



Final report

EUSALP AG4 Activity “Infrastructure for combined transport (terminals)”

Preparatory study and dialogue events with strategic implementation partners to investigate and optimise multi-modal logistic chains

September 2019

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1. Motivation and structure of the report

LINKS carried out on behalf of EUSALP a preparatory study to investigate the possibility of actions to optimise multi-modal logistic chains in the Alpine region with particular focus on the flows of empty containers due to imbalances in trade in the area.

The project was carried out in four steps:

Working step 1: desk research

Working step 2: evaluation of solutions in empty container management

Working step 3: dialogue events with strategic partners

Working step 4: identification of a concrete implementation initiative relevant for EUSALP

The present report closes Working Step 4 by summarising the work developed and discussing further concrete steps that EUSALP may take.

The content of the report follows the main working steps of the study: chapter 2 illustrates that there is a difference between intermodal flows linked to maritime traffic and those that are only continental and chapter 3 then briefly reports on the results of the data collection work.

The reasons for the lack or excess of empty containers are reviewed in chapters 4, whereas chapter 5 characterises the stakeholders in intermodal transport, some of whom may act to improve the situation with empty intermodal units.

The possible actions that may be taken to tackle issues with empty intermodal units and their storage are indicated in chapter 6, providing also an outlook indicator about the viability and the limits of each method. Chapter 7 reports the motivation for action and the strength of the position of the key stakeholders in intermodal transport, that may be then linked to which actions they could actually take.

A significant input to the study was provided by four dialogue events, whose main outputs are summarised in chapter 8, before conclusions and recommendations are provided in the final chapter 9.

2. Intermodal container flows

Following the official definition by UNECE (2001), *intermodal transport is the movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes*. Still UNECE (2001) provides the definition of combined transport, which is most relevant here, as *intermodal transport where the major part of the European journey is by rail, inland waterways or sea and any initial and/or final legs carried out by road are as short as possible*.

Transport in Intermodal Transport Units (ITUs) allows the economies of scale that make intermodal transport economically sustainable and, in turn, enables the environmental advantages that follow from the shift of cargo from road to rail or inland waterway. This is especially relevant as much of the EUSALP area is part of the Alps, where reduction of road transport is particularly important to protect the environment¹.

It is important to distinguish between maritime and continental unitised transport because the two different flows entail different characteristics:

- Containers/loading units:
 - Maritime transport uses mostly ISO 20ft and 40ft used in maritime transport, while continental transport makes use of 45ft containers, 30ft containers swap bodies or semitrailers.
 - Whether continental or maritime, containers come in different types depending on the cargo they are designed for: e.g. simple boxes, open top containers, flat racks, reefers, and tank containers of different sort.
- Transport chains, and therefore (often):
 - Operators and in general stakeholders involved (for more information see chapter 5)
 - Locations (in some cases terminals specialise in one or the other traffic)

¹ See in particular the EUSALP AG4 report on External costs in mountain areas, available at <https://www.alpine-region.eu/node/467>

3. Summary of data collection work

The data collected for this study showed increasing maritime containerised flows (Figure 1) and inland combined flows (Figure 2). Maritime transport has increased by about 34% from 560 trillion TEUs in 2010 to 750 trillion TEUs worldwide, European continental transport –calculated in number of consignments- has increased by about the same amount 35% over the period 2010-2017, including a recovery from a marked reduction in 2012. Figures for continental transport are available also for 2018, when a further growth was recorded: the almost 4.3 million consignments carried out mark an increase by 41% with respect to the 2010 figure. The information available illustrates the trade imbalances across continents that bring about maritime flows of empty containers, and data indicate also imbalances of continental flows suggesting that transport of empty containers do occur along several European trade lanes.

Further data from EUROSTAT² indicate that much of railway traffic concerning the EUSALP Countries is actually intermodal and that there is still potential for shift from road to rail or, where relevant, to inland waterways. Although the data published by EUROSTAT are referred to whole countries, it is noteworthy that as of 2017 21.0% of the tonnes of containerised goods recorded as travelling by road for more than 300 km by Slovenia could be shifted to intermodal. That figure, as the corresponding one for France (17.2%), has varied over the latest ten years but altogether remained at the same level. The modal shift potential of long-distance road freight in containers considered in tonnes is 8.2% for Germany and 2.7% for Austria, following a steady decrease over the last decade. To exploit that remaining intermodal potential it is important that current infrastructure is used as efficiently as possible.

Data for a number of ports belonging to the Northern European range, to the Tyrrhenian range and to the Northern Adriatic in general showed increases in containerised traffic (ports considered and ranges to which they belong are illustrated in Figure 3). Important exceptions are Hamburg and Bremen as well as Livorno whose containerised traffic is stable.

Altogether, the study found a general lack of detailed public statistics on intermodal flows at regional level and no availability of data about flows of empty intermodal units in both public statistics and planning documents.

