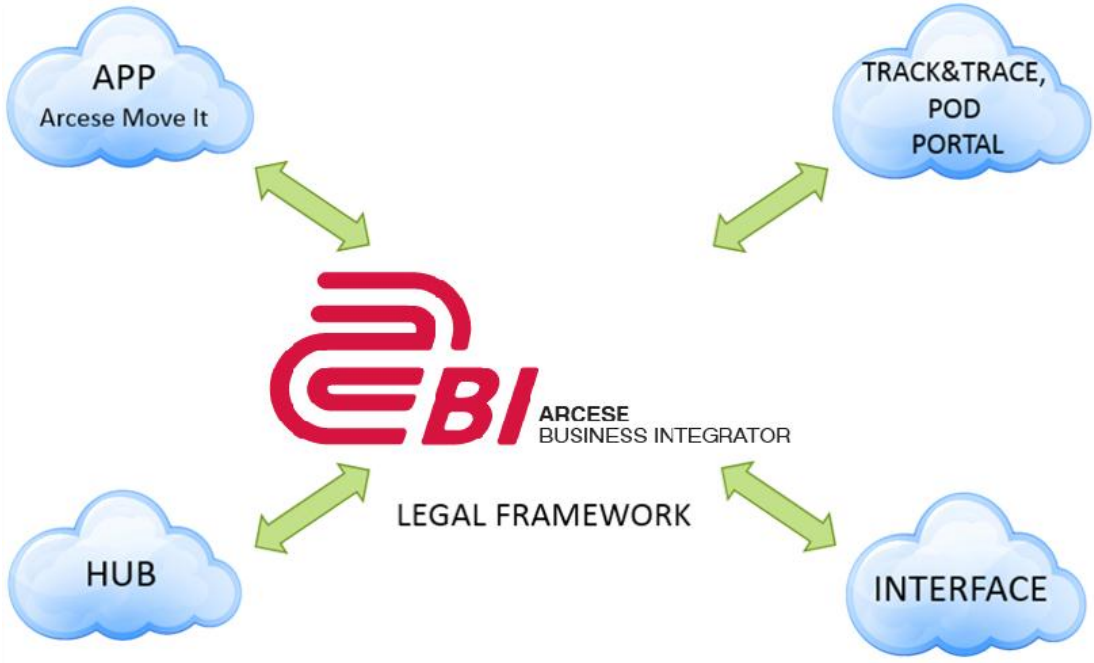
# NeTrust

## Intermodal Demonstrator

## Optimizing supplier planning and real-time shipments through trusted collaboration

### *ABI – Arcese Collaboration Business Integrator*

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## Executive Summary

The general objective of the NexTrust research project is to demonstrate how to improve sustainability through an innovative approach where trusted collaboration is the solid business model and basis. The NexTrust intermodal pilot case by Arcese in particular is demonstrating the high potential of enhancements through collaboration for *real time* freight execution.

The question was to find the appropriate collaboration business model for a supplier network which has a contractual relationship with more than thousands small and medium-sized enterprises (SME). These contracted SME's are involved in the daily execution of freight shipments for Arcese in a safe and reliable way.

The main goals of the NexTrust Intermodal Demonstrator were the following:

> Goal (1): *How to optimize the supplier planning and real-time shipment of Full-truck-loads (FTL) across Europe through the innovative approach of trusted collaboration?*
>
> Goal (2): *How technically to collaborate horizontally with more than 1000 carriers of small and medium-sized enterprises (SMEs) to make intermodal freight transportation more competitive and attractive?*

The starting point of the research are the fact, that today the execution of transporting freight flows is already supported by *Information and communication technologies (short ICT).* The key technological component is the "transport management system" *(TMS).* The TMS is the technological facilitator between an Order Management System *(OMS)* for the booking of the actual freight execution and the Distribution Center *(DC)* of the shipper or retailer.

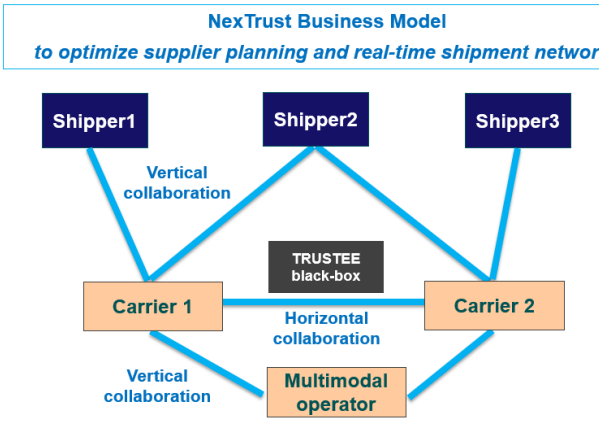
However, the challenge today in the European logistic market is, that not yet every transport stakeholder has an ICT support platform and if, then it is a customized and tailor-made ICT environment. There is no technical collaboration and the IT tools are not connected enough to be able to communicate efficiently during the planning and real time freight transport execution.

This is a major logistic challenge and is leading to a lack of visibility of the actual and real time transportation flows, which is causing in consequence significant inefficiency with a negative impact on the sustainability, in forms of empty mileages and waiting times.

The inefficiency in the execution of freight transport is even more complex in the context of *intermodal* transportation, which involves much more stakeholders and is much more complex in the technical set up than a pure road transport execution. Intermodal freight transportation needs several carriers for the first and last mile delivery from origin/destination to the rail terminals. Intermodal rail transportation needs a railway undertaking to set up the train across different national rail systems from terminal to terminal with locomotives, wagons, loco drivers, track charges. Within NexTrust, Arcese was know tackling these challenges and needs.

As a first result it emerged that in order to improve the inefficient situation, there is a requirement for collaboration, which addresses different supply chain level. On the one hand, the collaboration with multiple suppliers horizontally, but on the other hand at the same time

also vertically with the customers (shippers) upstream and multimodal operators, downstream, as visualized in the figure below.




The research results demonstrated, that horizontal and vertical collaboration is a corner stone for success in order to build *trust* in a sustainable supply chain network with multiple stakeholders.

Horizontal collaboration with sub-contractors and partners is fundamental in order to share risks and provide efficiency in the vertical relationship with customers.

Key component for the innovative business model is to understand how to build a ***trust environment*** with these entities which can increase the efficiency in the freight transport execution. In the same time, the collaboration must be EU competition law compliant. That means any commercial sensitive information shall not be shared with direct competitors also for legal compliance rules, detailed information shall be also not shared at all with non-competitors, as this could also lead to legal issues.

As a second result, the NexTrust intermodal pilot case by Arcese demonstrated the high potential of enhancements through collaboration for *real time* freight execution. Arcese established a technical “black box” in order to integrate the thousands of SME sized carriers in a legally compliant way.

Arcese developed a trusted ICT blackbox called **“ABI”** (**Arcese Collaboration Business Integrator.** ABI is based on the NexTrust business model, which was added to the Intermodal supplier network and guaranteeing a more competitive intermodal business focusing on the technical integration between the collaborating partners.

ABI ARCESE BUSINESS INTEGRATOR

ABI is the first main milestone for European carriers in order to create a collaboration and integration environment with the suppliers involved in the execution of freight flows.

The main findings of the successful research activities are many fold.

- ✓ Collaboration is an important element in supporting to tackle the inefficiency in the transport execution and to gain sustainability.

- ✓ Significant Improvement of optimization capacity planning
- ✓ Enhancement of connectivity with suppliers
- ✓ Improvement of end-to-end visibility with suppliers
- ✓ Increase of trust and confidence of shipper (client), quality improvement, responding to new transportation requirements

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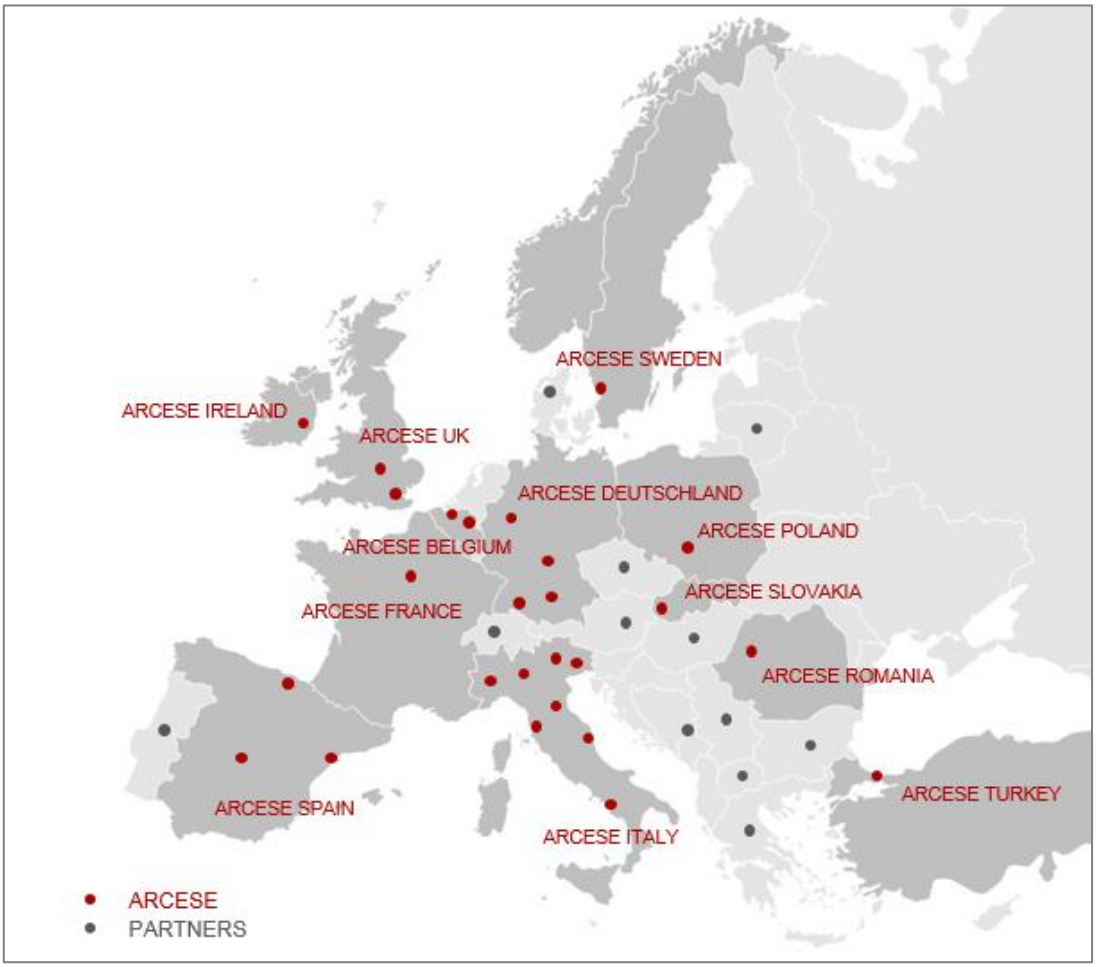
# 1 Introduction, Goal and Objective

The NexTrust Intermodal Demonstrator is accomplished by the European logistic service provider Arcese Trasporti (short “Arcese”). The research and innovation activities of the demonstrator are tackling the inefficiency in the execution of freight transport which is caused by a lack of collaboration between the parties, which in itself is leading to a lack of visibility and communication among the players involved in the freight transportation.

