D.T1.5.6 – ACTION PLAN TO IMPROVE MULTIMODAL NODES EFFICIENCY AND CONNECTIONS – VERONA FREIGHT VILLAGE

Last mile connections
Assessment of multimodal services

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EXECUTIVE SUMMARY

The core business of the freight village of Verona is focused on the multimodal transport so the majority of the needs regard the topic WPT1 (Work Package T1 - Multimodal nodes efficiency and connections). The action plan is developed according to the results of the analysis and the knowledge tools, focusing especially on the good practices. In fact, the description of the good practices adopted in other business realities similar to Verona freight village can be useful to solve the problems identified. Moreover, these practices generate some challenges that are the targets to achieve through the actions.
In particular, this document will tackle all the aspects of the implementation of the Action plan to improve multimodal nodes efficiency and connections - VERONA FREIGHT VILLAGE. Its aim will be to increase the last mile connections on multimodal nodes and the assessment of multimodal services that are two of the three clusters involved in the multimodality topic T1 of the TalkNET project.

In fact, the actions planned are presented per cluster. TalkNET has set-up five thematic clusters - corresponding to the five sub-topics of Multimodality and ECO-innovation shown in the table below – right on the basis of the common priorities identified through the analyses of all project partners, identifying the cooperation networks with mapped stakeholders in order to improve their coordination.

1	LAST MILE CONNECTIONS OF MULTIMODAL NODES	MULTIMODALITY
2	NODE MANAGEMENT OPTIMIZATION	
3	ASSESSMENT OF MULTIMODAL SERVICES	
4	ALTERNATIVE FUELS DEPLOYMENT	ECO-INNOVATION
5	ENERGY EFFICIENCY SOLUTIONS	

The beginning of the action was the “Analysis on multimodal nodes efficiency and connections - VERONA FREIGHT VILLAGE”. This preliminary study showed the issues of the node that generate the challenges to face in order to enhance the efficiency of the Verona freight village that will be carried out mainly through the upgrade of the terminal area and the activation of new intermodal connections. Therefore, the action plan that will be presented in details in this document represents the countermeasure against the majority of the problems and needs detected in the first phase of the project, providing a concrete solution to the challenges resulting from the analysis. The analysis was performed following a precise scheme. The first step was to study the AS-IS situation of the intermodal chain on which the freight village of Verona carries out its daily activities. Once all the problems was measured, it was easy to understand the needs of the node and the actions to do in order to achieve the targets

generated through the challenges. This second phase (TO-BE) is more focused on the ways to reduce the bottlenecks affecting the inland terminal of Verona. The tool used to develop both these phases was the S.W.O.T analysis. On the other end, this action will be the starting point for the deployment of both pilot actions in which Zailog is involved, giving the inputs for their implementation. In fact, the results of this action plan are the activities that must be carried out to improve the node, overcoming the problems detected. Chiefly, the pilots that will be developed by Zailog in the field of the first main topic T1 (multimodality) are:

D.T3.2.1 - Improvement of the terminal area: feasibility study of the fourth module

D.T3.2.6 - Market study for the activation of a new railway shuttle service between Verona freight village and the port of Venice

Consequently, the steps necessary to complete the entire path designed through TalkNET project are the following:

1. Evaluation of the AS-IS situation to understand the business and to detect the problems (analysis phase)

2. Elaboration of a detailed strategy to solve the bottlenecks affecting the node through the development of concrete actions (planning phase)

3. Deployment of the planned solutions to enhance the overall efficiency of the node (testing phase)

In addition, this document will provide a short description of the best practices elaborated in the knowledge tools since their outputs will be useful to plan the actions and to implement the action plan elaborated in the project.

In the next paragraphs, there will be an explanation of each action that will be introduced by a summary. This short introduction is essential to understand the connection among problems/needs/challenges and between actions/solutions. The outputs of the SWOT analysis will give an important contribution in the elaboration of this summary.

Action 1: Realization of the feasibility study of the new fourth module

STRENGTHS	WEAKNESSES
First key point for the goods coming from the north of Europe and important destination for freights coming from China Strategic geographical position of Verona freight village located at the crossroad of Scandinavian and Mediterranean Ten-T Corridors. Excellent road and railway accessibility with a direct connection to the Verona by-pass that is linked to the Brenner and Milan-Venice motorways. At the same time, there is a direct connection also with Brenner and Milan-Venice railway lines	Gabarit limitation on the southern tunnels is hampering the railway flow of trailers The limited space in the buffer areas sometimes causes the congestion of the terminal, especially because the trailers are not stackable like the containers Few domestic railway connections
OPPORTUNITIES	**THREATS**
Additional traffic Increase the efficiency of railway shunting inside the freight village Improvement of the local viability and of the traffic conditions Enhancement of the business opportunities thanks to the extended capacity given by the upcoming new module Development of new intermodal rail freight services	Delays in the improvement of the external railway network Increase of the freight flow with a consequent enhance of the road traffic in the node Shortage of train drivers Reduced participation of the intermodal operators to the upcoming freight village community system Scarcity of interoperable locomotives able to travel in different countries without stops

As research and development center of the Verona freight village, Zailog is developing the extension of the terminal area in close cooperation with the bigger players of the multimodal chain like RFI (the Italian railway infrastructure manager), Consorzio ZAI (the infrastructure manager of the Verona freight village) and the municipality of Verona. This new infrastructure is necessary to face the growing railway freight traffic arriving at the Verona node that will have a significant increase after the Brenner Basis Tunnel (BBT) opening in 2026. This terminal extension will raise in the north of the inland terminal area, very close to the dedicated railway station of the node and to the Milan-Venice railway line.

The scope of this action is to exploit the area currently occupied by the automotive sector to strengthen the terminal area, enhancing both the railway capacity and the overall efficiency.