The work also included looking in detail at four study areas (Novara and west of Lombardy, Basel and Freiburg, Tyrol, Veneto) and asking the intermodal terminals in each area about data on

² See the data tables “Modal shift potential of long-distance road freight in containers - tonne-kilometre” (tran_im_mosp) and “Modal shift potential of long-distance road freight in containers” - tonne (tran_im_mospt). The estimated are obtained as the percentage of laden containers by road over distances of 300 km or more compared to the total number of laden containers transported by road.

containerised flows and possible issues with empty intermodal units. Availability of data from terminals was different by study area: in some case there was a good feedback, at other locations issues with confidentiality resulted in no data supplied at all. What is noteworthy is that none of the terminals that replied, with the only exception of Hall in Tirol, indicated flows/space for empty intermodal units as an issue.

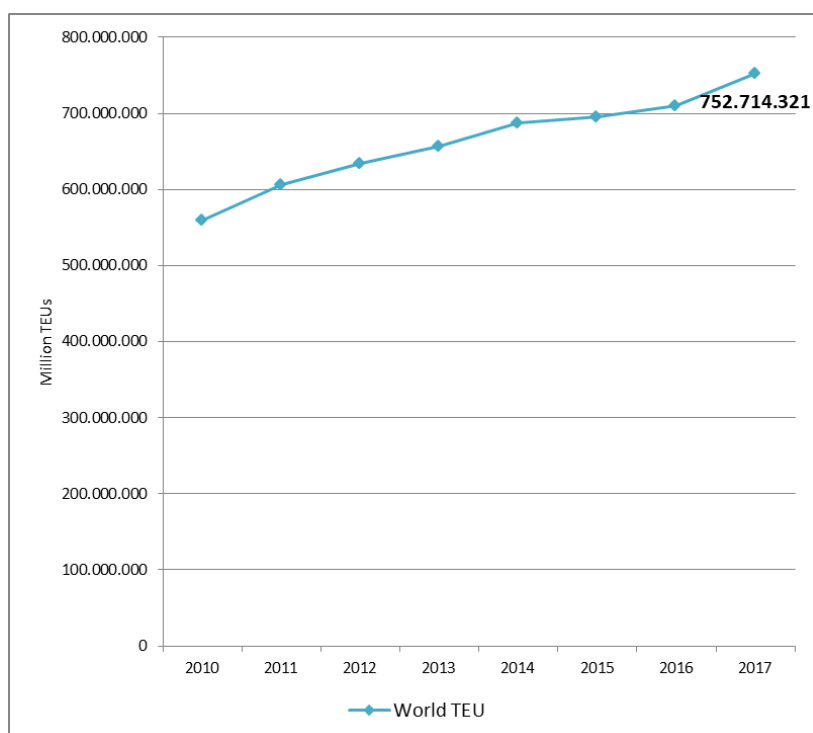


Figure 1: TEUs carried by maritime vessels across the world (elaboration on UNCTAD 2018 data)

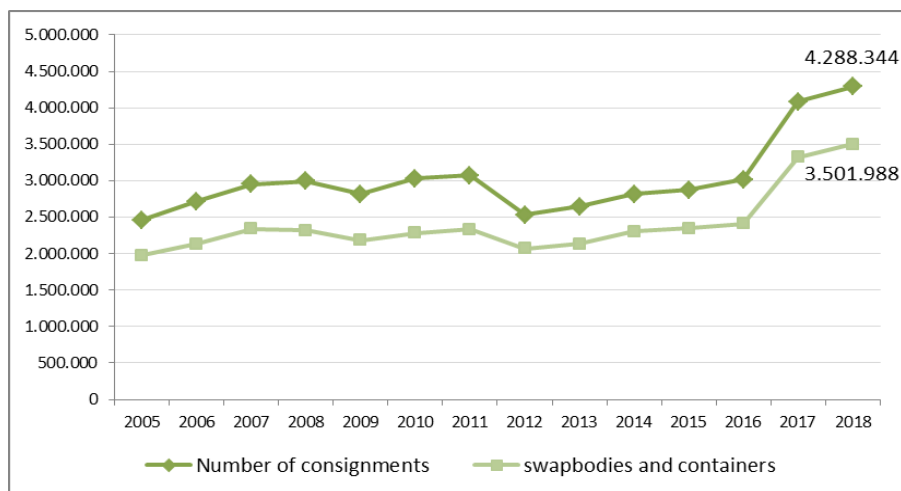


Figure 2: Evolution of flows of container and swap bodies and of consignment carried out by UIRR associated companies, thus capturing the majority of European unitized flows (elaboration on UIRR 2019 data)

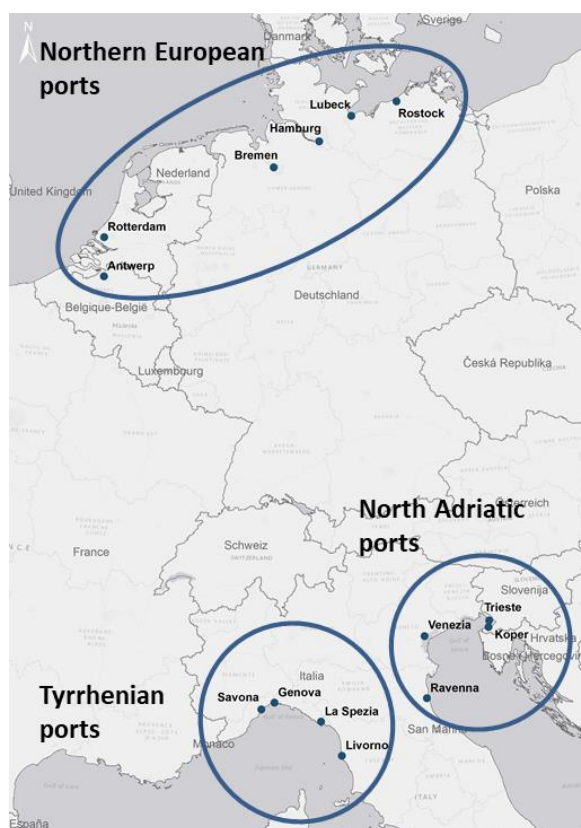


Figure 3: Ports considered in the statistical analysis and ranges to which they belong