Arcese was established in the year 1966 and evolved from a transport company into an advanced European logistics operator, providing integrated services covering the entire supply chain and transport sector across Europe.

The Arcese Group counts on a solid transport network with branches all over Europe, a property owned fleet of 500 trucks equipped with on board system and 2,200 trailers equipped with GPS tracking devices. This fleet and more than 500,000 $m^2$ of warehouse makes Arcese to one of the largest private logistics operators in Italy and Europe. Annually, it carries out 150,000 Full-truck-Loads (FTL) and 1,900,000 Less-than-Truck-Loads (LTL) shipments.

## 1.1 Arcese presence across Europe



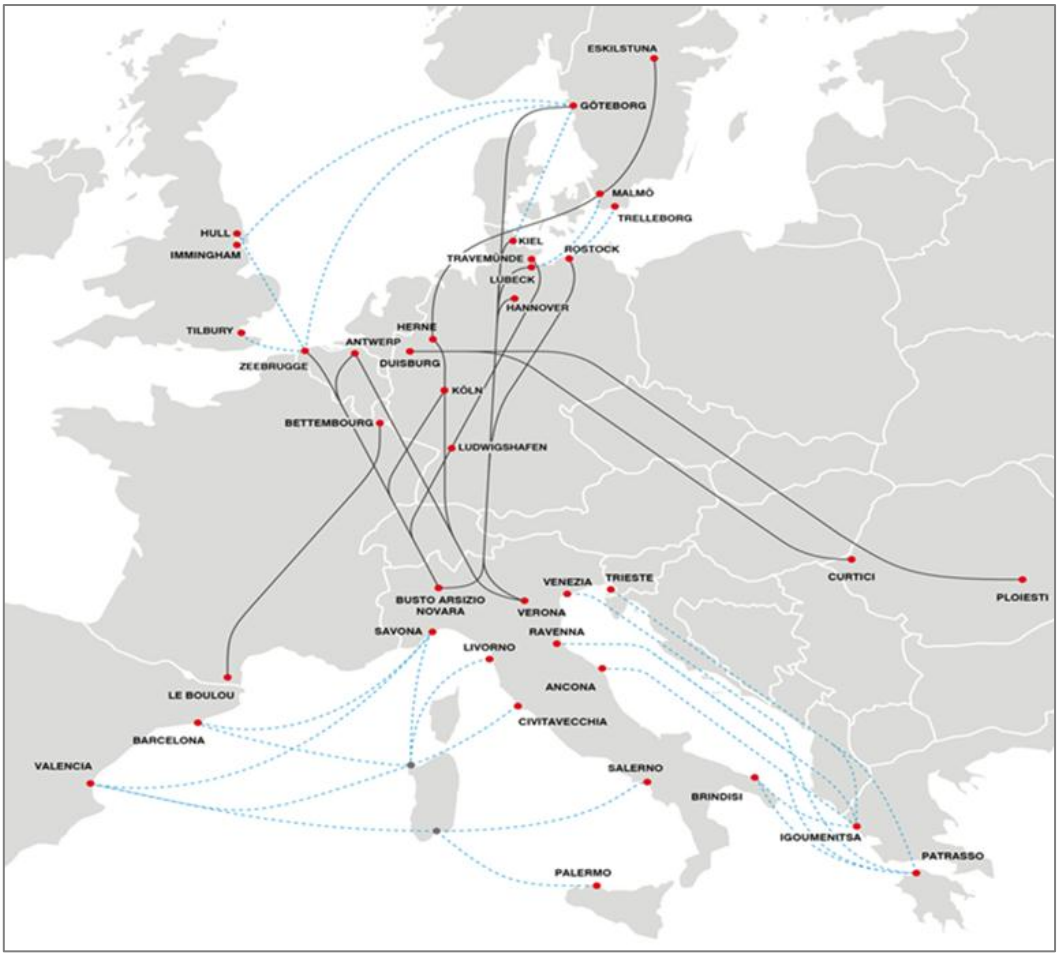
Arcese has a large customer number from different sectors, in particular the sector of Automotive, Chemical, Consumer, Food & Beverage, Industry, Paper, Technology, Textile and Fashion.

## 1.2 Intermodal Transport Network within the Demonstrator

Over the last ten year, Arcese also increased the intermodal services *from 7 % to 40%.* Today intermodal transportation is an integral part of the Arcese FTL network.

In 2017, Arcese had 45 multimodal freight lanes running across seven TEN-T core network corridors and 4 motorways of the sea. The main TEN-T corridors involved are *Scandinavian-Mediterranean, Rhine-Danube, Rhine-Alpine, Orient-East-Med, Mediterranean, North-Sea Mediterranean, North-Sea Baltic.* Main flows include six countries connected with daily departures: Italy, Germany, Benelux, UK, Sweden and Romania.

The current intermodal network by Arcese is visualized in the map below. Indicating rail and short sea connections.




*Arcese intermodal network (status 2017)*

## 1.3 Main objective and goal of the Demonstrator

The general objective of the NexTrust research project is to demonstrate how to improve sustainability through an innovative approach where trusted collaboration is the solid business model and basis. The NexTrust intermodal pilot case by Arcese in particular is demonstrating the high potential of enhancements through collaboration for *real time* freight execution.

The focus of the research was to find the appropriate collaboration business model for a supplier network of more than thousands small and medium-sized enterprises (SME), who are involved in executing for the customers of Arcese the freight shipments in a safe and reliable way. The SME sized carriers have usually its own fleet consisting of 1 to 20 truck vehicles with its own truck driver. The equipment asset, where the goods of the customers are loaded, are owned by Arcese itself. The main equipment type by Arcese are semi-trailer or containers in the FTL Arcese transport network.

**Goal of the NexTrust Intermodal Demonstrator**
*(internal pilot case 3.4)*

***(1) How to optimize the supplier planning and real-time shipment of Full-truck-loads (FTL) across Europe through the innovative approach of trusted collaboration?***

***(2) How technically to collaborate horizontally with more than 1000 carriers of small and medium-sized enterprises (SMEs) to make the intermodal freight transportation more competitive and attractive?***

# 2 General Description, including Need and Problems

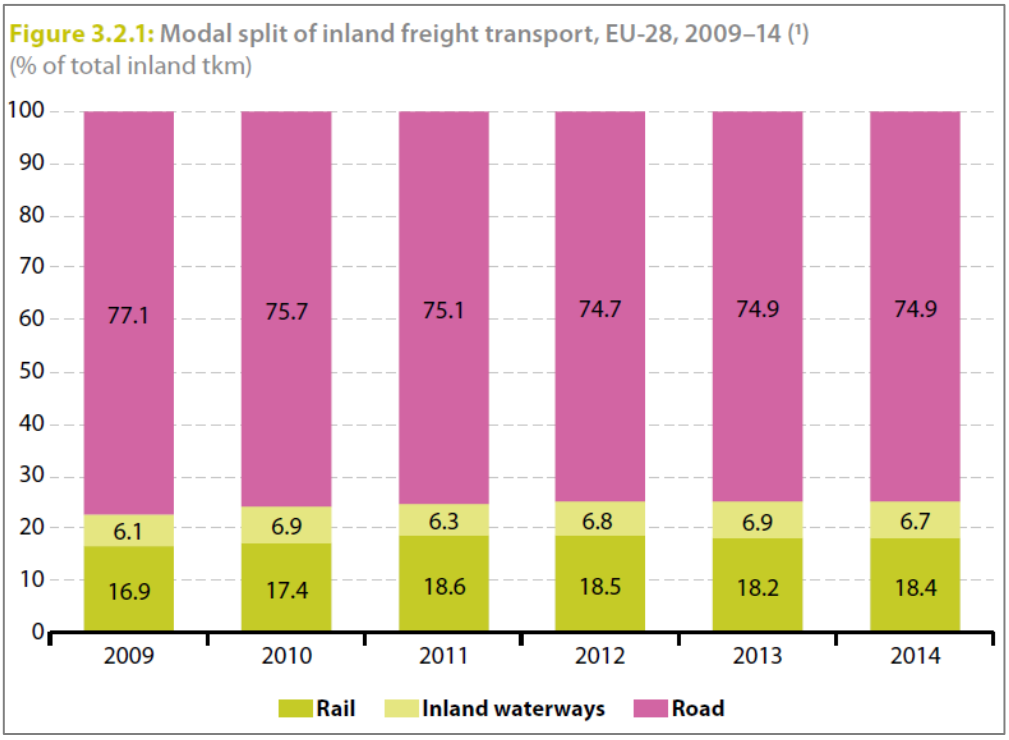
The NexTrust project is tackling the greenhouse gas (GHG) emissions problem with an innovative business model which facilitates trusted collaboration in transportation to increase efficiency and sustainability in European logistics.

The here presented research report of the intermodal demonstrator focusses on the transportation of “Full-truck-loads” (FTL), which are transporting freight from production plants to warehouses or shipping raw material to production plants across Europe. The overall situation today is that the FTLs are transported mainly via road causing high levels of GHG. Shifting the road freight to the environmental railway transportation mode could cut GHG emissions significantly.

## 2.1 Road the dominant freight transportation mode

Latest transportation statistic by EUROSTAT shows the huge potential of shifting freight off the road. Among the land transport modes in Europe for freight, road transportation continues to account for the biggest share with about 75% causing 411 Billion Tonne-Kilometers (TKM) in the EU. This share has remained almost unchanged since 2009.

Railway’s share of the freight transport market is steady and low with around 18%. While freight will probably continue to be transported by truck when it comes to short distances, freight transportation over medium and long distances can be shifted to the rail mode to increase the environmental sustainability of the European Transport System.



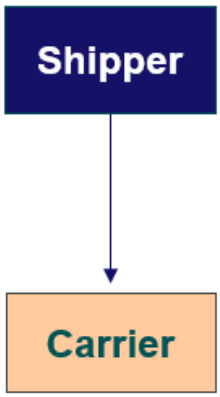

*Source:* Eurostat: “Energy, transport and environment indicators”, 2016 edition, ISBN 978-92-79-60137-8, page 101

## 2.2 The current business model framework for freight transportation

The shippers (manufacturing companies) are buying through regular tender and procurement processes from different carriers the transportation services for the produced goods for a dedicated time.

### 2.2.1 The transport quality parameters

Once the shippers have purchased transportation capacity, the selected and agreed carrier must execute the transportation from origin to destination in a given transit time and follow defined *quality parameters*, which are part of the contractual transport agreement.