Therefore, it will be necessary to move the automotive sector in the south of the inland terminal area to recover enough space to build this new infrastructure. The main reason why this new terminal is necessary is to handle trains 750 meters-long. In fact, after the BBT opening longer and heavier trains will be able to travel on the railway line so the majority of terminals must be ready to receive these bigger vehicles.

The solution proposed with this action is to use the knowledge acquired through the analysis and the knowledge tools to create a strategy to implement the following action plan that is the creation of a feasibility study of the new terminal 750 meters-long. In this way, all the aspects linked to the last mile thematic analyzed in the previous phases of the project, will be faced and in the majority of cases, solved. For instance, thanks to the works to build the new terminal will be realized a new railway connection to the high speed and high capacity line, making the railway links of the node faster and increasing the load factor. All these aspects are the essential condition to achieve the target established by the European community that is to shift the 30% of the freight traffic from the road to the rail.

Action 2: Market study for the activation of a new railway shuttle service between the freight village of Verona and the port of Venice

STRENGTHS	WEAKNESSES
The great amount of railway connections in the north of Europe of Verona can be combined to the ones of Venice in the Adriatic and Mediterranean sea	The shunting in the port of Venice takes a lot of time and it is expensive
One train can carry 32 trailers, reducing considerably the CO2 emissions and the traffic jams	Verona Quadrante Europa railway station is closed during Sunday night when there is the availability of a rail path for the shuttle train
The development of the freight trains allows to change the role of truckers, decreasing the daily work load since their trips are shorter (e.g. from the terminal to the company and vice versa, last mile concept)	The absence of contribution from the public sector to incentive the development of new railway connections

OPPORTUNITIES	THREATS
Creation of a long multimodal route starting from Turkey coast and arriving to Scandinavian countries without the use of the road transport	Scarcity of T-3000 pocket wagons
The activation of a shuttle train between Verona and Venice could allow to create a customs corridor to speed up customs declarations	Lower cost of road transport on the same route

The rail-road terminal of Verona is the first freight village in Europe, according the ranking drafted by the German association of the freight villages. This ranking is based on about 40 parameters including the services provided and the level of traffic generated. It means that Consorzio ZAI (the infrastructure manager of the Verona node) is working hard every day to reduce the issues and enhance the efficiency. For this reason, it is born the idea to activate a shuttle railway service between the inland terminal of Verona and the port of Venice. This connection has been thought to link the railway connections of the Verona freight village to the maritime trips of the port of Venice. Therefore, it is not an isolate shuttle service because the distance between these two nodes is too short to compete with the road.

The aim of this action is to decrease the high number of heavy vehicles on the Milan-Venice motorway, moving this amount of freight from the road to rail. The identification of the issues in the first part of the project is the ground on which this action is developed. In fact, the analysis made given an overview of the market situation, detecting the need to create a huge multimodal route starting from the Middle East and arriving in the Scandinavian countries (and vice versa) without the use of the road transport. Therefore, this action uses the results of the analysis to elaborate a plan of activities to do that will be implemented in the next action plan.
The upcoming action plan will be a market study focused in the activation of the railway shuttle service between Verona freight village and the port of Venice. All these project's steps are following a logical path that is driving the partners to the production of an output. The action described in this document will be the guideline to follow in order to overcome many problems affecting the multimodal chain, creating new multimodal connections.

1. CLUSTER 1 - LAST MILE CONNECTIONS: OVERVIEW OF NEEDS AND GOOD PRACTICES IN COOPERATION WITH STAKEHOLDERS TO DEVELOP THE ACTION PLAN

In the following paragraphs, there will be the description of the needs and good practices related to the first cluster (LAST MILE CONNECTIONS). It is an illustration of the main features and critical aspects of the Verona node. After this first part, there will be the list of the countermeasures necessary to face the problems detected.

NEEDS DEFINITION

The needs detected in the analysis of the node's region can be satisfied through physical and intangible interventions. In fact, in many clusters there are some important works needed to improve the situation but in the meanwhile is possible to implement some rules able to enhance the overall performance.

NEEDS DETECTED

In the first cluster are necessary both new rules and physical interventions. The needs detected are the result of an analysis focused mainly on the node but also on its connections. In fact, the main issues on the node will be solved thanks to the works performed by RFI (the Italian railway infrastructure manager) in the following years. The freight village of Verona will work jointly to RFI for the realization of the new terminal able to manage trains 750 meters-long that will be described better in the following paragraphs. This infrastructure will cope with the majority of the node's problems. However, the benefits of this new terminal will be available only after the 2027. Moreover, there are other problems affecting the connections of the node. In fact, the railway network connecting the freight village to the main southern Italian ports in some stretches has gabarit constrains. For this reason, the railway traffic of semitrailers (that are the core business of the freight village of Verona) on these routes are not allowed since they cannot pass through some tunnels. Nevertheless, these bottlenecks will be removed in the next three years. Therefore, it is important to develop a solution able to enhance quickly the performance of the node while the works will be not completed. For example, the use of the High Speed/High Capacity railway line for freight purposes may be a remedy. In fact, overnight passengers do not exploit this line. They travel usually during the day so it can be the right countermeasure to enhance the number of connections. Another example is to appoint an impartial subject that coordinates all the different operators of the multimodal chain avoiding the leakage of sensitive information. A national regulation drafted by the Italian Ministry of Transport would allow to make progress in leaps and bounds in this field. In fact, the main constraint is represented by the lack of trust between the players of the chain that are afraid of the risk of industrial espionage.

GOOD PRACTICES DEFINITION

The right tool to satisfy a need is a good practice. It is an effective way to face problems detected during the analysis phase that can be used in comparable situations. Following a logical structure, there will be a good practice for every cluster.