4. Causes of lack or excess of empty containers

Container imbalances may occur for several reasons, and most often due to a combination of them. Lack of containers occurs when exporters from a region cannot find suitable containers in the quantity they need to carry their goods and have to import them empty. Excess of containers occurs when containers imported full do not have return loads and have to be kept in storage until a load is found (thus taking up valuable) or sent away empty. It should be noted that keeping a number of containers in storage is normal, especially at ports, in order to fulfil rapidly the requests of shippers.

In practice, there may be lack or excess of containers or both at the same time in the same area for different traffic flows and different types of containers.

Relevant reason for container imbalances comprise:

- **Trade imbalances.** These may be at global level, such as the East-West trade imbalance affecting maritime flows of empties, or with a regional scope.
- **Containers of the appropriate type not available in sufficient numbers.** For instance, flows in and out of an area may show imbalances due to inbound heavy cargo transported in 20 ft containers and lighter cargo exported in 40ft containers.
- **Demand variations.** There may be seasonal variations in the flows of goods transported resulting in seasonal variations in the balance, lack or excess of containers.
- **Different operators in charge of different flows.** For instance, when the flow in one direction is, say, largely maritime and the flow in the opposite direction is mostly continental, imbalances in equipment are normal and so are flows of empties, both due to different types of containers and, often, to different operators.
- **Transport of chemicals in tank containers,** that often have no return flows.
- **Strategies and choices of operators.**

Discussions with stakeholders indicated that imbalances and flows of empty containers pertain mostly maritime traffic whereas continental intermodal transport units typically have return loads although no data is available to support this point.

5. Stakeholders in container flows

The study developed schematic representations of the relevant elements of maritime and continental intermodal transport chains: Figure 4 and Figure 5 illustrate the inland transport steps for maritime containers whereas Figure 6 and Figure 7 provide an outlook of the transport steps of continental containers. Depicting the transport chains allowed to characterise the stakeholders involved in the various transport steps, as reported in Table 1.

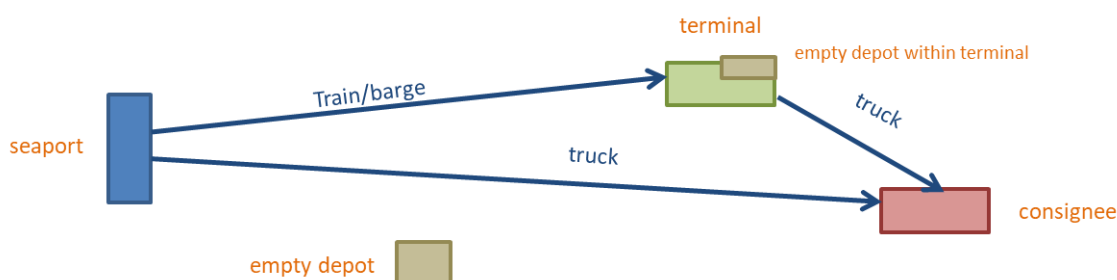


Figure 4: Maritime container flows of laden containers, two alternative routes from seaport to consignee. The figure considers maritime containers unloaded from a containership at a seaport, where they clear Customs and may be sent to their final destination directly (often by truck), or via a terminal reached by train or by barge. At the terminal, the containers are moved onto a truck and delivered at destination. A possible alternative, not depicted, includes trains from the port that enter directly the plant or warehouse of the consignor. Movements of containers booked for transport on a containership are opposite those shown here.

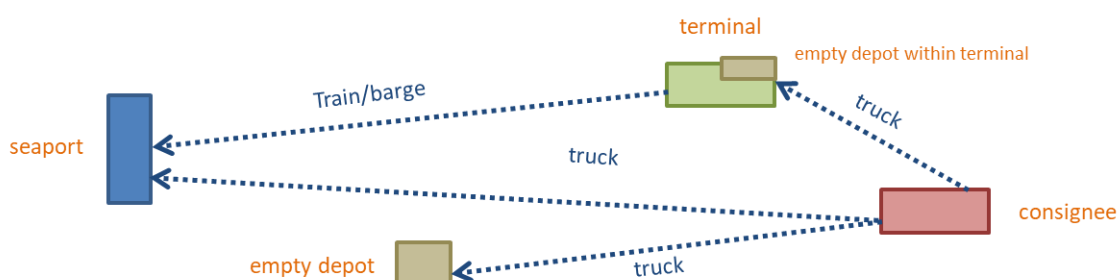


Figure 5: Maritime container flows of empty containers, three alternative routes of containers after stripping. The figure depicts a case where a truck picks up the container and delivers it to an empty depot (inland or close to the port), or to a terminal equipped with an area for empties, or to the port. Operations and destinations of empty maritime containers are different depending on who is in charge of transporting them. In case the road haulage is performed by a contractor not acting for the maritime carrier (merchant haulage) the container must be taken back to the port or to the nominated depot. In case the road haulier acts for the maritime carrier (carrier haulage), the carrier may decide where to send the container as it is released by the consignor, also re-routing it directly to a new customer. Movements of empty containers to supply shippers who booked them are opposite to those shown here.