**Examples of requested quality parameters by the shippers:**

- *Loading/unloading with time windows and slots, transit time*
- *Procedures for loading/unloading and exceptional anomalies management (e.g. damages, accidents, etc…)*
- *equipment requirements of the loading unit (length, height, temperature controlled, pallets, double deck, tank, side loading etc.)*
- *security, safety standards & sector certification (e.g. chemicals, beverages)*
- *conformity with national and EU legislation (e.g. EU driving time and rest periods)*
- *traceability requirements to follow the freight flow execution in real time*

### 2.2.2 ICT support for freight transport execution

The execution of transporting freight flows is supported today by ICT *(Information and communication technology)* and in particular through transport management systems *(TMS).* The TMS are facilitating the interactions between an Order Management System *(OMS)* for the booking of the actual freight execution and the Distribution Center *(DC)* of the shipper or retailer.

The ICT shall support in particular the current planning process of transport order management to meet customer requirements for the execution of freight flows. Generally, each customer contacts an Arcese reference branch to request a specific service and the branch is in charge of conducting the business and start the execution of the freight services.

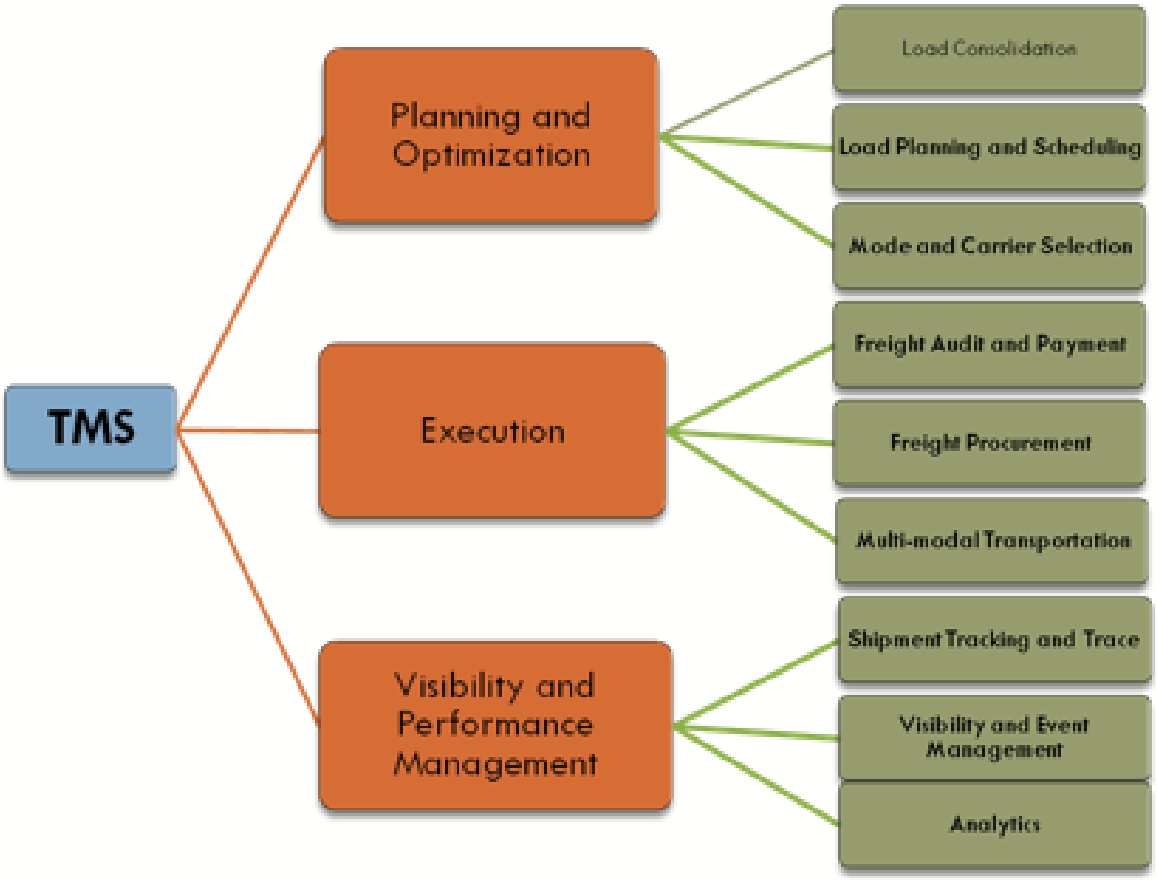
The customer request, is received through different nature channels (e-mail, phone, EDI) and are transferred to the corporate Enterprise resource planning (ERP) in order to generate several execution elements (e.g. Pick up, Shipment) that drive the entire transport process.

The ‘as-is’ situation of transport order management process is general as following:

a. Order cut-off time: cut-off hour for the receiving of transport order is 4pm on a Thursday for the following week. (Planning)

b. Pre-planning: an initial estimated time planning is made for the pickup and the delivery of goods. (Planning)
c. This estimated time of pickup and delivery must be updated with real time planning and delivery during the execution of the transport order (Execution)
d. Once the goods are delivered, the order must be followed up (traceability and monitoring of the consignment), including the proof of delivery (POD) (Execution).
   Today the POD handover takes place with considerable delay and is a manual process.

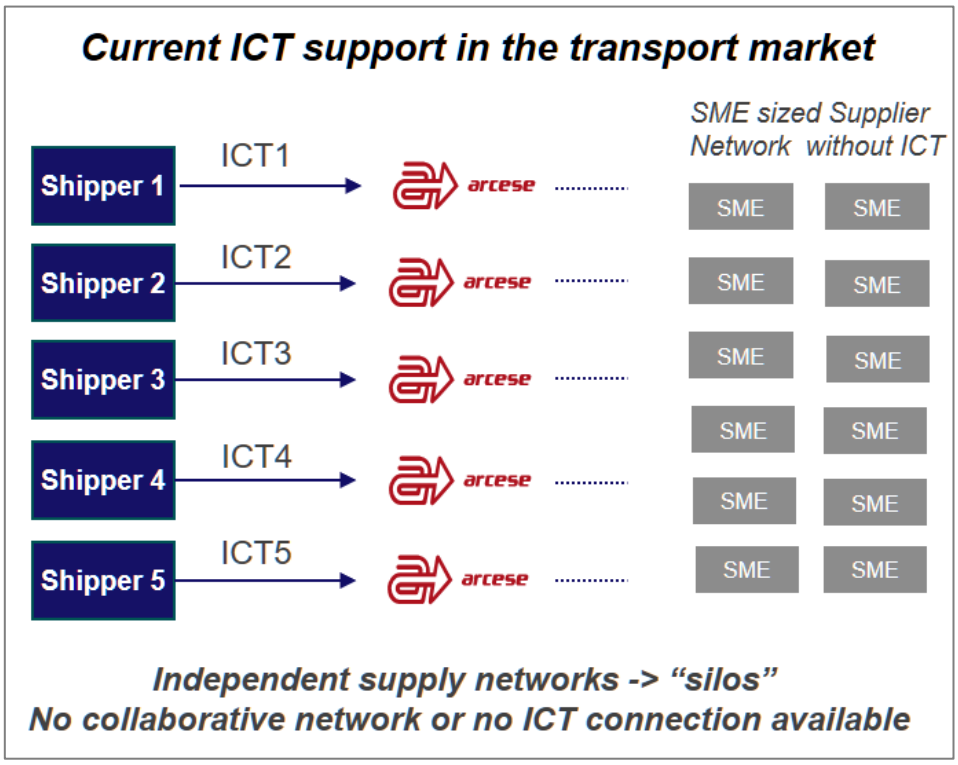
To understand more the ICT supporting function, we visualize one example of a TMS platform and its potential functionalities to support the entire process how it looks today in the market.




### 2.2.3 The problems with the current ICT support in the transport market

However, the challenge today in the European logistic market is, that not yet every transport stakeholder has an ICT support platform and if, then it is a customized and tailor-made ICT environment. There is no technical collaboration and the IT tools are not connected enough to be able to communicate efficiently during the planning and real time freight transport execution.

This is a major logistic challenge and is leading to a lack of visibility of the actual and real time transportation flows, which is causing in consequence significant inefficiency with a negative impact on the sustainability, in forms empty mileages and waiting times.

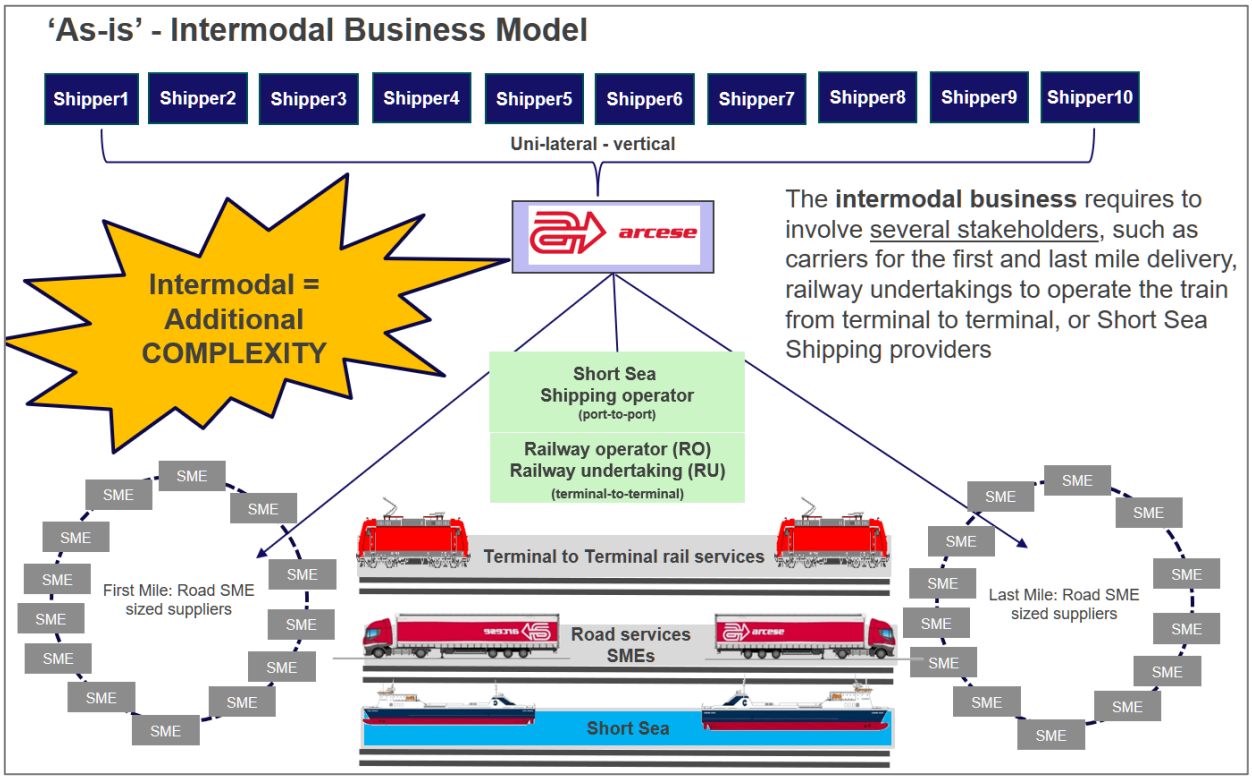



## 2.3 Complexity of the intermodal freight transportation system

The inefficiency in the execution of freight transport is even more complex in the context of *intermodal* transportation, which involves much more stakeholders and is much more complex in the technical set up than a pure road transport execution. Intermodal freight transportation needs several carriers for the first and last mile delivery from origin/destination to the rail terminals. Intermodal rail transportation needs a railway undertaking to set up the train across different national rail systems from terminal to terminal with locomotives, wagons, loco drivers, track charges.

