport system
• Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
• e-solutions for integrated transport and effective door-2-door multimodal chains
• Conclusions
The MOS Project

• Motorways of the sea (MoS) represent the maritime dimension of the TEN-T network. As such, MoS are a TEN-T horizontal priority which supports and integrates the development of maritime transport, ports and their hinterland connections (origin/destination) whilst promoting the deployment of infrastructure, transport technology and information systems.

• Motorways of the sea consist of short-sea routes, ports, associated maritime infrastructure and equipment, and facilities as well as simplified administrative formalities enabling Short Sea Shipping or sea-river services between at least two ports, including hinterland connections.

• They shall contribute towards the achievement of a European Maritime Transport Space without Barriers and also facilitate maritime freight transport with neighbouring countries.”
MOS Corridors

• ‘Motorways of the sea’ refers to the four motorways of the sea corridors that are defined in Priority Project 21 of the TEN-T guidelines:

• Motorway of the Baltic Sea (linking Baltic Sea states with Member States in Central and Western Europe, including the route through the North Sea/Baltic Sea Canal) (2010);

• Motorway of the sea of western Europe (leading from Portugal and Spain via the Atlantic Arc to the North Sea and the Irish Sea) (2010);

• Motorway of the sea of south-east Europe (connecting the Adriatic Sea to the Ionian Sea and the Eastern Mediterranean to include Cyprus) (2010);

• Motorway of the sea of south-west Europe (western Mediterranean), connecting Spain, France, Italy and including Malta, and linking with the Motorway of the Sea of south-east Europe (2010).
Development of sea motorways will contribute to:

- to achieve a full integration of maritime transport operations in the global logistic chain as this will allow for a seamless integration of transport operations supporting European external trade (75% of Europe's external trade is performed by maritime transport) and internal trade (40% of Europe's internal trade).

- Enhancement of cohesion between Member States
  - MoS builds on the core and comprehensive networks of European ports and logistics centres as well as on the TEN-T core network corridors, knitting a dense transport grid which will facilitate trade operations and cohesion thereby boosting growth. Every TEN-T corridor starts and ends in a port.

- Motorways of the Sea seek to reduce congestion on land, support the uptake of more sustainable transport modes, increase efficiency and allow peripheral regions to be better accessible.

- Through the establishment of frequent and high quality maritime-based logistics services between Member States, motorways of the sea will become veritable alternatives to congested roads.
MOS the new framework

• Dual layer approach
  • A comprehensive network: a European-wide transport network ensuring the accessibility to all regions, including the remote and peripheral areas, for which overall fulfillment should be complete by 2050
  • A core network: consists of the most important infrastructure interventions as defined in the comprehensive network – it could be considered the back-bone of the multimodal mobility network
TEN-T Network (MOS)
MOS within TEN-T

- new, integrated, intermodal maritime-based logistics chains with high quality maritime links to connect the limited number of selected ports that are located at strategic points on European coastlines
- These are links of general interest (Atlantic and Mediterranean) with the direct aim of extending the territory to the sea
  - chains will be more sustainable, and should be commercially more efficient, than road-only transport, permitting a massive modal shift of freight traffic from congested roads to key routes. Realizing such routes should bring about a structural change in our transport system and how it is organized in the future.
Agenda

• Definitions
• Evolutions & Challenges in the transport chain
• Multimodal transport chain integration through IT tools
• European challenges for an integrated transport system
• Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
  • e-solutions for integrated transport and effective door-2-door multimodal chains
• Conclusions
How far is this future though?

- the application of emerging and existing technologies sustained by efficient communication procedures and collaborative information exchanges among public and private stakeholders can improve, promote and simplify the use of multimodal short/deep-sea services and hence, enhance the efficiency, effectiveness and cohesion of European multimodal chains.