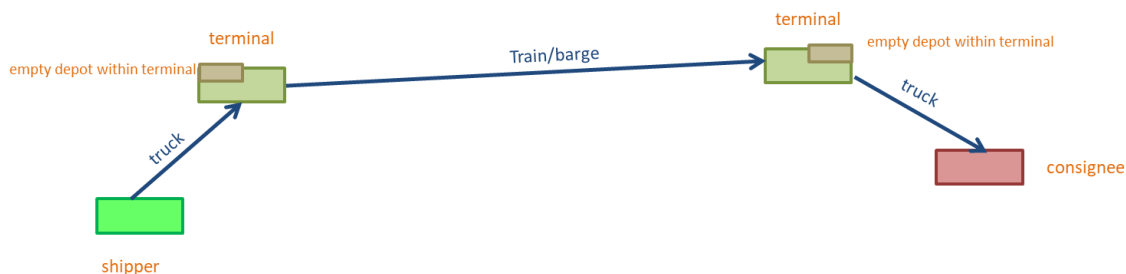


Figure 6: Continental container flows of laden containers, from shipper to consignee. The figure shows the sequence whereby a shipper stuffs the container or containers, which are then taken to a rail or inland waterway terminal by truck. After the train or barge transport, the containers are taken by truck to their final destination. Alternatively, the loading or unloading point of the intermodal transport units may be directly within the shipper or consignor's plant or warehouse so the initial or final legs by truck are not necessary

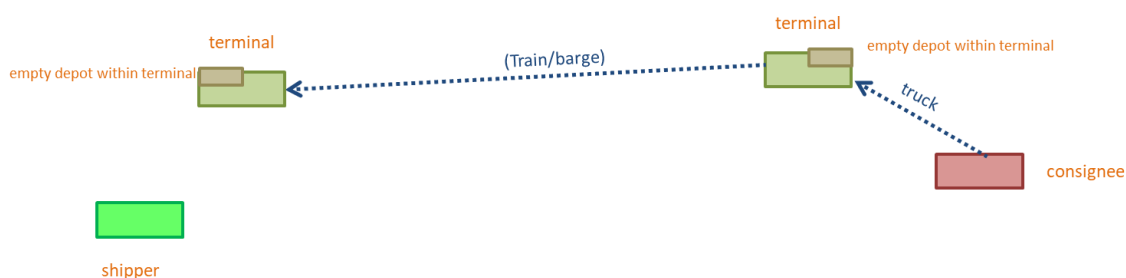


Figure 7: Continental container flows, return of empty containers. Once released by the consignor of the goods, the empty container is taken to a depot within a terminal, where it remains available until the next request. Terminals typically allocate areas to key customers managing intermodal transport to temporarily store empty containers. Movements of empty containers to supply shippers who booked them are opposite to those shown here.

Stakeholder	Maritime Transport chain	Continental Transport chain	Role
Shippers	✓	✓	Send the goods and, depending on the commercial terms subscribed, may choose the MTO/forwarder/carrier carrying the goods. In some cases they also own the containers or the swap bodies
Consignors	✓	✓	Receive the goods and, depending on the commercial terms subscribed, may choose the MTO/forwarder/carrier carrying the goods
MTOs	✓	✓	Organise the transport of goods (in intermodal units) from the shipper to the consignor by using different transport modes, also by subcontracting the actual transport to other specialised parties such as intermodal operators and road or IWW carriers
Freight forwarders	✓	✓	Organise the transport of goods (in intermodal units) from the shipper to the consignor, typically subcontracting the actual transport to other specialised parties such as road carriers
Maritime shipping lines	✓		Transport intermodal units on containerships. Due to strong negotiating power (they control the maritime traffic) and vertical integration with inland partners, they are key in determining movements of maritime containers inland. They own significant shares of maritime containers.
Container leasing companies	✓	✓	Lease containers to maritime companies and other transport operators
Seaports	✓		Locations of transshipments of intermodal units and hubs for the storage of empty containers
Terminals	✓	✓	Locations of transshipments of intermodal units and hubs for the storage of empty containers
Intermodal operators	✓	✓	Provide the transport by railway. They provide the train service (in some cases leasing the wagons). Some intermodal operators provide also further services such as road haulage. In the case of continental transport they sometimes own the intermodal units
Barge operators	✓	✓	Provide transport on inland waterways, also as part of intermodal transports organised by MTOs
Rail operators	✓	✓	Act as subcontractors to intermodal operators by providing traction on the rail infrastructure
Road hauliers	✓	✓	Act as subcontractors to other operators by providing transport along initial or final road leg