GOODS PRACTICES DETECTED

In the first cluster, the main target is the improvement of the last mile connections. In a huge railroad terminal as Verona, it means both to carry out physical works and to adopt intangible solutions. As seen in the needs chapter, several works are in progress to remove the critical bottlenecks. Nevertheless, some expedients can be deployed to reduce the inefficiencies. A key element can be an impartial subject to regulate the behavior of the partners of the chain. This entity must act in the interest of the players involved, avoiding the leakage of information and increasing the efficiency of the entire chain. Currently, there are only private terminals like Hupac in Busto Arsizio that can be mentioned as an example of this good practice. Unfortunately, the freight village of Verona has only public terminals inside its area. However, the case of Hupac is a reality with a high level of efficiency so it should be a good idea to adopt this solution also in public terminals. A sole and impartial coordinator of the all daily activities performed inside a multimodal chain represents a huge opportunity to erase the wastes and to increase the performance. For instance, if the information about the railway line are known in advance (especially regarding the delays), it is possible to re-arrange the duties of the employees to exploit better their work.
Another good practice is developed inside one of the terminals of Verona, called “Interterminal”. Since there are only three tracks (2 operatives and one for trains parking placed between the other two), it was necessary to increase the terminal efficiency avoiding steady daily congestions. The rule normally used is that when a train arrives inside the terminal, it is unloaded and until it is loaded again, its departure does not occur. Using this procedure, a track is occupied by a train for about 37 hours. A long period like this can paralyze the entire terminal, especially when it is a small reality as Interterminal. The solution is the use of a “wagon sharing” policy. In this way, the wagons are no longer bound to a destination but their use is free. Therefore, once the train is unloaded, the terminal operator can immediately load it with loading units addressed to another destination. With this operative system, a train occupies a terminal track only for about 10 hours instead of 37 of the previous method. It allows to increase a lot the productivity of the terminal. In addition, it produces benefits also for the railway undertakings and for the M.T.O. (Multimodal Transport Operator) that can enhance their business activity. The only problem is for the rental company of the wagons that is the owner of them. Its advantage is the increase of the number of wagons hired but the disadvantage is to locate the wagons because it does not exist a tracing system for them. Generally, the wagons are rented by the M.T.O. so the solution is to deploy this operative system in a terminal with one Multimodal Transport Operator in order to avoid confusions among the wagons. A detailed study about the wagon sharing was carried out in EU project AlpInnoCT.

1.1. ACTION: FEASIBILITY STUDY FOR A NEW RAILWAY TERMINAL

The following paragraphs will talk about the studies to realize the fourth module that is an improvement of the current railway infrastructure in the Verona freight village.

1.2. MAIN CHALLENGES TACKLED

Following the analysis of the needs made in the knowledge tool documents, one of the main challenges of the first cluster is to strengthen the multimodal node of Verona in order to absorb the future increase of multimodal traffic. Despite the countermeasures adopted by the terminal staff (for instance, a railway priority system based on the trains actually arrived) it is necessary to enhance the capacity of the node. For this reason, the infrastructure manager of the area (Consorzio ZAI) and the Italian railway infrastructure manager (RFI) has signed a memorandum of understanding with the aim to build the fourth module. This improvement will allow to manage longer (750 meters of length) and heavier (2,000 tons) trains, according the new European standards. In fact, the 30% of freight traffic must be shifted from the road to rail within 2030. The big challenge is to realize this new infrastructure before the Brenner Basis Tunnel (BBT) opening in 2026. In fact, after this data it will be possible to travel with the aforementioned longer and heavier trains so the freight village of Verona must be ready to handle them. Therefore, it is important to produce a detailed feasibility study to describe all the steps necessary to free the north area that is essential to build the fourth module. Simultaneously, there will be the development of the area in the south, called “Marangona”. These two big actions must be performed following many steps in order to have enough time to complete both the administrative and the construction procedures.

1.3. RESULTS TO BE ACHIEVED

The deployment of the fourth module will make possible the handling of the new train format, as described in the previous paragraph. Therefore, this infrastructure will produce benefits both on the node and on the entire railway network. In addition, it is essential to design a dedicated driveability in order to make smooth the foreseen increase of heavy vehicles. These works on the surrounding roads of the terminal area will reduce the traffic jams and the congestions with the consequent decrease of the environmental impact. Moreover, there will be an additional road connection from the north to the south of the city (and vice versa) able to split the citizen vehicles especially in the rush hours.

1.4. TASKS TO BE PERFORMED

After this deep analysis, it is important to fix some targets in order to overcome the current constraints, to reduce the waste and to increase the general efficiency.
For this reason, the infrastructure manager of the area (Consorzio ZAI) signed a memorandum of understanding with the national railway infrastructure manager (RFI) with the aim to build a new terminal able to manage trains 750 meters-long and with a loading capacity up to 2,000 tons. Nowadays, the majority of the trains travelling in the European railway network reach the

average length of 600 meters and they can carry up to 1,600 tons. The future situation can be translated in big savings of money and energy. This huge works will affect positively in the entire inland terminal structure changing the entire way to operate. In fact, the handling process will become more efficient and fast. There will be an increase of the number of trains managed and consequently of the loading units reducing the use of resources. These results can be obtained thanks to a new terminal lay-out in which the movements of the operative vehicles (reach stackers and slave tractors) are reduced at the minimum level. In fact, each railway track will be under the gantry crane structure and will have a dedicated buffer area along its side. Therefore, the loading and unloading operations will be quickly with a low use of the energy. In addition, the railway sidings between the railway station and the terminals will be built to carry out only two shunting operations for the management of a train roundtrip. Finally, this new terminal will need of a new drivability that produces benefits not only for the freight village but also for the citizens of Verona, reducing the traffic jams and the environmental impact both in this area and in the surrounding roads of the fair. However, this new terminal area will be ready in 2027.