The diagram on the next page visualizes the complexity on a general level.

The rail freight production from terminal to terminal itself, has its own complexity, which is not addressed further in this demonstrator report, but is also leading to some of the inefficiency in the intermodal transportation sector.




The NexTrust intermodal demonstrator by Arcese is involving more than 1000 SMEs sized carriers as suppliers of Arcese for the freight transport execution for the first and last mile delivery.

MULTIMODAL SUPPLIERS

| No | Intermodal Supplier | Short Description | Transport Mode |
|---|---|---|---|
| 1 | CEMAT | Established in 1953 in Milan (IT), CEMAT is specialized in Road-Rail Combined Transport. It is the biggest Intermodal Operator in the country and, connecting more than 150 intermodal terminals throughout Europe, is the third Intermodal Operator in the Old Continent. | Rail |
| 2 | HUPAC | Founded in 1967 in Chiasso (CH), HUPAC is Europe's leading intermodal network operator. Modal shift and environment protection is the focal point of the company making them innovative and reliable on rail transport services. Their network comprises connections between the main European economic areas to destinations as distant as Russia and the Far East. | Rail |
| 3 | TXLOGISTIK | Founded in 1999 in Bad Honnef (DE), Tx Logistik is one of the largest rail transport companies in Europe. The company moves more than 20,000 trains a year from Germany through Europe offering freight transport concepts and industry-specific customized solutions. | Rail |
| 4 | compagnia ferroviaria italiana | Established in 2007 in Rome (IT) CFI is now one of the leading players in the Italian rail transport industry thanks to its modern and reliable locomotives. CFI counts on a widespread network that covers all the Italian routes. Connecting harbors, industrial districts and intermodal terminals. | Rail |
| 5 | P&O FERRIES | P&O Ferries is a company with over 40 years freight transport experience making it one of Europe's leading freight ferry operators. It carries over 1.85 million freight units a year on 9 separate routes between UK and Ireland, Belgium, Holland, France. | Short Sea Shipping |
| 6 | GRIMALDI GROUP | Established in 1947 in Naples (IT), Grimaldi is a fully integrated multinational logistics Group specialized in maritime transport of cars, rolling cargo and containers. The company counts on subsidiary companies and branches located in 25 country all over the world. | Short Sea Shipping |

Additionally, the railway or sea mode is involving leading European suppliers in the multimodal sector, such as:

- Railway Operators: CEMAT, HUPAC, CFI and TX Logistik
- Short Sea Shipping: P&O and Grimaldi

## 2.4 Practical Problems for the planning and real-time freight management

In practical terms, the planning of the various suppliers on road, rail, sea and the quantity of thousands of suppliers presents several problems and inefficiencies:

- The position of trucks are unknown and it affects the correct and appropriate planning
- The transport orders and communication is not efficient as it mainly organized via phone or e-mail communication.
- In the execution phase of the order there is no traceability of dynamic events, such as technical problems or congestions on the road.
- There are long waiting times, at least a month, to receive the transport documents.

From the planning perspective the current scenario creates a large number of empty mileage and waiting times on the European roads. This situation is due to lack of collaboration, visibility in real time and difficulties to have an efficient multi-provider integration.

The reduction of empty mileage is fundamental in order to have a load planning optimization. In some cases, there are also low utilizations of trucks like:

- Two trucks on same relation with low utilization
- Multiple trucks with different origin and same destination and low utilization
- Multiple trucks with same origin and different destinations and low utilization

From a communication point of view, the difficulties to send transport orders lead to incorrect routings with significant delays. The lack of traceability contributes to weaken both the planning phase (fewer possibilities to optimize the transport) and the services offered to the customer. Some customers require complete traceability (end-to-end) and if Arcese cannot guarantee this service there is no possibility to increase multimodal transport solutions and to have a more efficient and sustainable planning.

## 2.5 Summary of major inefficiency constraints

**Major inefficiency constraints and need for innovation:**

1) Inefficiency in the transport execution, leading to non-optimized capacity planning
2) lack of connected communication
3) fulfilling new and increasing quality requirements by customers
4) «common» IT tools (TMS), electronic data interchange (EDI), Track & Trace, proof of delivery (POD), telematics are not connected
5) «common» IT tools are not complete on information level, offering different level of information services, lack of uniformed global vision (i.g. track & trace event information missing, real time link to documentation), due to liberal market conditions and competition
6) traceability: lack of visibility of the actual and real time transportation
7) lack of trusted legal framework, barrier of mistrust
8) Additionally, Arcese business model changed from road transportation to intermodal network, which is facing more complexity, non-flexibility, and requires to work with a lot of stakeholders and suppliers to produce intermodal transportation

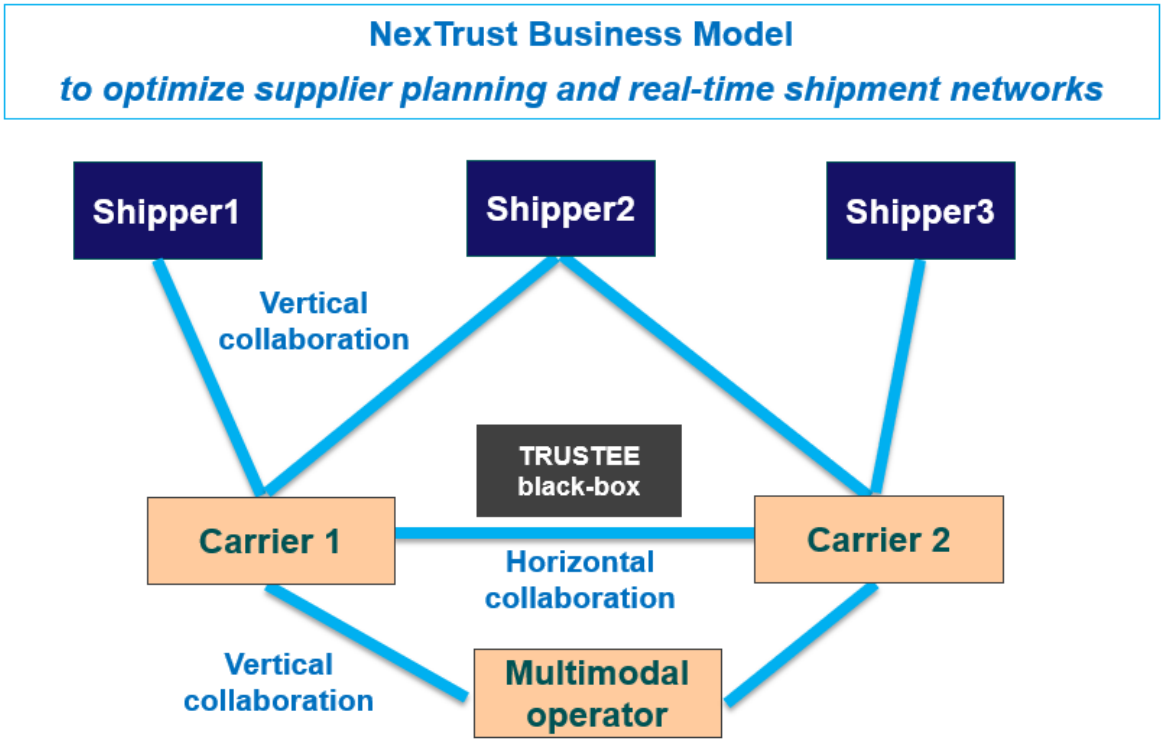
# 3 Application of NexTrust Business Model

## 3.1 The trusted collaboration business model

The research activities looked into the appropriate business model of NexTrust to understand how with a new and innovative way of trusted collaboration, the supplier planning and real-time shipments could be optimized.

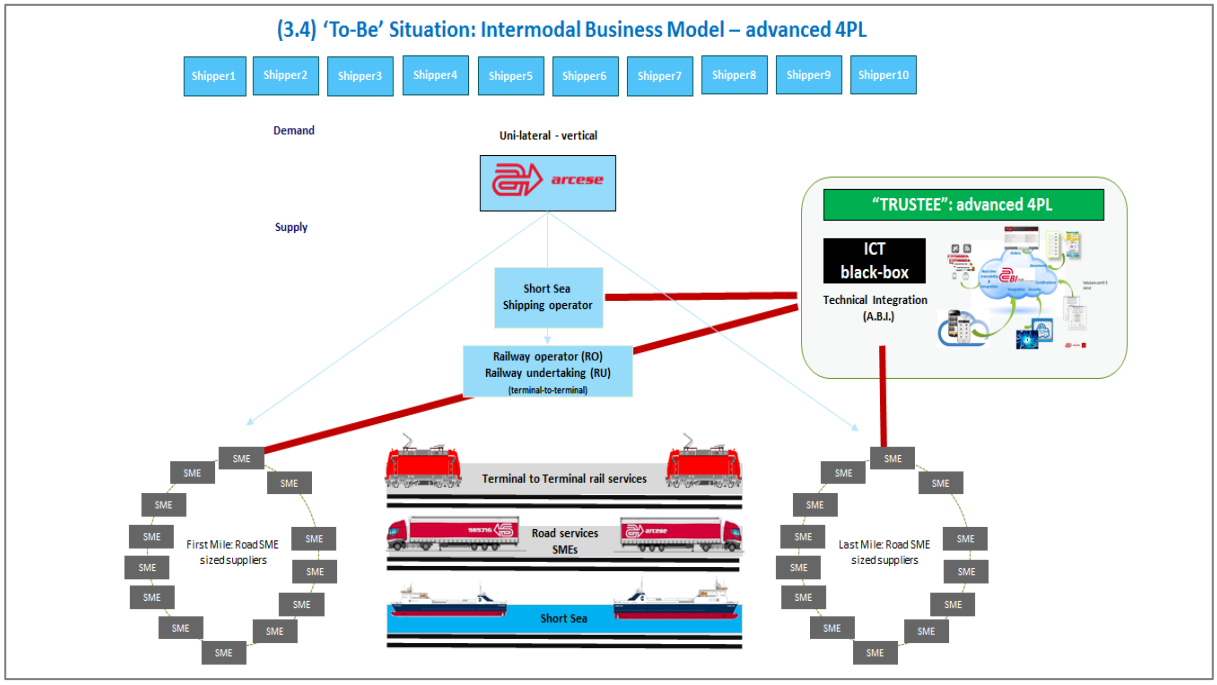
It emerged that for the improvement of the above described inefficiency situation, Arcese as lead logistic provider needs to collaborate with the multiple suppliers horizontally, but in the same time also vertically with the customers (shippers) and with the multimodal operators.