Stakeholder	Maritime Transport chain	Continental Transport chain	Role
Depots for empties	✓		Locations to store empty containers, often providing services such as cleaning and repairs
Customs	✓	(✓)	Provide border controls, along with other public agencies. They require appropriate information for a swift release of the containers subject to import or export regulations
Public authorities	✓	✓	Define policies and issue regulations relevant to intermodal transport, often to foster economic activities and to safeguard their areas from the negative externalities of such activities, including transport

Table 1. Stakeholders involved in the maritime and continental intermodal transport chains and their roles

6. Methods to deal with imbalances of empty containers and empty container storage

A number of solutions to container imbalances and issues with space have been identified in the frame of the project and discussed in the frame of the stakeholder events. The different solutions are illustrated in Table 2. The table includes a short description for each solution as well as an outlook indicator which is intended to report a general impression of the viability and usefulness of the methods proposed. The outlook indicator has been qualitatively obtained by considering the feedback from stakeholders at dialogue events and the observations reported in the technical and academic literature.

The evaluation of the different solutions leads to the following main results:

- **The most promising solutions are triangulation and virtual container yards as well as the effort to balance flows of laden containers if supported by pricing or subsidies.** However none of them can be expected to offer a thorough solution to imbalance issues. The attempt to balance flows is likely limited by the type of goods that are transported to and from an area. Therefore part of the imbalance may be structural. Additionally, the effort should be common to several operators since each operator manages its own flow
- **Triangulation and virtual container yards will reduce rotation time of containers and save truck trips to reposition empty containers** between consignors, depots and shippers. They would also rationalise use of space in terminals. However, they are likely to be implemented within the network of a single operator due to the strict confidentiality with which transport operations are treated by operators. The chances of success of a third party platform, such as those developed in the US, are unclear.
- **Shared pools of containers do not appear viable** due to the practicalities linked to managing containers and, again, to the confidentiality that characterises container transport.
- **Homogenisation of container pools is equally impractical** due to the separations in container flows and ownership as well as to avoid transloading of goods.
- **Transloading** does not seem useful since in Europe it does not provide the advantages that may provide in the US and Australia due to the marked difference of size between the maritime containers and the continental ones used there.
- **Foldable and compoundable containers add operations and related costs** to container transport that operators seem to note more than the possible savings, plus they are seen as special equipment whereas operators seem to prefer the flexibility of “simple boxes”, thus they are deemed ingenious but –at present- with limited interest. They could have as a starting point of uptake the traffic of a single operator on a particular connection, but this

again should be developed by the operator and, possibly, by a large shipper (who could perhaps own the special containers).

Solution/action	Brief description	Outlook
Balance flows of laden containers	The lack of empty containers available for transport in one direction could be solved by turning as much as possible the flow of empty containers in the opposite direction into a flow of laden containers, so that -once stripped- containers become available for transport. Similarly excess of container availability could be solved by further marketing container transport in the opposite direction.	+
Triangulation/street-turning	Containers just emptied by a consignee are often returned to a depot or terminal where they wait to be re-used. With triangulation containers just released after stripping, if deemed fit for re-use, may be taken directly to a new shipper to be loaded, without going back to a depot/terminal. This saves truck trips, allows quicker rotation of containers, and is already used by single operators within their own operations.	+
Virtual container yards	Virtual container yards may be used to link demand by hauliers and the availability at several container depot in an area -or at warehouses of consignors that are releasing containers after stripping. The truck is then addressed to the nearest place where the required empty container is available and receives on-line the necessary authorisation to pick it up. Virtual container yards are also used to operationalise triangulation, thus saving trips and related costs and externalities as well as space in terminals.	+
Grey boxes/shared pools	Containers belong to different shipping lines/leasing companies/intermodal operators. One operator may have excess empty boxes in an area while another may be short of them due to their separate trade flows. By pooling all or part of their containers in a region, operators may cooperate to solve their own container imbalances. Cooperation is however unlikely due to confidentiality of information about flows and container ownership/leases that link them to the company that owns them.	- -

Solution/action	Brief description	Outlook
Homogenisation of containers used by combining journeys	Imbalances in empty containers may be due to import and export flows carried out with containers of different types. Excess of a certain type of container could then be exploited to load goods currently travelling on a different kind of containers that has to be imported empty. For instance, goods currently travelling in swap bodies could travelling in 45ft containers. However, the separations in container flows and ownership as well as to avoid transloading of goods suggest that this solution is not feasible in practice.	- -
Transloading	Transloading is a practice in place where continental containers are much larger than maritime ones and goods are moved at ports from the one type to the other in order to save crane moves and truck trips (and related costs). Due to the limited difference in size between maritime and continental containers in Europe, transloading does provide the advantages it may provide elsewhere, while adding the operations and the administration required to move goods between containers.	- -
Foldable containers	They are general purpose containers that may be flattened onto the base thanks to walls linked to the base and the top by hinges and locks. The idea is that the empty containers may be folded and 3-4 containers may be stacked together and repositioned as a single block reducing room, truck trips or train slots required, and crane moves. Operators interviewed see foldable containers as ingenious but impractical and requiring extra costs for folding/unfolding. Also they would be special equipment while operators prefer plain boxes.	-
Compoundable containers	The concept of compoundable containers entails locking together two small containers to obtain a large one when needed or when empties need to be moved, in order to save crane moves. The only example is the Tworty Box composed by two 20 ft containers with doors at either end that may be linked into a 40 ft container. There is no information on the use of this method beyond a single test case in 2013. Effective operation requires keeping track of small containers that may be compounded.	-