In the meantime, other important actions can be carried out to improve the operating cycle of the freight village of Verona:

- firstly, an efficient use of the buffer areas is the first step to increase the terminal capacity. A tracing system of the loading units can be implemented especially in Terminali Italia in order to identify the right units that must be loaded quickly on the departing train. In this way, it is possible to reduce the time to handle a train and reduce the delays that often occur on the railway network. If the train leaves the terminal in time or if the delay is widely reduced, the free track is available for the handling of another train before the foreseen time of arrival inside the terminal. This situation can decrease or erase the useless shunting operations (from the railway station to the marshalling yard and from the latter to Terminali Italia) and the number of additional gantry lifts. In addition, a well-organized buffer area avoids the congestions of the terminal in the rush hours and allows to handle more trains, increasing the overall productivity. Interterminal is the model that must be followed. Rescheduling of the trains handling according to the delays and buffer areas arranged according the incoming departures are the keys of its success in addition to the aforementioned “wagons sharing”;
- another task is to change the behavior of the terminal users, especially the road operators. In fact, the forwarders usually concentrate the pick-up of the loading units in the morning and the drop-off in the evening, congesting the terminal gates and surrounding roads. Then, they use the buffer area like a warehouse especially during the weekend leaving the loading units inside this zone. It happens because the construction or the purchase of a new warehouse is very expensive so the road operators prefer to avoid these costs and to exploit the terminal zones. The action that can be taken is to draft a sort of bonus/malus policy to avoid these type of situations. A group of specific rules is necessary to get a steady flow of trucks and to erase the use of the buffer areas to stock units for a long time. Unfortunately, the road operators prefer to pay more the use of the terminal facilities than to buy a new warehouse since this structure costs more of these additional fees. Therefore, it is essential the intervention of the municipality that can make possible the respect of these regulations.

1.5. KEY ACTORS

The achievement of the described tasks is linked to the involvement of the different actors of the multimodal chain because only with the cooperation of all the participants is possible to overcome these challenges.

TERMINALI ITALIA

Terminali Italia is a branch of RFI (the Italian railway infrastructure manager) and it is the terminal manager of the same name terminal settled inside the freight village of Verona. This terminal is the biggest compared to others in the dry port of Verona and has two modules. Each module has five operative tracks and two gantry cranes per module. Terminali Italia manages also Quadrante Europa Terminal Gate that is latest terminal built (in 2010). This new terminal has five operative tracks and the handling of the loading units is performed using a new generation of gantry cranes. It was realized according the last building techniques that allow to manage the same amount of loading units of the first two modules with the half of tracks. These two infrastructures handle together the majority of the freight village annual trains. The areas of Terminali Italia and Quadrante Europa Terminal Gate have an advantageous position with a direct connection to the railway station of the freight village that allows to avoid useless shunting operations. However, the productivity could be enhanced through physical works and software improvements. Terminali Italia is a player with a key role inside the multimodal chain so its involvement is essential.

INTERTERMINAL

Interterminal is another terminal of the freight village of Verona owned by Consorzio ZAI (the infrastructure manager of the Verona inland terminal) but is managed by Quadrante Servizi. It has three railway tracks, two are operative and one is used for temporarily trains parking while the other two are full. Four slave tractors and four reach stackers compose the equipment of Interterminal. The complete absence of gantry cranes is an advantage for this little terminal because it has a high level of flexibility that allows to reach the highest rate of efficiency of the entire freight village. Unfortunately, the position of the terminal is disadvantageous. In fact, are necessary two shunting operations to tow a train from the railway station to the operative tracks of the terminal (the first from the railway station to the marshalling yard and another from the marshalling yard to the terminal) and vice versa when the train is departing. It causes a waste of money and energy. Nevertheless, its involvement in the project is very important.

CONSORZIO ZAI

Consorzio ZAI is the infrastructure manager of the freight village of Verona. It is a public body established in 1948 thanks to a special law with the aim to revamp the agriculture and the industrial sector of the city after the Second World War. Firstly, it rebuilds the entire southern area of Verona that currently is occupied by the historical industrial zone of the city and by the

fair. Then, it started the construction of the Verona freight village in the west side of the city. After about fifty years of growth, the inland terminal of Verona was awarded twice (in 2010 and 2015) as the first freight village in Europe according a ranking drafted by the German association of the freight villages. Therefore, Consorzio ZAI has realized one of the most important multimodal centers in the World that every years produces work for thousands of employees and moves tons of goods in an eco-friendly way. It is clear that its involvement in the project is mandatory.

QUADRANTE SERVIZI

Quadrante Servizi is a private company owned by Consorzio ZAI (75% of shares) and other private enterprises (25% of shares). It has many functions. Firstly, it is the sole service provider of the area that supplies services (like the internet fiber, cloud computing, data recovery, server storage only to name a few) for all the company settled in the area. Another function is to provide general services like the cut of the grass or to fix other problems occurring in the freight village. Finally, it is the sole shunting company in the area. Therefore, it tows the trains of the 9 railway undertakings operating in the Verona inland terminal. This action allows to get a high rate of coordination and performance never seen before because in the past there were many shunting companies and it caused a lot of confusion. For all these reasons, its involvement in the project is compulsory.

RFI

RFI is the Italian railway infrastructure manager. It owns and manages a huge network used both for passengers and for freight trains. In the last years, the privatization process has changed the management of the company with positive effects for its business activity. Now it has a proactive approach about the investments. In fact, it is removing the bottlenecks in the key stretches allowing an increase of the railway freight transport. In addition, it is making several deals with the most relevant Italian nodes like ports and freight village to improve their railway infrastructure. Finally, it owns the data about the scheduling of the trains and it could get the same information of the foreign countries. Moreover, its involvement in the project is recommended.