Horizontal and Vertical Collaboration is a corner stone in order to build trust in a sustainable supply chain network with multiple stakeholders. Horizontal collaboration with subcontractors and partners is fundamental in order to share risks and provide efficiency in the vertical relationship with customers.




Key component for the innovative business model is to understand how to build a ***trust environment*** with these entities which can increase the efficiency in the freight transport execution. In the same time, the collaboration must be EU competition law compliant. That means any commercial sensitive information shall be not shared with direct competitors also for legal compliance rules, detailed information shall be also not shared at all with non-competitors, as this could also lead to legal issues.

Therefore it emerged that it is essential to setup a business model where Arcese as lead logistic provider function as “trustee” and establishes a “black-box” for commercial sensitive information, which cannot share commercially sensitive information among the stakeholders. The trusted black box must be in the case of planning and real-time transport shipments supported by technical solution. The collaboration in practical terms consequently is aiming to *technical integrate* SME sized carriers and multimodal operators. The trusted ICT box shall enable to overcome the inefficiency in the planning and real time transport execution by addressing missing important IT functionalities and components, which addresses customer required specifications to collaborate efficiently.




## 3.2 The 3-step-methodology

The NexTrust demonstrator conducted its research activities following the 3-step methodology of the project.

**Step 1) Identification** → **Step 2) Preparation** → **Step 3) Operation**

First step activities focused on the identification of the freight flows, the technical set up and the management process to address the inefficiency and need for trusted collaboration. The Identification Phase aimed to analyze the as-is situation, create the network, match the opportunities and define the benefits.

The second step prepared the actual implementation of the demonstrator in real live conditions to conclude essential learnings for the project and beyond. The preparation phase has put the opportunities in place through the technical implementation of the trusted cloud and real-time components. This phase included the selection of suppliers with appropriate ICT technologies, the

programming and integration of the trusted cloud and the training for planners, truck drivers and selected suppliers.

The third step and last phase, aimed to start the management of the daily collaboration for planning and real time freight execution. This phase included first operational test of the trusted cloud, the review of the first results and the update of the trusted cloud and components if needed, second operational test of the trusted cloud in real market environment (execution) and finally the validation and external audit of the operated pilot case.

The demonstrator pilot case 3.4 is based on the existing supplier network of the European logistic service provider Arcese. The geographical scope of the shipments are across Europe with particular usage in Italy, Spain, UK, Germany, Belgium, France, Netherlands, Sweden and Romania. More than 100 large European companies operating across many sectors like Automotive, Chemical, Food, Beverage, Paper, Textile, Fashion. There are more than 1000 SME sized carriers supporting the freight transport execution managed with the assets by Arcese.

In order to proceed with the technological implementation of a trusted cloud into the Arcese IT environment it occurred the need of external IT support. At first Arcese experienced team dedicated to the project planned to work only with internal resources (*make* solution), but after few weeks from the start the complexity of the project required external specialists subcontracting (*buy* solution).

In addition, the evolution speed of the IT market forced Arcese to ask for external support, in order to be fully updated with the best updated and latest IT/network solutions and lead the development into the future, acquiring external competence on very specific topics and functionalities.

The research activities were split in two areas. The first one is focusing on the technical collaboration with more than 1000 SME sized carriers, and the second one with railway operators and Short Sea Shipping companies.

The demonstrator pilot case was divided into seven pre-identified activities, with the following enumeration:

| *ACTIVITIES PILOT CASE 3.4* | |
|---|---|
| 3.4.1 | POD, T&T |
| 3.4.2 | CLAIMS |
| 3.4.3 | MULTIMODAL CEMAT + HUPAC + CFI |
| 3.4.4 | MULITMODAL TX |
| 3.4.5 | SHORT SEA SHIPPING |
| 3.4.6 | ASSET TELEMATICS INTEGRATION (CONVERGENZA) |

In practical terms, following main tasks were conducted for the implementation of the demonstrator case:

- *3.4.1 POD, T&T*
  Planning with the knowledge of the exact location of the trucks, real time visibility of the events and real time information of Proof of Delivery in order to:
  - Increase operational planning efficiency
  - Reduce the empty runs
  - Optimize trucks usage in order to reduce CO2 and congestion in communities and at the logistic nodes
  - Increase the opportunities for modal shifts

- *3.4.2. CLAIMS*
  Timely registrations of all anomalies related to the pickup and delivery of the goods provide a real time visibility and a consequence reduction of the empty runs. It also speeds up the communication between drivers and workshop of vehicle damages or breakdowns in order to be more efficient.

- *3.4.3 MULTIMODAL CEMAT + HUPAC + CFI*
  Integration with the CESAR portal for transport related information exchange between intermodal operators and their customers. Improving intermodal booking system it is possible to make the rail-road intermodal transport more attractive.

- *3.4.4 MULTIMODAL TX:*
  Integration with TX in order to have a better booking system and a complete traceability that could improve the attractiveness of rail-road intermodal transport.

- *3.4.5. SHORT SEA SHIPPING*
  Integration with shipping lines in order to have:
  - integration with the booking system
  - real time and updated information on departures/arrivals to improve the planning of trucks at terminals and reduce empty runs

- *3.4.6 ASSET TELEMATICS INTEGRATION (CONVERGENZA)*
  The implementation of a new virtual/physical solution (also defined internally as a HUB) devoted to support the management of assets of Arcese's fleet. The HUB is able to consolidate and integrate data coming from different telematics equipment and systems on board of our assets (i.e. trucks, trailers, swap bodies) in an integrated and cost efficient solution. This implementation is fundamental in order to increase knowledge about traceability (diagnostics, driving style, anomalies, driving hours). Improving the information needed for planning leads to a reduction of the empty runs

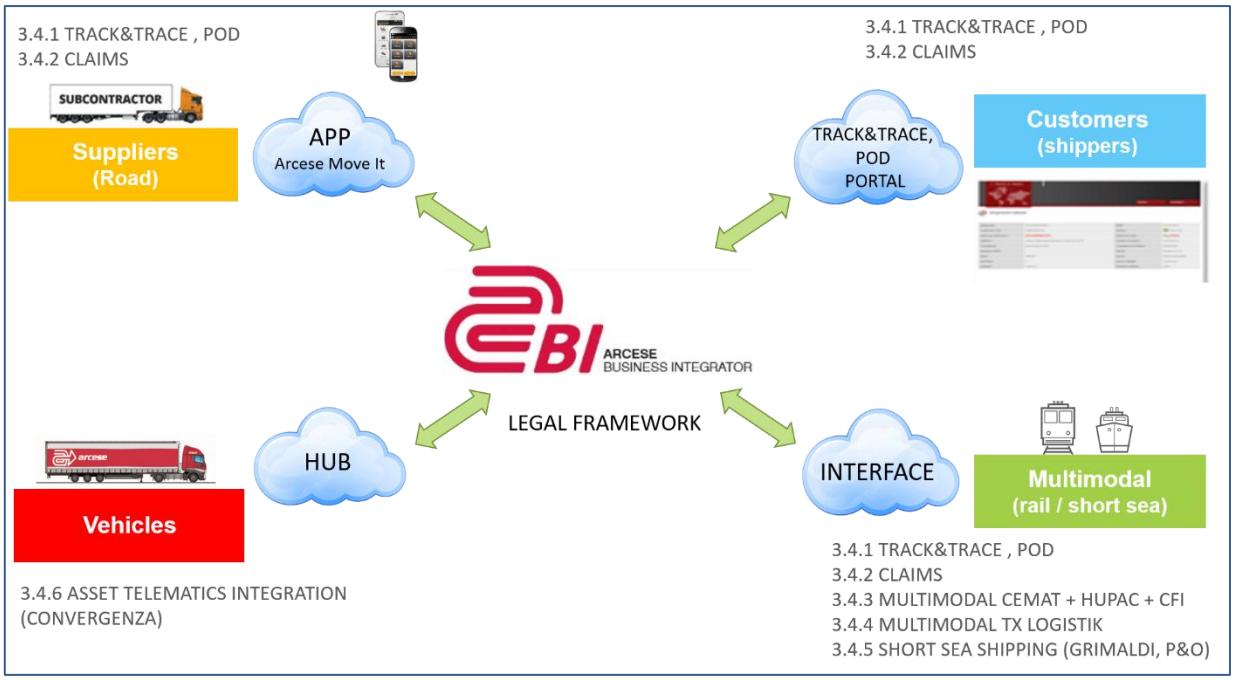
# 4 Results and Objectives demonstrated

The research application of the NexTrust business model achieved to demonstrate in which way to overcome the inefficiency in the supplier planning and real-time freight execution with trusted collaboration. Furthermore, it were validated that for a complex and multi supplier environment, a lead logistic provider can only offer more effective freight execution, if there is a technical integration level achieved, which of course is EU competition law compliant.

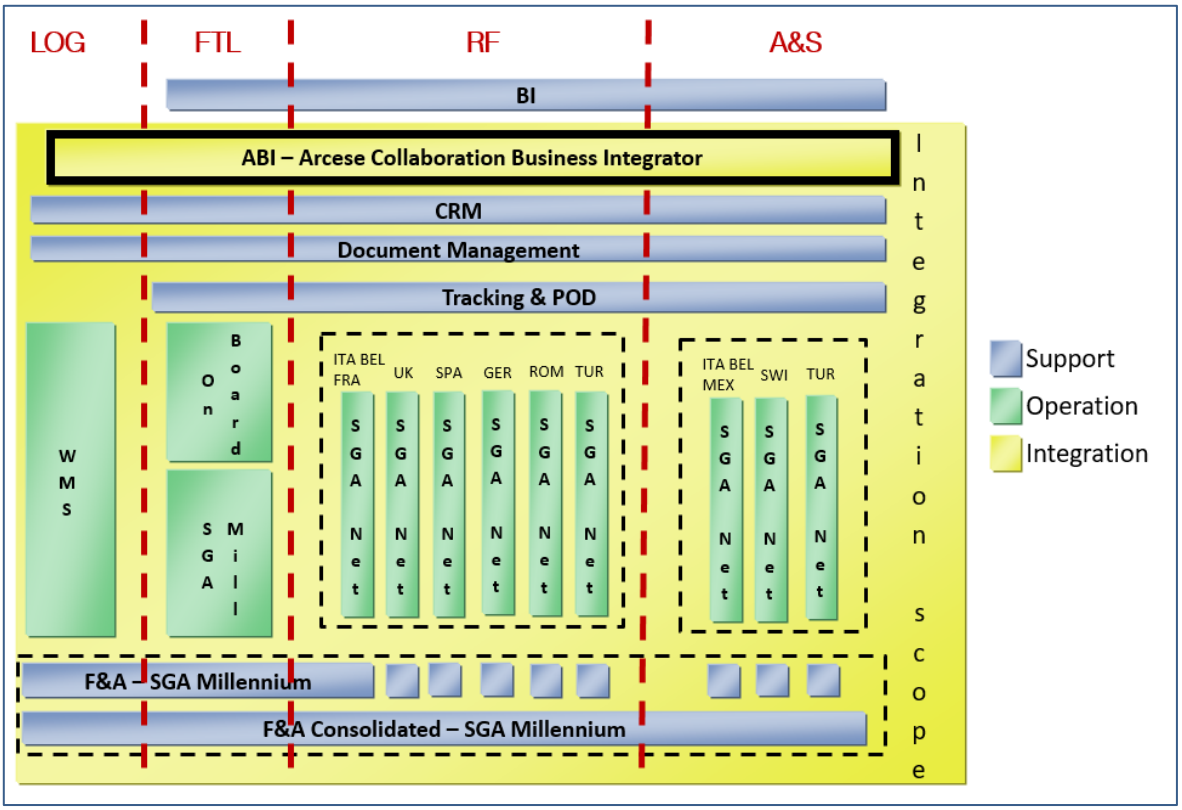
## 4.1 ABI concept: Arcese Collaboration Business Integrator