Solution/action	Brief description	Outlook
Subsidies	<p>Subsidies could be used to limit the effect on the shippers of imbalances in containers availability by creating the conditions to balance flows. This could include subsidies to transport laden containers –rather than empty ones- in the direction opposite to that requiring them, with an obligation to pass a part of the sum on to the shippers. They should be temporary and be designed to stop at the latest once the target balance is established. Most importantly they should be designed and monitored so that their overall effect is to increase the efficiency of the combined transport system.</p> <p>Subsidies may be directed also to mitigate the environmental and economic costs of repositioning containers, as in the case that follows.</p>	:
Mitigation of the environmental and economic costs of repositioning containers	This action does not attempt to change the flows of empties but to shift them on a mode less environmentally and economically expensive, such as the inland waterways.	+

Table 2. Summary of solutions to manage empty container imbalances (an outlook with a + sign indicate a general viability of the solution; a : sign indicate an unclear outlook; the – sign indicates a negative outlook)

7. Motivation and position of key stakeholders

The relative position of different stakeholders –focusing only on those that are deemed to have influence on the choices pertaining movements of empty intermodal units - and the possible actions they may undertake with respect to empty container flows are reported in Table 3.

Maritime shipping lines have the upper hand in all transactions since they own the traffic: other actors are strongly dependent on their choices. These in turn may be made at a geographical scale much wider than the hinterland of a port or a part of it –also at global level-, and include several decision factors.

MTOs and forwarders have an interest in providing transport services that meet the demand of their customers, therefore they need empty containers ready when requested and at the same time need to limit transport costs, which may be in part related to flows of empties. They could work to balance flows with their commercial activity, however stakeholders at workshops warned that, in the case of maritime traffic, they have little room for action since they are linked to the indications of the shipping lines. They could also foster the use of ITS (e.g. virtual container yards), although the tough competitive situation suggests that they would limit ITS solutions to their customer base.

Intermodal operators, aiming for fully laden trains, could be interested to work towards expanding traffic, use ITS to improve train load factor, and set up collaborative environments with ITS. However, their interest in collaborative facilities based on ITS would be limited to their client base.

Seaports and inland terminals are in similar situations in terms of strength of their role. They aim to maximise their traffic and may react with charges and waivers for container stays. Their decisions on using charges to attract empties need to weight the risk that the availability of empties rather than actually generating traffic (thanks to the active customer base of the operators that use the terminal) ends up occupying otherwise useful space, which in ports and terminals comes always at a premium.

Shippers and consignors are the ones that are ultimately charged for the movements of empty containers by the other actors in the chain so they could set up collaborative agreements to get better transport services and conditions.

Stakeholders	Maritime shipping lines	Container leasing comp.	MTOs / forwarders	Intermodal operator	Seaports	Terminals	Empty depots	Shippers	PA
Aims for	Max usage of ships esp on routes with high rates	Max usage rate of containers (empty or full)	Cost, reliability, time of transport solutions	Fully laden trains	Max traffic	Max traffic (crane moves) with min stay of containers	Use of depot and added value services (repairs)	Ready availability of transport solutions	Favourable economic situation Reduced env. impact (traffic, noise, accidents, landscape)
Strength of role regarding container flows	●●●●	●	●●●●	●●	●	●	-	●	●●
How can they act	Repositioning decisions, location of depots, collab. ITS	-	Commercial activity, triangulation, ITS	Commercial activity, triangulation, collaboration ITS	Tariffs for container stay	Tariffs for container stay	-	Collaboration/grouping	Regulation, subsidies

Table 3. Influential stakeholders in intermodal transport, their main aims, a qualitative evaluation of their negotiating position and the possible actions they may take with respect to flows of empty containers

8. Dialogue events

The situation and the methods outlined above were discussed at a series of dialogue events with stakeholders that took place between June and August 2019.

One dialogue event was carried out for each study area: Tyrol, Novara and west of Lombardy, Veneto, Basel and Freiburg (Figure 8). Organising dialogue events proved challenging as only a limited number of stakeholders accepted to participate.