FORWARDERS

They are not a unique subject like the previous but they represent the road-side that is the missing link of the multimodal chain. Inside the freight village area there is a forwarders center in which operate the many road players. These operators carry out a key function that is to bring the goods from the shipping companies to the railway terminals and vice versa. These routes are called “last mile connections”. This service is necessary because the majority of the Italian enterprises are SME (Small Medium Enterprises) so the railway network cannot reach every one. Therefore, the use of the road transport is crucial to connect the many productive sites to the railway. In addition, they could share traffic information about the road network that are useful for the all-multimodal chain so their involvement is recommended.

RAILWAY UNDERTAKINGS

All the trains managed in the freight village of Verona are towed by the locomotives of the 9 railway undertakings operating in the area. These companies buy the routes from RFI, the owner and the manager of the railway network. Then, they pay an annual fee to rent the wagons because they are too expensive to buy. Each railway undertaking that operates on transnational routes (for instance, from Verona to Koln where are involved three countries) has to face technical and bureaucratic issues when its trains must cross the borders. In fact, the wagons must be detached from the locomotive because there is a different signaling system and a different electric voltage in the other country. Therefore, is necessary another locomotive with a different train driver because also the driving license is different among the countries. The same goes if the train must cross other borders. Some railway undertakings have overcome this problem creating their branches in each country in which they operate. It means that they can trace their trains in real time and that they know in advance all the problems on the European network. It easy to understand that their involvement is very important.

MTOs (Multimodal Transport Operators)

These subjects are a sort of “travel agency”. They take contacts with all the operative players of the multimodal chain that are the terminal manager, the railway undertakings, RFI and the forwarders. Then, they arrange the entire trip filling as much as possible the entire train. In this way, the railway undertaking provides the train to the MTO for a determinate destination. Then, the forwarders contact the MTO that looks for free slots on the train. Finally, the terminal manager receives the trucks and the trains and handle the loading units according the instructions of the MTO. The MTOs are the glue of the chain so their involvement is crucial.

PUBLIC AUTHORITIES

As mentioned before, many interventions are not physical. For this reason, the involvement of the local and national authorities is mandatory. They could be a sort of “referee” of the entire multimodal chain, creating many “ad hoc” agreements fitted for each player. They can draft the rules and enforce the players to observe them. Nevertheless, it is not easy to identify the correct regulations. They are the results of several discussions with the representatives of the actors of the chain that have different point of views. Therefore, these meetings often do not produce the expected outputs. This is why there is not a unique shared platform where the different players can exchange information without the risk of leakage of data.

1.6. TIMELINE AND FINANCIAL RESOURCES

	REALIZATION											
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TASKS DESCRIPTIONS												
NEW TERMINAL 750 meters-long												
BONUS/MALUS policy against bad behaviours of the operators												
TRACING SYSTEM of the loading units												

The realization of the NEW TERMINAL 750 meters long will takes about 8 years. A big part of this lapse of time is due to the authorization process. In fact, it will take about three years because are necessary all the authorizations and the public procurement must be completed. Once this last step is finished, it is possible to start with the works. They will be divided in three main phases: the first one is to move the automotive sector from the north to the south side of the freight village. This operation will make free the areas on which the new terminal (fourth module) will be realized. The second phase involves all the works to build the fourth module. Lastly, the third phase will focus on the realization of the secondary works that are necessary to make operative the fourth module. These are focused mainly on the connection roads and on the entire viability system essential to avoid congestions. The three phases will takes about five years. The foreseen costs for the entire project are about 140 million of euro (only 50 million are necessary for the railway part). It is a large sum but this infrastructure will completely change the Verona freight village that will become one of the main multimodal nodes of the world. The estimated data to complete the infrastructure is at the beginning of 2027 that is the same data of the Brenner Basis Tunnel opening. In this way, the freight village of Verona will be ready in time and it will not miss the opportunity of manage the new train 750 meters long that can travel only after the BBT opening. In the meanwhile, it is necessary to exploit better the potential available of the terminal. Therefore, an agreement with the operators can be reached in order to introduce a bonus/malus policy aiming to avoid bad behaviors. In fact, many dispatchers use the buffer area like a warehouse, leaving their loading units especially throughout the weekend. The approval of this restrictive rule will take about 4 four year so will be effective in 2023. Another way to increase the capacity is the deployment of a tracing system of the loading units. This system will allow to have a precise idea about the location of each loading unit when it is loaded on a train. Therefore, this system will provide an overall visibility of the European railway traffic to the terminal manager that will able to manage in real time both the equipment and the personnel operating in the area, reducing the waste and increasing the overall performance. The costs of these two alternative countermeasures to strengthen the terminal are under evaluation because currently there is not a final implementation plan like for the fourth module.

1.7. EXPECTED RESULTS

In conclusion, it is essential to fix some KPIs to understand how the achievement of the objectives is going. These KPIs were defined according to the needs of the managing directors of the Verona's freight village terminals that have a long-time experience in this sector.

The most important indicator is the daily number of trains managed on an operative track. In 2017, the overall result of the inland terminal was 1.39 daily trains managed per track. However, this number has a little relevance because is an average of different enterprise performance. Therefore, it is better to analyze the singular company outputs to figure out which is the goal to reach. Interterminal scored 1.95 daily trains per track in 2017 against Terminal Italia's result that was 1.23. The optimal performance would be 3 daily trains per track but is an idealistic result because there are many events throughout the year that are difficult to manage (bad weather conditions, network interruptions, traffic jams, etc.). Nowadays, the high level of technology of the forecast systems helps to face these issues but without the cooperation between the actors, some problems can be only reduced and not completely erased. Unfortunately, the lack of specific rules in this field make impossible to overcome the hesitancy of the companies to share their data. Therefore, the delay of many hours of a train departed in the port of Rostock leading to Verona cannot managed properly for this lack of information that should be shared between the actors of the chain. This is one of the main problems affecting the multimodal transport. It is one of the reason of the Terminali Italia's results. Nevertheless, 1.23 daily trains per track is a low result compared to the one of Interterminal. The latter has fewer trains to manage so it can adopt a flexible system to carry out his business activity but fixing to two daily trains per track the expected result of Terminali Italia is not a utopic target.