The collaboration between Arcese and its external suppliers only became possible by improving communication via a technical ICT “black box” integration; this ICT “Black Box” in our specific case was named **ABI (Arcese Collaboration Business Integrator).** The Trustee Model was added to the Intermodal supplier network and guarantees a more competitive intermodal business focusing on the technical integration between the collaborating partners, without sharing commercial sensitive information and upgrading the relationship with the SMEs suppliers through contracts that create trust.

The map below shows the activities that are now integrated in ABI – Arcese Collaboration Business Integrator

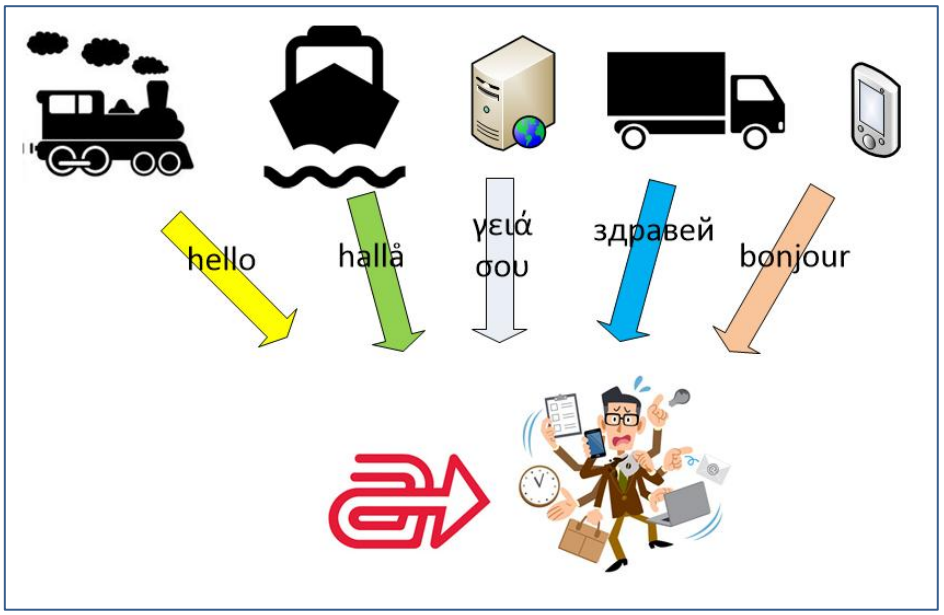



ABI is a software solution which provides a framework that put itself on top of Arcese systems architecture in order to allow Arcese to communicate with a complex network of providers, subcontractors, intermodal partners and customers. In this way, ABI enables a complete and easy collaboration with Arcese whole partner network.

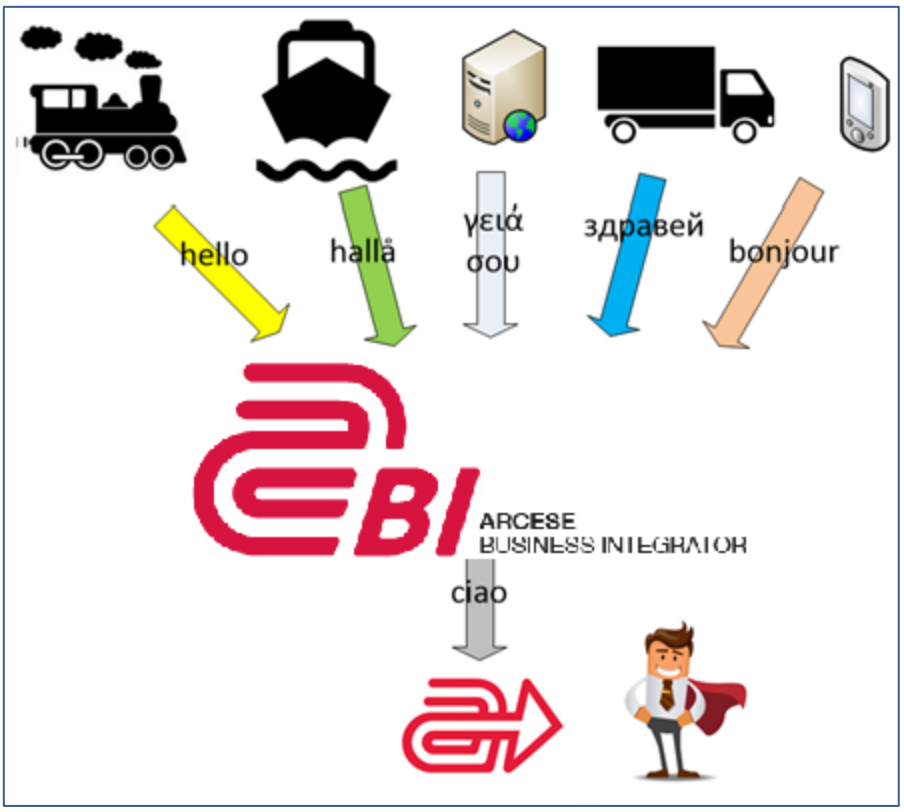



Working in this position ABI allows to normalize communication between Arcese and the external "world" of stakeholders.

The complexity of the transportation business with all the involved partners and still no fully adopted standards in communication, force a logistic provider as Arcese to manage the complexity of the communication with all involved parties (intermodal partner, geo-tracking systems, subcontractors, customers, etc), resulting in inefficiencies and possible loss of information and optimization opportunities.



ABI collocates itself in between of Arcese and all its partners in order to solve this problem and reduce all the communication complexity, giving Arcese the possibilities to handle all data received and allow Arcese dispatchers to optimize the service reducing transit times, empty mileage and CO2 emissions.




## 4.2 ABI: Technical Integration

The WP 3.4.1, 3.4.2 and 3.4.7 are divided into four different areas of improvement to achieve technical integration:

- Traceability (Track&Trace)
- Documents (POD, transportation document)

Real-time information are important in order to understand the capabilities of be compliant with the planning. For this reason, there is a strong need to improve the knowledge and the management of some information:

- Location of the truck
- Numbers of driving hours available
- What are the next steps planned
- Remote communication with the driver (missions to be executed, loading or unloading instructions)

In the execution phase it is important to have real-time visibility of the events (including anomalies) related to the shipment. By way of example: "Departed", "Arrived" and "Unloading".
Regarding documents the goal is to get real-time digital signed Proof of Delivery (POD), with the possibility to manage attachments. The documents obtained have legal validity and certify the serviced offered. The first operational test with a trusted network of selected suppliers was integrating real-time C-ITS to track and trace the proof of delivery, transportation document feedback, insurance claims of goods, and equipment conditions.

The first action in the WP 3.4 is the integration of the road subcontractors (traction haulers and agency), the main characteristics are:

- Improving the traceability of the services provided
- Improving the customer service's level
- Improving quality perception, safety and transparency of the services provided
- Improving the flows of information and documents related to the delivery process
- Obtaining documents with legal validity certifying the services offered
- Increase the level of accuracy and timeliness of all the information necessary in order to manage and close the order: in both the operational side - through the careful management of events - and the administrative side, including the issuance of the invoice for the services performed.
- Decreasing the number of working hours required to manage any disputes with customers through a transparent and timely management of the events

Traceability

- Getting and managing all shipping events along the supply chain, whatever the transportation modality (owned fleet or sub-contractors)
- Providing real time information about all deliveries of Arcese network (national/international) like date, hour and document duly signed:
    - Waiting for loading
    - Landed
    - Departed
    - Estimated Time of Arrival (ETA)
    - Arrived
    - Waiting for unloading
    - Available for pick-up
- Having complete and real time visibility on the goods' progress and position during the different transport phases:
    - Position of the vehicle
    - Landed
    - Departed
    - Estimated Time of Arrival (ETA)
    - Arrived
    - Unloading

Documents

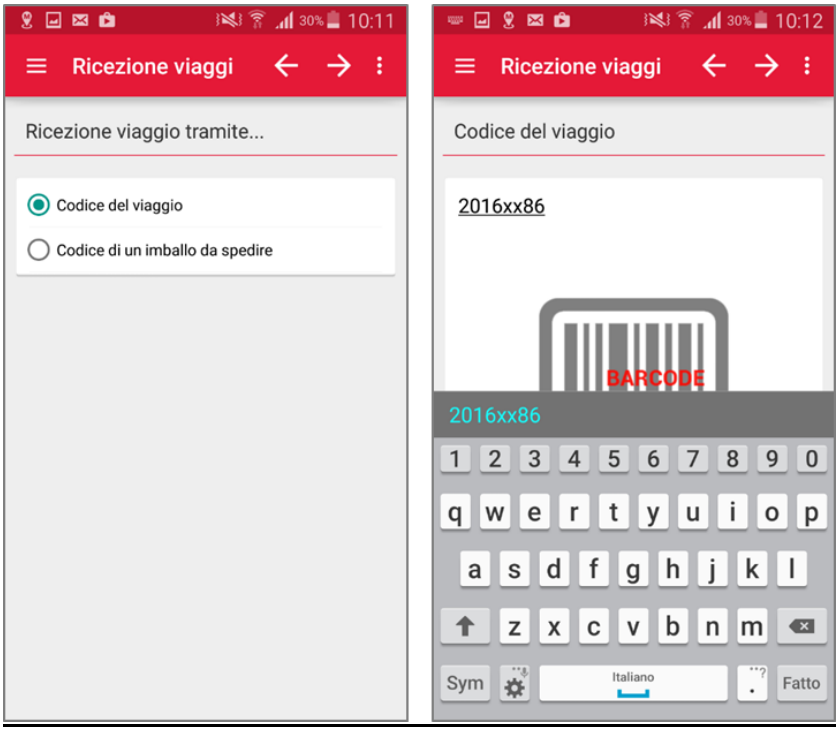
- Digit and getting real time signed Proof of Delivery (POD)
- Guarantee the highest traceability level (single parcel – label)
- Timely registration of all anomalies related to the pick-up and delivery of the goods
- Complete integration with the Arcese ERP related to the transportation modality (land, sea, air)
- Realizing a multilingual software system that can be used by all sub-contractors and commercial partners (on national/international network) without an investment on specific and specialized hardware. The general approach is based on usage of a mobile technology on smartphone/tablet devices without excluding, for operational reasons, the use of standard palmtop for «closed» distribution networks
- A solution oriented to the management of the single event with real time data
- The operating system will be easy to use by every user and on any-device and any-where application
- The operating system will be open and it will be easy to integrate with other external operating systems
- Guaranteeing multilingual support 24/7 to truck drivers

In order to implement such a system we need the support of an external software house that is able to produce the right level of technology to our needs.