Common framework for freight information exchange

Single window and one stop shopping for administrative procedures

A single digital European transport document irrespective of the mode (e-waybill)
Framework to track and trace freight along its journey

Integrated traffic and transport management and information systems through electronic archives

Simple, harmonised border crossings procedures for all modes of transport for all EU member states
Common Reference Framework

Transportation Network Management (Co-operative Systems)

Transport Demand

Transport Supply

Supply chain security and Compliance

Corridor Management

ITS
TAF/TSI
RIS
eMaritime
A minimum data set must be agreed upon amongst all parties, including:

- the format,
- data fields and
- data elements.

- conformity with international standards (e.g. UNECE/ISO UNTDED)

- Core components of the common framework are becoming international standard (OASIS – UBL)

- GS1 - links established between GS1 messages and common framework messages

**The expected benefits will be:**

- Creating a reference framework for the use of smarter solutions to enhance modal shift in port areas;
- Promoting data interchange among transport modes;
- Develop a transparent and user friendly environment for goods flows management.
Single Window

The Single Window concept refers to 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. If information is electronic, then individual data elements should only be submitted once.

- Regulatory Compliance Complexity
  - Mode-specific, country-specific, globalisation
  - Complex set of (duplicating) reporting requirements and related systems

- EU policy context and legal framework:
  - White Paper, Customs Code, e-Customs, SafeSeaNet, Ship reporting formalities, RIS, TAF/TSIs, ITS

- EU Single Window Initiatives
  - E-Customs single windows – trade facilitation
  - Maritime single windows – monitoring vehicle and cargo movements

- A single entry point for all traffic and transport regulatory information at national level regardless of mode and the exchange between countries
A Single Window Model for the collection and dissemination of information

3-c: 'Automated Information Transaction' System

Trader (incl. Transport)
Information and Documentation

• Specify how the data should be transmitted across participating authorities and agencies and where it should be stored.
• Consider how the data could be exchanged with administrations in other countries;
• Consider how the data could be used for risk analysis and other relevant purposes;
• Quantify the potential benefits of making better use of data held in commercial systems and records in meeting government requirements and helping to reduce business compliance costs in the transmission of information.
Bills of lading and seaway bills are two basic documents that verify the carriage of goods by maritime transport
• B/L used mainly for deep sea transportation - conveys title
• Seaway bill used for short sea trade evidence that the consignee has contracted with the shipper to carry the goods

Current Process Flow:
1. The freight forwarder sends the shipping instructions to the carriers for approval.
2. Communications to Customs using the T2L format to distribute cargo.
4. Once the waybill is approved, it is delivered to all parties involved at a given time frame.
5. Documents being delivered at the import side so cargo can be checked out at destination
6. Validation process, to ensure the delivery to the responding consignee
Towards a Multimodal e-waybill

— Document exchange between stakeholders involved in transport of goods is characterised by various national, international, often mode-specific regulations, conventions and standards

— To cope many organisations and companies have developed their own waybill

— Is this the right setting for multimodal transport chains?

— Can we not facilitate multimodal transport by multimodal e-waybills, reducing administrative burden and providing more accurate and reliable information

— How to face the challenges: global dimension; negotiability; trust and data security; liability
Why e-waybills of lading?

For your shipment to arrive on-time, the bill of lading must have accurate:

- Carrier Shipment Information
- Insurance Provider Information
- Customs Information

Manual bills of lading:
Errors often occur since multiple parties enter and re-key data

Result:
Shipment delays and unhappy customers.
E-waybills of lading features:

- Multi-carrier inbox for all participating carriers
- Seamless B/L viewing, editing and approval process
- Automatic email notifications of B/L receipt for customers
- Historical 90-day archive
- Visibility across all your bills of lading (Bs/L) whether booked directly with a carrier or through INTTRTA
- Easy sharing of non-negotiable copies and Express & Sea Way Bills to multiple parties
- Immediate B/L print upon final customer approval
E- Manifest

— The e-Manifest is defined as a document allowing for the identification of goods for Custom purposes

— The combination of the PoUS system and e-Manifest will provide an electronic environment for port customs … and will allow the replacement of the current paper T2L with an electronic equivalent