3. CLUSTER 3 - ASSESSMENT OF MULTIMODAL SERVICES: OVERVIEW OF NEEDS AND GOOD PRACTICES IN COOPERATION WITH STAKEHOLDERS TO DEVELOP THE ACTION PLAN

In the following paragraphs, there will be the description of the needs and good practices related to the third cluster (ASSESSMENT OF MULTIMODAL SERVICES). It is an illustration of the main features and critical aspects of the connection between the node of Verona and the port of Venice. After this first part, there will be the list of the countermeasures necessary to face the problems detected.

NEEDS DEFINITION

The needs detected in the analysis of the node's region can be satisfied through physical and intangible interventions. In fact, it is possible enhance the railway capacity both strengthening the nodes and the network and through the activation of new railway connections and organizing better the management of the terminals.

NEEDS DETECTED

Unlike the previous cluster, here it is not necessary to implement only hard tools to face the problems. In fact, with some rules and best practices can solve the main issues. The most problematic question regards the international railway licence for train drivers. There are different signal systems, electric voltage and gauge in the European countries so it is not easy to

create a unique license. In addition, there are different languages and the drivers often are not able to speak in English.
Moreover, if the railway network of the Balkan countries will be updated, it is possible to develop new railway connections with them. Currently, there are serious problems on these lines. Many connections have only one track so it is impossible to carry out a simultaneous roundtrip. Then, the majority of these lines are not electrified that causes a negative impact on the environment and on the costs.
Another problem regards the interoperability of the assets between the different players of the multimodal chain. Generally, the daily activity of a company does not follow a steady trend but there can be some production peaks. At the same, it could happen that another undertaking of the same multimodal chain is not very busy in that moment. Therefore, the latter can "lend" few employees to the first company to overcome the production peak. In this way, there is an increase of efficiency because the personnel of a firm "temporarily inactive" makes up for the lack of resources of the other busy enterprise.
Lastly, it is necessary more railway capacity since the demand of slots on the trains is raising. For this reason, the activation of new railway services is suggested.

GOOD PRACTICES DEFINITION

The right tool to satisfy a need is a good practice. It is an effective way to face problems detected during the analysis phase that can be used in comparable situations. Following a logical structure, there will be a good practice for every cluster.

GOOD PRACTICES DETECTED

As in the previous cluster, the right way to satisfy all the needs detected during the analysis is using both "soft" and "hard" tools. For instance, a "fast corridor" is an intangible tool created by the Italian Customs Agency that allows to move the international goods from a port to another place speeding up the customs procedures. It is important to understand how it works. The freight travels inside a loading unit (semitrailer, swap body or container) on which is attached a signaling device that permits to trace it in every moment. In addition, this unit must follow a determinate path in order to make available the goods when a police control is necessary. For this reason, the use of the railway is suggested. When the fast corridor is implemented, the customs can give the authorization to transship the freight from the sea to the rail immediately after the docking of the ship saving a lot of time usually spent to carry out the customs declarations. These bureaucratic procedures are temporarily skipped because they will take place at destination in a special customs warehouse. This warehouse can be built both inside the premises of a company or inside a freight village where the customs operation can be performed avoiding long queues inside the congested area of a port. This solution can be implemented in Verona freight village to foster new multimodal services from the ports. In fact, the majority of traffic managed in the inland terminal comes from the Brenner axis. These alternative routes will allow to develop a new function for the Verona's railroad terminal: it would become the gateway of the Italian ports.
Another good practice is represented by the "ad hoc employee sharing" where an employer that temporarily cannot provide work for its staff sends them to work for another company. The

employment contract between the initial employer and the worker is maintained while the worker is incorporated into the work organisation of the receiving employer. Again, the structure is similar to temporary agency work, with the difference that the initial employer is not in the business of placing people in work, and the intention is that the placement is temporary and the worker will return to work with the first employer at the end of the production peak. This practice was defined in a 2015 Eurofound report about new forms of employment but there are not proofs of its deployment in real business activities.

3.1. ACTION: NEW SHUTTLE SERVICES BETWEEN VERONA FREIGHT VILLAGE AND PORT OF VENICE

The following paragraphs will talk about the railway shuttle service between Verona freight village and Venice Port Authority that will be deployed despite the short distance between these two nodes.

3.2. MAIN CHALLENGES TACKLED

As described in the previous paragraphs, the number of trucks on the road network is steady increasing. For instance, through the analysis of A4 motorway, one of the most important Italian roads, it is possible to measure the impact of the heavy vehicles traffic. Throughout the day, the trucks occupy two out of three lanes. Therefore, the challenge is to reduce their number on the longer stretches, keeping only their shortest routes. For this reason, the Verona freight village and the port of Venice are working together to create a railway shuttle service between their nodes. The aim is to catch as road freight traffic as possible, reducing the congestions on the motorway and the CO2 emissions. However, another challenge is hampering the development of this new service. The distance between Verona and Venice is too short, so the price of the service is not affordable for the actors of the multimodal chain. The solution is to sell this stretch inside a longer route. For example, the service can be embedded in the multimodal route from Greece to the Baltic Sea (and vice versa).