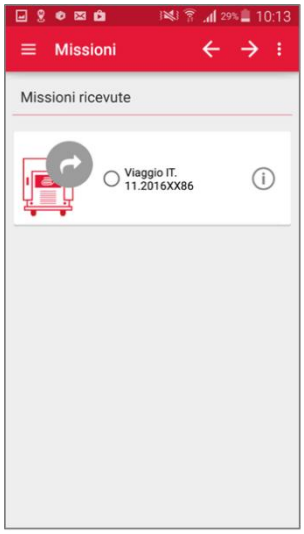
## 4.3 ABI: Demo screenshots (T&T)

Once the driver gets the Arcese Trasporti mobiie app activated, he can:

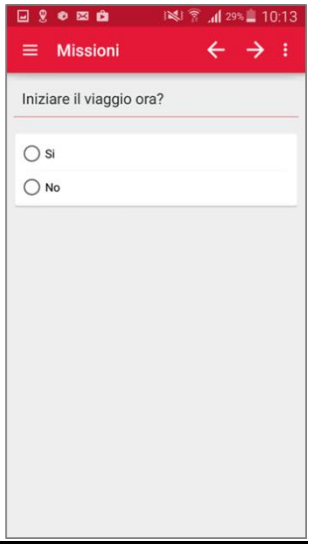
- Receive a trip



- Select and execute a mission







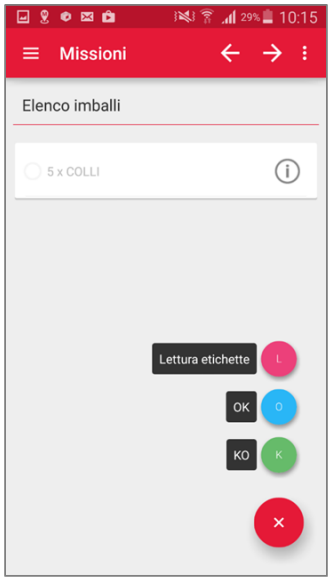

- See the stops and all the operations that should be completed in every place (such as load, unload, repositioning of goods, etc.)

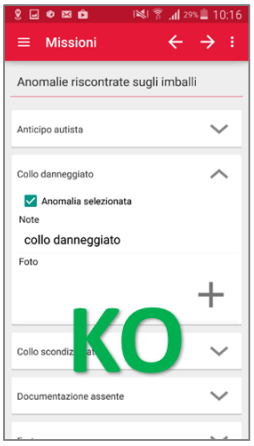


- Read the label (by scanning it) on the packaging to receive a trip



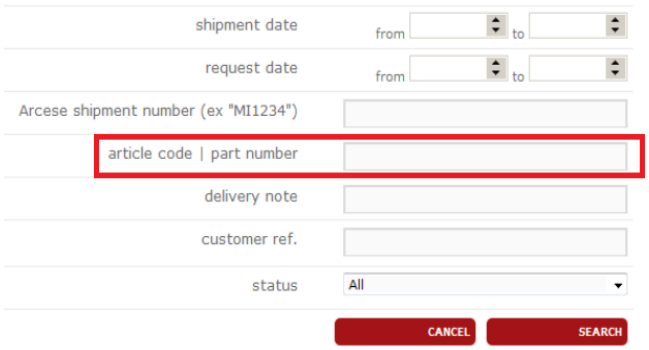

Arcese app allows the driver to record any single parcel. Parcel tracking is possible due to scanning the labels that report a barcode printed according to the GS1 standard.
In general, operation completions or failures can of course be tracked by the app and sent back to Arcese ERPs, as well as the geographic positions.

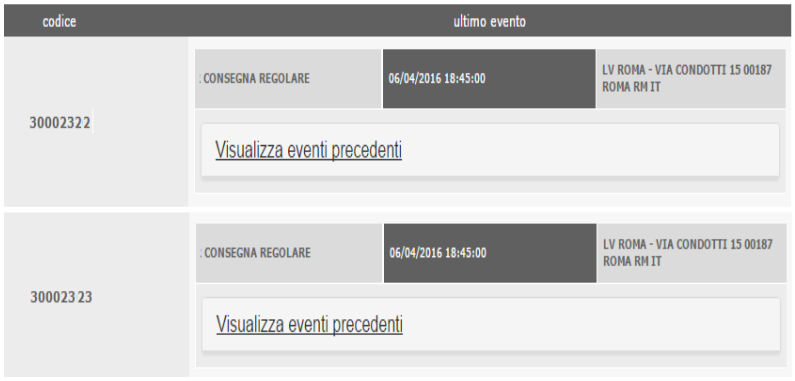

## Transport organization

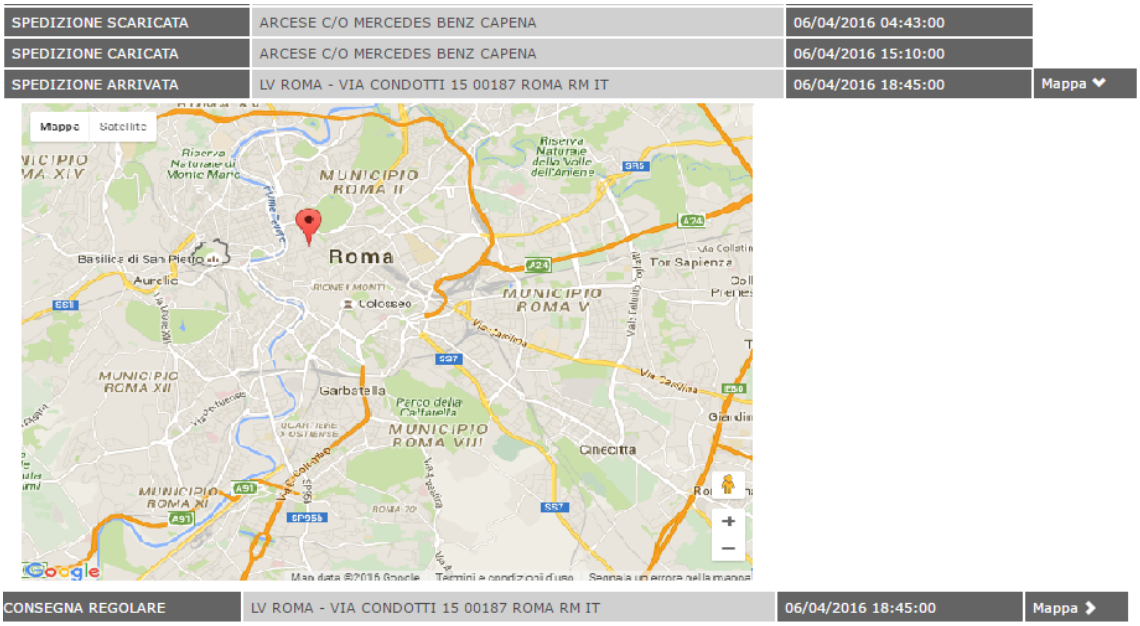
With Arcese Trasporti, customers (shippers) can search for freight using the barcode of a single item contained in the shipments. They reduce the amount of emails, faxes and telephone calls.




## Transport organization

While our operations team organizes the shipments, the item




## Real Time Track & Trace System

The events section of the shipment details page has the possibility to open a map in order to see where the events occurred. With the Real Time Track & Trace system of the digital freight forwarding service, customers are constantly kept informed of where their goods are. This provides them with the necessary control over incoming shipments or deliveries, as well as (thanks to mobile app functionalities) the possibility to check in real time the GPS position of the driver and the update of information about the operations he performed.

### 4.3.1 Multimodal, Short Sea Shipping and traceability and Asset Telematics Integration (Convergenza)

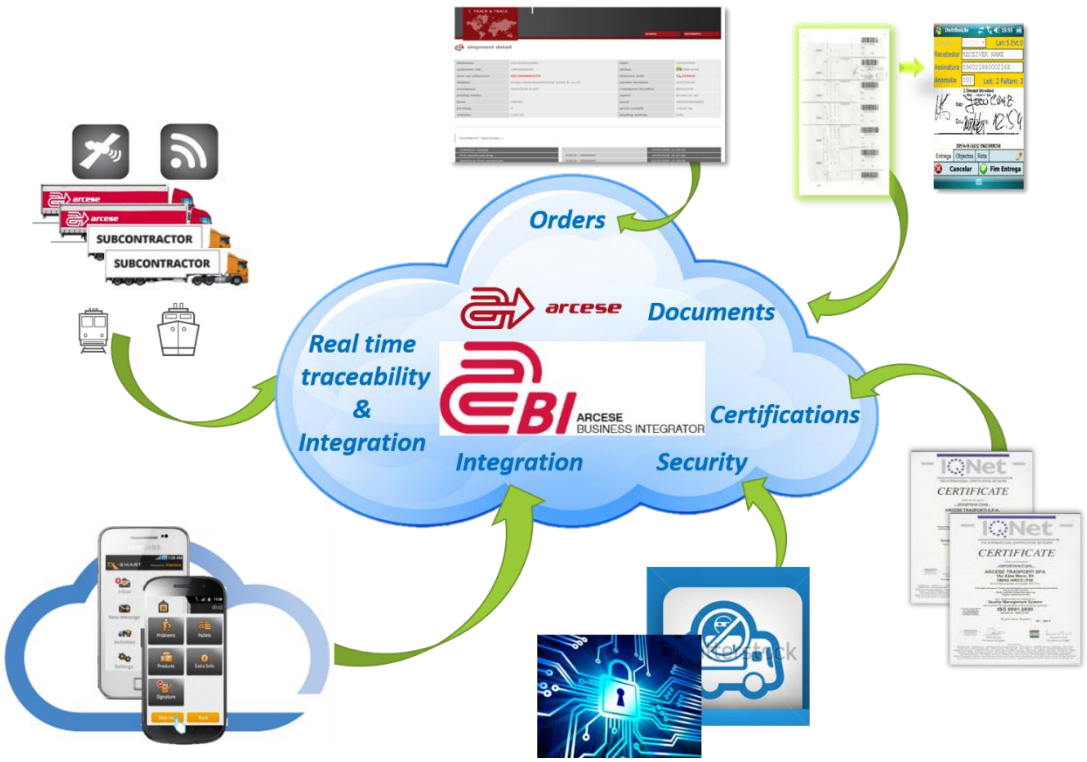
The WP's 3.4.3 (Multimodal CEMAT + HUPAC + CFI), 3.4.4 (Multimodal TX), 3.4.5 (Short sea shipping (Grimaldi P&O)), 3.4.6 Asset Telematics Integration (Convergenza) are fundamental in order to make the intermodal business competitive.