— Simplifications can facilitate the free movement of goods as for an authorised consignor, the PoUS procedure is greatly simplified (only the e-manifest is needed for proof at re-entry)

— Validation of the PoUS can be done within the e-Manifest framework
<table>
<thead>
<tr>
<th>Authorised consignor</th>
<th>Non-authorised consignor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not required to request the endorsement of the PoUS</td>
<td>Required to request the endorsement of the PoUS to customs</td>
</tr>
<tr>
<td>Not required to stamp, sign or endorse any document if they use the e-Manifest</td>
<td>Required to prepare the documentation required by customs for its endorsement</td>
</tr>
<tr>
<td>Not required to use the PoUS system (when available)</td>
<td>Required to use the PoUS system (when available)</td>
</tr>
<tr>
<td>Only required to mark the goods which have Union status in the e-Manifest</td>
<td>Required to mark the goods which have Union status in the e-Manifest and include the PoUS reference</td>
</tr>
<tr>
<td>Not required to hold the PoUS at the time of presenting the e-Manifest</td>
<td>Not required to hold the PoUS at the time of presenting the e-Manifest</td>
</tr>
</tbody>
</table>
E-Invoicing

• An invoice – paper or electronic – is a document certifying the delivery of a product or the provision of a service, showing the date of accrual and the amount payable in consideration for the product or service provided. The invoice constrains the issuer’s and recipient’s details, a description of the products and services provided, unit prices, total prices, discount and taxes.

• Electronic invoicing- is the act of receiving and/or sending electronic invoices in a structured format that is suitable for automated processing

• Full electronic invoicing permits benefits both for the invoice issuer and for the recipient
About electronic invoicing

- Wide scope of possibilities to transfer an invoice electronically:
  - Via e-mail with the invoice attached in pdf or xml
  - Via web portal
  - Via EDI etc. (considered most secure and most reliable delivery + maximum level of automation)

- Normally the electronic invoice consists of two elements:
  - A data component with a structured form which enables process automation
  - An image element that provides a human readable presentation.

- Standardization: more than 450 technical szntax standards in Europe-
  common global, regional, industry specific and national standards. Already
today few standards(CEN, UBL, EDIFACT) cover 99% of the existing market,
however the European Commission decided that semantics rules for the core
of the e-Invoices must be created to facilitate wider interoperability.
e-solutions for the realization of more effective and sustainable multimodal transport

• Interoperability of transport ICT systems = make actors understand each other easily

• Inventory amplitudes decrease (minimization of the bullwhip effect)

• Interconnectivity for SMEs

• Run transport business processes smoothly across organisational boundaries

• Reduce administrative burden and facilitate multimodal transport

• Improve communications, decrease errors in exchanged documents and increase the efficiency and cohesion of maritime transport chains

• But there is more…. 
Agenda

- Definitions
- Evolutions & Challenges in the transport chain
- Multimodal transport chain integration through IT tools
- European challenges for an integrated transport system
- Multimodal transport from the perspective of MOS & the Core Multimodal Corridors
- e-solutions for integrated transport and effective door-to-door multimodal chains
- Conclusions
Possible overall transport chain enhancements through integrated e-solutions

- Reduce process time (time to execute a process activity) and lead time (time elapsed between the initiation and execution of a process).
- Enhanced supply chain visibility and security as well as increased service reliability by providing better traceability.
- Optimisation of logistics multimodal chains may help to increase also environmental performance and cost efficiency.
- Accuracy, centralization and uniform electronic repository of e-documents, re-use of data, minimized paper documentation, minimal risk of lost document.
- Automated auditing, files are archived upon arrival and senders are sent a confirmation immediately.
Conclusions

• There are real benefits to the challenges illustrated so far, that transform multimodal transport chains within EU into integrated transport systems.

However in order to achieve the desired level of European transport integration there is a need for:

• Correct information between the different actors
• Better communication & use of ITS
• …the common solution is to have planned coordination to reach a better and easier world of transport…
End of Session

Thank you for your attention!

Q&A