3.3. RESULTS TO BE ACHIEVED

The expected results are the reduction of the trucks on the longer routes, shifting their daily activity on the last mile connections. In this way, they will connect the terminals to the companies since the railway cannot cover these short distances. As previously described, the benefits will be the reduction of the congestions on the roads (especially on the motorways) and the decrease of the CO2 emissions. However, there is also a social aspect that must be considered. In fact, there is a scarcity of truckers since there are only few people willing to stay for long periods far to their house. Therefore, the use of the road transport only for short routes can solve this problem because a trucker will drive only for daily short stretches, avoiding longer business trips. This action will make the trucker job more attractive.

3.4. TASKS TO BE PERFORMED

The actions that must be performed are mainly focused in the identification of the right players willing to invest money in this service. In fact, it is not simple to convince the operators to start this service since the costs are too high in a short route like Verona-Venice (and vice versa). For this reason, the business operators must be clever to sell in the market a long multimodal route that includes also the short stretch between Verona and Venice. Only in this way, it is possible to absorb the high costs and timings of the service. Therefore, the necessary actions to start the service are:

a) to identify the key actors willing to invest in this shuttle train;
b) to analyze all the factors of this innovative service (technical aspects, costs, timings, administrative issues, etc.);
c) to grab an adequate market share in order to cover the cost, making the service sustainable.

As said before, the first action is the most important. In fact, there must be some players willing to make a business activity that is not able to compete with the road. Therefore, this service will not produce profits at the beginning phase and it is necessary a starting support.
The second step regards mainly the evaluation of the shuttle connection operative elements. The cost is the bigger issues as mentioned before but also the other aspects are important. For instance, there must be two sets of wagons always available since the first train can be in delay and it is important that the departures be as much as possible on time. In addition, this stock can support the potential lack of wagons caused by sudden damages in order to guarantee the regular daily activity. Moreover, another critical element is the shunting procedure. In Verona it takes about thirty minutes but in Venice is longer (a prudential evaluation shows an average shunting timing of two hours and a half). The sum of the two shunting phases and of the travelling time makes this service too long compared to road.
Lastly, the third action is the key to solve the other problems. In fact, the marketing department must be able to offer to the customers a long route that starts in Greece and finishes in the Baltic Sea (and vice versa). Only in this way is possible to spread the costs and the timings of the shuttle service otherwise it is not sustainable.

3.5. KEY ACTORS

The achievement of the described tasks is linked to the involvement of the different actors of the multimodal chain because only with the cooperation of all the participants is possible to overcome these challenges.

TERMINALI ITALIA

Terminali Italia is a branch of RFI (the Italian railway infrastructure manager) and it is the terminal manager of the same name terminal settled inside the freight village of Verona. This terminal is the biggest compared to others in the dry port of Verona and has two modules. Each module has five operative tracks and two gantry cranes per module. Terminali Italia manages also Quadrante Europa Terminal Gate that is latest terminal built (in 2010). This new terminal has five operative tracks and the handling of the loading units is performed using a new

generation of gantry cranes. It was realized according the last building techniques that allow to manage the same amount of loading units of the first two modules with the half of tracks. These two infrastructures handle together the majority of the freight village annual trains. The areas of Terminali Italia and Quadrante Europa Terminal Gate have an advantageous position with a direct connection to the railway station of the freight village that allows to avoid useless shunting operations. Therefore, this terminal has the advantage of a shorter shunting time compared to the other one (Interterminal) so its involvement is essential.

CONSORZIO ZAI

Consorzio ZAI is the infrastructure manager of the freight village of Verona. It is a public body established in 1948 thanks to a special law with the aim to revamp the agriculture and the industrial sector of the city after the Second World War. Firstly, it rebuilds the entire southern area of Verona that currently is occupied by the historical industrial zone of the city and by the fair. Then, it started the construction of the Verona freight village in the west side of the city. After about fifty years of growth, the inland terminal of Verona was awarded twice (in 2010 and 2015) as the first freight village in Europe according a ranking drafted by the German association of the freight villages. Therefore, Consorzio ZAI has realized one of the most important multimodal centers in the World that every years produces work for thousands of employees and moves tons of goods in an eco-friendly way. It is clear that its involvement in the project is mandatory.

QUADRANTE SERVIZI

Quadrante Servizi is a private company owned by Consorzio ZAI (75% of shares) and other private enterprises (25% of shares). It has many functions. Firstly, it is the sole service provider of the area that supplies services (like the internet fiber, cloud computing, data recovery, server storage only to name a few) for all the company settled in the area. Another function is to provide general services like the cut of the grass or to fix other problems occurring in the freight village. Finally, it is the sole shunting company in the area. Therefore, it tows the trains of the 9 railway undertakings operating in the Verona inland terminal. This action allows to get a high rate of coordination and performance never seen before because in the past there were many shunting companies and it caused a lot of confusion. For all these reasons, its involvement in the project is compulsory.

VENICE PORT AUTHORITY

It is the infrastructure manager of the Venice port area. It is a public body established by Law n.84/94.Its task is to guide, plan, co-ordinate, promote and monitor port operations. It is also in charge of maintaining common areas and the seabed, overseeing the supply of services of general interest, managing the State Maritime Property and planning the development of the port. Venice Port Authority is involved in issues such as the development of the Port Community System in interconnection with the port stakeholders, port current and potential developments and environmental sustainable transport promotion. The ports of Venice also invest efforts into

the coordinated planning of road, rail and maritime infrastructures, as well as the harmonization of regulations and procedures in the field of port service provision. For all these reasons, its involvement is mandatory.

RFI

RFI is the Italian railway infrastructure manager. It owns and manages a huge network used both for passengers and for freight trains. In the last years, the privatization process has changed the management of the company with positive effects for its business activity. Now it has a proactive approach about the investments. In fact, it is removing the bottlenecks in the key stretches allowing an increase of the railway freight transport. In addition, it is making several deals with the most relevant Italian nodes like ports and freight village to improve their railway infrastructure. Finally, it owns the data about the scheduling of the trains and it could get the same information of the foreign countries. Moreover, its involvement in the project is recommended.