Goals are:

- Simplify booking process: the road-only service, with a direct truck transportation is simpler than the intermodal service. All the action taken to improve the operating gap are useful
- End-to-end visibility leads to greater customer confidence in these production methods and consequently to an increase of multimodal volumes
- Real time visibility with benefits for planning and asset utilization

In order to implement such a system we need the support of an external software house that is able to produce the right level of technology to our needs. The KPIs will be measured in the upcoming months and reported together with the validation of the pilot case.

The final product is summed up in the image below. Employees, suppliers and clients have all access to the Trusted Cloud (ABI). Employees use the cloud to manage the fleet in a more efficient way while suppliers can upload and store all the documents and certifications they need to provide. Clients can follow their goods thanks to T&T service also embedded in the cloud.



## 4.4 Legal Aspects

There are important legal aspects to be considered when establishing business collaboration. Today in the transport market it can be observed that there is lack of knowledge as to how to comply with EU and national competition law including, but not limited to competition law. Legal aspects are sometimes overlooked and thus possibly managed in a grey area, hindering collaboration efforts. In other cases, collaboration initiatives do not consider the legal aspects and risk violating national and/or EU competition law, among others with respect to competition or privacy law.

In NexTrust, the legal compliance for collaboration initiatives is fundamental and is a cornerstone of the project. There are at least three legal compliance schemes, which shall be highlighted in the context of the NexTrust FTL and intermodal demonstrators:

a) **Competitors:** Commercially sensitive information, such as confidential data, pricing etc. cannot be (in)directly shared with actual or potential competitors.

b) **Anti-dumping price behavior:** Possible concerns with respect to abuse of purchasing power of competitors and non-competitors.

c) **Costs behind the prices are confidential:** Shippers cannot receive information concerning another shipper's costs and/or price structures via the logistic service provider or carrier. Such information can be regarded as commercially sensitive information and the exchange thereof is prohibited under competition law.

The Arcese demonstrator works in line with this legal framework. Arcese's partners are sharing only technical information, keeping the commercially sensitive information strictly confidential. We use the App to provide them all the information needed to deliver goods such as geocoding loading and unloading position, pickup and delivery slots, required documentation, always hiding information concerning our clients. We provide them information such as quantity and type of goods and extra services that must be fulfilled in order to guarantee an easier delivery process. All the information shared are just operational and not commercially sensitive.

## 4.5 Impact of ABI

In summary the desired 'to-be' situation, safeguarding commercially and legally sensitive information:

- Planning with the knowledge of the exact location of the trucks
- Planning with sending information in real time
- Sending Loading/unloading operative instructions
- Real-time visibility of the events related to shipments
- Having real-time information of Proof of Delivery
- Timely registration of all anomalies related to the pick up and delivery of the goods
- Obtaining real-time information that the truck is deviating from standard route. This aspect is important from a security point of view

All of these aspects lead to:

- Increase operational planning efficiency from 1,5% to 5%, through traffic avoidance and reduction of the empty runs
- Increase load efficiency per load
- Consolidated deliveries into Full Truck Loads (FTLs); better truck utilization to reduce CO2 and congestion in communities and at the logistic nodes
- Access to potential backhaul/continuous FTL movements; better truck utilization
- Reduce waiting times
- Maximize daily production reducing CO2 emissions
- Increase the opportunities for modal shifts. The analysis of the initial situation shows that Transport mode split is negative, Road dominant transport. If traceability and integration are guaranteed there is more flexibility to adapt the transport offer to the market
- Opportunities for modal shifts to reduce CO2 and noticeably cut road transport volumes
- Legally compliant environment

### 4.5.1 Change in costs & gain sharing

In the identification phase, we identified several KPIs that must be measured and verified. During months 26 to 32 we are making evaluations based on KPIs in order to understand (define) the outcome.
It is possible to sum up all the positive impact on three major topic we developed:

1. PODs (smartphone "app")
2. Intermodal Shift
3. Documentation Digitalization

### 4.5.2 Expected Impact of PODs (APP?)

Thanks to the spread of the smartphone “app” to our subcontractors, we now know the exact location of our fleet trucks and third-party trucks, and we have access to PODs in real time as soon as the driver has uploaded them.

The information on trucks location allowed us to increase the optimization of operational planning efficiency from 1.5% to 5%. Being easier to avoid traffic and reduce empty runs are both actions that goes in the direction of maximizing daily production cutting CO2 emission.

Instant PODs have a positive impact also on the invoicing procedure, it is now possible to invoice in real time instead of waiting the driver to come back to the headquarter which could also take 30 days. The real time invoicing ensuring a monthly cash flow of 60.000€ for the FTL Business Unit

The profit gain from PODs instant digitalization and real time invoices is more a management one than an economical one.

### 4.5.3 Intermodal Shift

With the technical solution of ABI, the impact is also very positive on modal shift. The main reason is that there are some shippers who request visibility. ABI is able to offer end-to-end traceability of goods increasing customer confidence in the new service offered and a more compliant attitude in choosing this service.

For the impact calculation of potential greenhouse gas emissions (GHG) in terms of CO2, Arcese has already a well established and audited calculation tool in place. The challenge today is, that there is no single globally recognized and accepted standard for calculating GHG (including CO2) emissions along supply chains. Arcese is using a system that is built on the EU standard EN16258. In addition the actual GHG calculation was then done by Arcese as trusted partner itself, because for the calculation access to commercially sensitive information is required. For example, the fuel consumption is needed, but this information is considered to be very confidential, as from this parameter, the costs behind the price can be released. In the same way, the payload and number of vehicle movements from production plant (origin) to warehouse (destination) can lead to market share knowledge of shippers and production size.

Here below we show some examples of the positive CO2 reduction we can achieve:

***Example 1***

| Mode | ROAD | INTERMODAL |
|---|---|---|
| **Origin & destination** | Pregnana Milanese – Petite Foret | Pregnana Milanese – Busto Arsizio – Köln – Petite Foret |
| **Distance** | 922 km | 311 km road<br>843 km rail |
| **Weight** | Goods: TBD<br>Tara (equipment): 7500 kg<br>Tara (truck): 8000 kg | Goods: TBD<br>Tara (equipment): 7500 kg |
| **Fuel Consumption** | X Confidential | |
| **CO2 Emission** | 919 KG (CO2) | 471 KG (CO2) |

***Example 2***

| Mode | ROAD | INTERMODAL |
|---|---|---|
| **Origin & destination** | Köln - Craiova | Köln– Duisburg – Curtici – Craiova |
| **Distance** | 1767 km | 450 km road<br>1465 km rail |
| **Weight** | Goods: TBD<br>Tara (equipment): 7500 kg<br>Tara (truck): 8000 kg | Goods: TBD<br>Tara (equipment): 7500 kg |
| **Fuel Consumption** | X Confidential | |
| **CO2 Emission** | 2390 KG (CO2) | 1060 KG (CO2) |

# 5 Lessons Learnt and Outlook

ABI is the first main milestone in order to allow Arcese to create collaboration and integration environment with all of the partners involved in the Logistics market.

In a nutshell we can summarise the main research finding as following:

- Collaboration is supporting to tackle the inefficiency in the transport execution and to gain sustainability
- Improvement of optimization capacity planning
- Enhancement of connectivity with suppliers
- Improvement of end-to-end visibility with suppliers
- Increase of trust and confidence of shipper (client), quality improvement, responding to new transportation requirements

The results of the research activities will lead to the exploitation phase of the ABI solution. The ABI mobile app will be downloaded from both Play Store (Android users) and App Store (iOs users), thus covering most mobile devices used nowadays. It can be easily found in the stores, downloaded in the same way as most widespread apps (like other social media apps) and does not show any difficulties in its installation on the customer's device, ensuring an easy and smart user experience.

The outlook of the future activities need to address following aspects while developing trusted collaboration beyond the EU funded NexTrust project:

- Despite the positive ICT integration factor of ABI, there is for further benefits more digital investment to be achieved. In particular «common» IT tools, such as transportation management system (TMS), electronic data interchange (EDI), track & trace, proof of delivery (POD) and telematics are still not enough connected due to market conditions.
- Intermodal freight transport connection required much more time, additional resources and is still limited to the technology (e.g. power availability for GPS system, traceability on the train,…).The current situation shows that intermodal connections bookings are managed through suppliers portals, not integrated with the carriers TMS. This activity is not optimized with redundant info to be provided for the slot reservation and management. At the same way the info provided by the intermodal providers are not coming directly into our systems (events, GPS positions, critical topics, etc…), reducing shipment management efficiency.
- Furthermore the track and trace activity is more and more a must for carriers customers'. Arcese in order to grant continuity on the tracking service needs to collect these info from the intermodal suppliers. This integration will allow the carrier to not simply react to events (delay on train, line closure, slot discard, trailer NC, etc…) but pro-actively manage the situation and reduce customer impacts finding alternative solutions in order to avoid delays in almost real-time. There is an additional need to create close collaboration with these providers in order to implement this integration within the carriers TMS. This integration

could lead to a cost saving and removing redundant activities could revert more resources on added-value tasks and reduce significantly the human error in data entry.

In the same time, the outlook of the research activities feed in to the “Digital Transport and Logistics Forum” of the EU. ABI demonstrated what the DTLF is highlighting as advantage for the digitalization strategy of the transport sector:

- Better transport management:

We implemented an in-house mobile app that enhance communication with third party drivers showing them collection and delivery places. Moreover, it gives GPS position in order to track&trace the delivery goods.

- Reduced administrative cost of compliance:

Thanks to the app is now possible to deliver PODs directly from the smartphone to the headquarter, in this way it is possible to save money, time and paper.

- Fewer CO2 emissions:

Choosing intermodal transportation over road only means a drastic reduction of CO2 emission, fur sure this is just one step furthermore are coming in order to reduce CO2 emission.

- Improved security:

With on board diagnostics and real time damage notification, a control tower is able to immediately react on any anomalies happening on the truck in order to guarantee the security of the cargo

- Better maintenance of vehicles:

Real time damage notification will improve the efficiency of maintenance operation on vehicles and trailers and all the equipment drivers are using

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