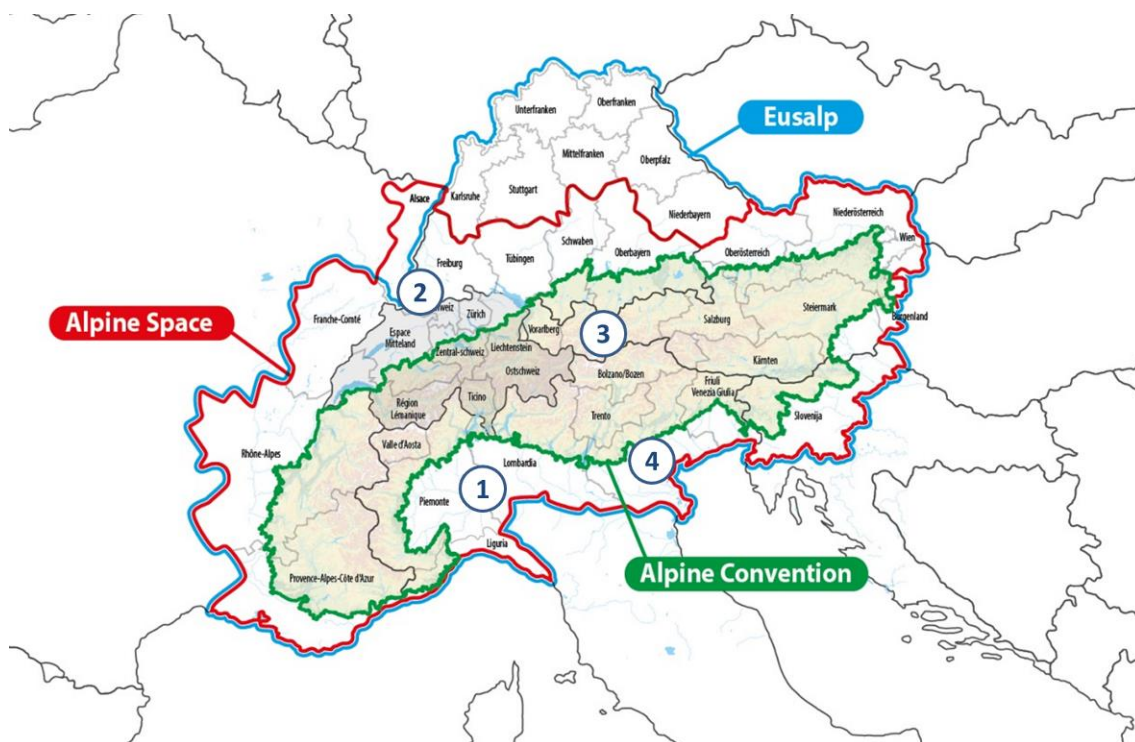


Figure 8: Locations of the case studies and the dialogue events 1) Novara and west Lombardy; 2) Basel and Freiburg; 3) Tyrol; 4) Veneto (Verona/Padova)

The following are some key outputs from the dialogue events.

There are **imbalances in container traffic** in Tyrol (lack of containers for export), the Basel area (mismatch of containers for imports and exports and excess of containers from import), Venice (due to demand forecasts by shipping lines that sometimes prove incorrect). In Novara they expect to have to deal with container imbalances once the maritime flows linked to the Belt and Road Initiative will affect the area. At both workshops in Italy it was stressed that imbalances pertain to maritime traffic whereas continental traffic swap bodies and containers always have return loads. Also for semitrailers there is no movement of empties over long distances since operators make their utmost to find return loads. Operators in Basel noted that customers do not want to pay for movements of empties so they are motivated to keep empty trips to a minimum.

Imbalances in empty containers are seen as normal part of the business due to the kinds of imports and exports required by a particular area or to different directions taken by imports and exports goods from an area. Operators try to mitigate costs (for instance transporting empty containers on barges as to/from Basel) since are concerned by knock-on effects such as extra charges for customers due to the need to move empty containers, unprofitable use of assets such as trains or terminal space.

Limits of terminal infrastructure. In Tyrol, Novara and Basel, discussing empty containers soon led to discussing terminal space. Terminals are set in areas where expansions are not feasible so space is precious. Lack of space to store empty containers requires trains to move them to and out of the area in Tyrol. In the North West of Italy operators would need more space in terminals to handle overbooking (as their services are always fully booked) and space adjacent to terminals for ancillary activities. In Basel there are several terminals and depots, while this is seen as partly inefficient (due to limited size of some such terminals and the induced road traffic) the development of a new large tri-modal terminal able to cater for the traffic of the whole of Switzerland is seen as a threat by several operators.

Rail and road infrastructure and services. In Innsbruck, Novara and Basel, operators noted that the increasing need of infrastructure slots for passenger traffic and for freight traffic is an important issue also due to the lower priority attached to freight traffic. The increase in intermodal traffic on rail is also pushed by the decreasing numbers of drivers that are expected to reduce further as many will reach retirement soon and there are not enough younger drivers entering the profession. Italian operators underlined the need for action to overcome the limits of length and weight of trains currently imposed by the infrastructure and to harmonise operations across borders.

Power imbalance and leeway to work on empty containers. Both in Venice and in Basel operators underlined the decision power of maritime shipping lines that drive the choices made also inland by MTOs and forwarders. In Venice operators suggested that working from outside the market on empty containers could have unintended effects, perhaps also moving traffic away to other locations, which goes to underline the sensitivity of power balances in the intermodal trade. When discussing optimisation of logistic choices, operators in Basel also noted that they propose

solutions to shippers, who make the final choice based very much on prices. These points seem to leave little room to work on empty containers.

Confidentiality. The one key issue equally stressed at all dialogue event is confidentiality of data, which also hampers collaboration. All operators are very careful not to disclose any data on traffic. This was clear also from the limited response obtained when collecting data for this study. The complete lack of replies for the Basel area was kindly but clearly confirmed during the dialogue event. Competition is fierce and data could reveal useful information to competitors. At one workshop it was suggested that in case subsidies were issued, there should be some data opening in return.