FORWARDERS

They are not a unique subject like the previous but they represent the road side that is the missing link of the multimodal chain. Inside the freight village area there is a forwarders center in which operate the many road players. These operators carry out a key function that is to bring the goods from the shipping companies to the railway terminals and vice versa. These routes are called “last mile connections”. This service is necessary because the majority of the Italian enterprises are SME (Small Medium Enterprises) so the railway network cannot reach every one. Therefore, the use of the road transport is crucial to connect the many productive sites to the railway. In addition, they could share traffic information about the road network that are useful for the all-multimodal chain so their involvement is recommended.

RAILWAY UNDERTAKINGS

All the trains managed in the freight village of Verona are towed by the locomotives of the 9 railway undertakings operating in the area. These companies buy the routes from RFI, the owner and the manager of the railway network. Then, they pay an annual fee to rent the wagons because they are too expensive to buy. Each railway undertaking that operates on transnational routes (for instance, from Verona to Koln where are involved 3 countries) has to face technical and bureaucratic issues when its trains must cross the borders. In fact, the wagons must be detached from the locomotive because there is a different signaling system and a different electric voltage in the other country. Therefore, is necessary another locomotive with a different train driver because also the driving license is different among the countries. And the same goes if the train must cross other borders. Some railway undertakings have overcome this problem creating their branches in each country in which they operate. It means that they can trace their trains in real time and that they know in advance all the problems on the European network. It easy to understand that their involvement is very important.

MTOs (Multimodal Transport Operators)

These subjects are a sort of “travel agency”. They take contacts with all the operative players of the multimodal chain that are the terminal manager, the railway undertakings, RFI and the forwarders. Then, they arrange the entire trip filling as much as possible the entire train. In this way, the railway undertaking provides the train to the MTO for a determinate destination. Then, the forwarders contact the MTO that checks if there are free slots on the train. Finally, the terminal manager receives the trucks and the trains and handle the loading units according the instructions of the MTO. The MTOs are the glue of the chain so their involvement is crucial.

WAGON OWNERS

As mentioned before, there are many elements necessary to start this shuttle service. One of them is the availability of wagons. The wagons requested must have particular features to make possible the passage of trailers inside the several tunnels located in the Italian railway line. The proper wagons are the T-3000 model that make possible the height adjustment according to the type of loading unit loaded (trailers are the higher loading units). However, there is scarcity of these type of wagons so the involvement of the companies that own the wagons is essential.

	REALIZATION											
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TASKS DESCRIPTIONS												
IDENTIFICATION of the key actors												
ANALYSIS of the all factors												
BEGINNING of the SHUTTLE SERVICE												

3.6. TIMELINE AND FINANCIAL RESOURCES

As mentioned before, the implementation plan of the shuttle service between Verona and Venice will be divided in three steps. The first one is focused on the identification of the players willing to invest in this project. It is the harder step since there are only few actors that accept to start a service not profitable. In fact, the majority of operators invest only on well-paying activities and have not a long-term vision showing the bigger benefits of this type of service. For this reason, it will be not easy to find the proper team of subjects so many meetings will be necessary to reach an agreement. This first step will end in 2020. Once the team is defined, there will be a deep analysis of the key elements necessary to start the service. The costs and the technical aspects are the main issues to overcome. This process will probably take another year. Lastly, in the third step the service will start but only after a good marketing campaign. Only through the advertising in the right channels, it will be possible to grab enough traffic in order to make this shuttle service attractive and profitable. The foreseen data to start the service is on 2022. The cost of a loading unit shipped from Verona to Venice is of 309€ by rail

and 145€ by road. It is clear that in one year with three weekly roundtrips and with a filling rate of 29 trailers per train, the total amount of costs is 2,795,832€ while using the road is 1,311,960€. The difference is 1,483,872€. This sum is an evaluation made considering only the measurable costs but it would be compared to the CO2 saved. In addition, it would be important to identify the reduction of the congestions on the motorway. Lastly, there will be only one train driver instead of 29 truckers so only one wage instead of 29. It is important to remember that the truck drivers will be not fired but they will make only last mile connections between the terminals and the companies instead of long trips. Therefore, there are not enough elements to make a precise comparison.

3.7. EXPECTED RESULTS

The proper way to measure the impact of the actions undertaken is to use some KPIs. However, this shuttle service does not exist in the market since nobody has offered something similar before. Therefore, it is easy to understand that it is necessary an evaluation about the expect results since there are not historical data to compare like in the previous case. This introduction is essential to explain why there are not KPIs defined in advance for this type of service. Nevertheless, an assessment of the expected outputs can be done in order to fix the targets to achieve. In fact, at the starting phase the service must be launched with three train pairs per week. Assuming a minimum train filling rate of 85% in both directions (otherwise the service is disadvantageous), we will have a reduction of about 162 trucks per week on the Milan-Venice motorway that is a decrease of 8,424 trains per year in the stretch Verona-Venice. Since a truck produces 0.85 tons of CO2 in the stretch analyzed (source: EcoTransit), there will be savings for 7,160.4 tons of CO2 per year. The benefits described show the importance for the community of service like this one. The motorways can become less congested and the air quality will increase. In addition, the evaluation is done with the minimum conditions necessary in order to make the shuttle train economically sustainable. However, if there were a good market response it would be possible to double the number of train pairs, reaching six weekly roundtrips. This optimistic result can be translated in a little reduction of the daily traffic in the motorways but it can be the spark to create other similar services. In this way, there will be a strong decrease of the heavy vehicles on the main motorways with all the benefits previously described.