Collaboration. Confidentiality and strong competitive environments hamper the development of collaboration, the only type of measure for managing empty containers that was received with some interest at all dialogue events. Sharing containers is deemed impossible and sharing a depot for empty containers (as it would be useful in Tyrol) would have to overcome competition concerns among operators. Operators are aware of the benefits of collaboration but the competition is too strong and they prefer to consolidate their own markets. Similar points apply to IT platforms to share container availability: they are developed only by single large operators, not among them. Another type of collaboration suggested would be among shippers so as to influence logistics decisions by transport operators.

The **measures to deal with imbalances** requiring collaboration (virtual container yards, shared pools) were deemed interesting and promising but unfeasible. Triangulation was indicated as common in Veneto but having limited application in Basel. Homogenisation of containers used by combining journeys as well as transloading were deemed not possible, whereas operators were sceptical about foldable or compoundable containers.

9. Conclusions and recommendations

Key conclusions and recommendations of the work reported are that:

- **There is limited knowledge of the intermodal transport sector and of the movement of empty containers:** the data available shed some light at aggregate level but data for single terminals are often unavailable as considered confidential. Operators are aware of their own operations but seem to have limited understanding of the overall picture as they often focus on consolidating their client base (although larger operators are likely to have a more complete overall understanding). Most importantly **data available to public authorities are not always sufficient to thoroughly understand flows, possible presence and reasons for major intermodal imbalances** and therefore, of limited use when making strategic policy choices at regional level. Modelled data may make up for the lack of information but require major data collection efforts and modelling exercises that should be repeated regularly for the information to remain current.
- **Flows of empty containers depend often on several concurring factors and in some cases are due to the structure of the trade in and out of an area.** This suggests that **a better understanding of the flows of empties should not be sought in isolation.** The entry point to understand such flows (and the others involved in intermodal transport) should therefore be a regional analysis of import, manufacturing and export activities of each single area, with a focus on the transport needs of the supplies and the outputs. Then **the network of terminals and operators active in the area is important in determining the actual container flows, as well as their connections out of the area of interest, for instance to the seaports.** In fact, it was clear that directions of flows in some regions depend on which is the first and the last call in Europe of ocean-going containerships and at the same time on the manufacturing structure of the regions . **This kind of knowledge requires pooling trade, regional economics and transport expertise.** Moreover due to the possibility that trade lanes used by transport flow change over time, understanding of flows should be achieved with an approach that allows for **continuous inflow of information.** This could be best achieved with a participatory approach thus by involving the operators directly.
- Further to the consideration above, from some dialogue events it appeared that operators have limited occasions to meet, discuss and convey issues, needs and information to the public administration. In order to gain, in successive steps, the knowledge base that is missing about intermodal flows, the possible relevant inefficiencies, and to have a first feedback on the room for work with the public administration, **we suggest that meeting occasions for regional discussion on logistics are promoted and kept going on a regular schedule.** They would be the occasion for structured dialogue between logistics

operators and local authorities. On the one hand local authorities would be able to gain knowledge of the sector, to feed into planning actions and local projects. They could also be the occasion to start interactions to put forward local needs to global operators (a case in the literature proved that is this approach may bear good results). On the other hand there should be a return also for operators, that could start with the involvement in local projects.

- Regular occasions to meet stakeholders should also involve the shippers, possibly, via their associations. It was noted at some dialogue events that **shippers, if clustered, could influence decisions made at logistics level and foster added efficiency of local operations.**
- **Local knowledge as developed during regular dialogue events could be scaled up thanks to the macro-regional dimension of EUSALP.** Operators at dialogue events noted the international dimension of their business and the need to network, for instance, with terminals across the borders to provide effective services. EUSALP (and the relevant EGTCs) could provide the macro-regional meeting occasions to develop joint strategies.
- A way to act on fostering further efficiency of local logistics operations, pursuing balanced flows could be to work along lines similar to those of **the Chemultimodal³ Interreg project that, thanks to the involvement of local authorities and associations of manufacturers and logistics operators, provided occasions for manufacturers to explore different ways of transporting their goods.** In Chemultimodal the aim was to switch from road to less carbon intensive modes. The objective of a new project could be to try and foster the balance of loaded intermodal transport units moving in and out of a region. However, it is recommended that the idea is discussed at dialogue events and reviewed considering the potential to actually have goods that may use the same containers in and out of a region. Ultimately the results sought could also be a lower carbon footprint of logistics in an area.
- It should be underlined that a key element of attention for many stakeholders at dialogue events was **infrastructure**: terminal infrastructure as well as roads and railways. **Local projects**, perhaps joined in an international umbrella project, **could explore ways for operators that are in competition to share terminal infrastructure where space available is limited.** This could be for instance the case of a depot of empties in Tyrol.
- **Issues with limited availability of rail infrastructure** –and with conflicting needs of passenger traffic- are likely to increase due to the shift to rail transport that is being pursued and which trade data indicate as possible. These are issues **that may be collected by regional administrations during regular discussions on logistics and then conveyed at national and European corridor level.**

³ Project website: <https://www.interreg-central.eu/Content.Node/ChemMultimodal.html>

10. References

The present section lists the reference material used to carry out the study.

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