Definition of non-technical and technical solutions

Project methodology

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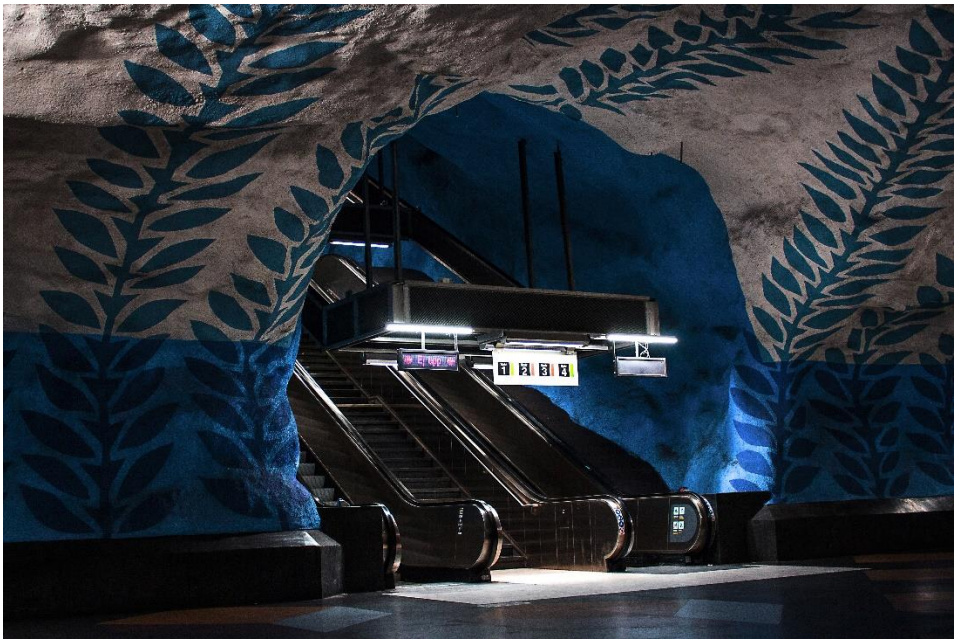
Interreg Central Baltic

European Union
European Regional Development Fund

Published: 2021-03-01



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About Baltic Loop

The Baltic Loop project focuses on developing solutions to transportation bottlenecks along the East-West corridors to smoothen the transportation flows. Project covers three separate corridors; northern from Örebro – Turku – St. Petersburg, middle from Örebro – Tallin – St.Petersburg and southern from Örebro – Riga – St. Petersburg.

The main goal is to minimize travelling and cargo time in corridors. These corridors have to develop to make them more attractive to new business and innovations by reducing traveling and cargo time.

The project tackles the bottlenecks and hindrances in timesaving along the corridors through four themes:

1) technical time saving solutions
2) non-technical time saving solutions
3) new business models for smart and sustainable hubs
4) dialog between transportation actors along the corridors.

The main result is shortened transportation and traveling time and decreased emissions in these three corridors. The sub-results of the project are as follows:

1) Improved competitiveness due to the more efficient transport flow

2) The efficiency is achieved by improved delivery and terminal operations, which results in a shortened time of good delivery to the retailer or client
3) Reduced traveling time
4) Improved passenger accessibility to corridors from hinterland with linking to technical solutions.

Non-technical and technical solutions

Background

This short report is about explaining the difference between the concepts of technical and non-technical solutions that are widely used in the Baltic Loop project.

The Örebro County Region is responsible for the non-technical solutions work package and Turku University of Applied Science is responsible for the technical solutions work package. The project description does not state the difference between technical and non-technical solutions. The project description states that work packages must work to reduce travel time without introducing technical solutions. Two examples that are stated as non-technical solutions in the project are organizational optimization like route development and schedule optimization.

The concept is not defined in any further detail in the project and due to that this report is written to clarify the difference between those two concepts; non-technical and technical solutions.

Method

The Örebro County Region has had a number of meetings with people within its own organization and with other organization to understand the difference between technical and non-technical solutions.

We have had a number of internal and external meetings to define more precisely what is considered non-technical and technical measures. Suggestions that have emerged in those internal meetings are that non-technical solutions could be legal-, administrative-, financial- and organizational measures. To get more answers, we have turned to the doctrine to find out if the concept is defined, but have not found any definition. We had meetings with the Swedish Transport Administration and discussed about what could be defined as non-technical and technical solutions. The authority does not use these concepts, but instead uses a methodology called the four-step principle. In the mentioned methodology, there are solutions/measures that are both non-technical and technical.

The four-step principle

We travel and transport goods like never before. The pace increases and thus the needs. There are thousands of requests for improvements in the road and rail network. But there are always divided opinions about which measures should be implemented and how they should be implemented in a problem situation. To find the most effective

and sustainable solutions to a problem, the Swedish Transport Administration has an established way of trying and evaluating alternatives - the four-step principle. The four-step principle is applied not only by the Swedish Transport Administration but also by municipalities, regions and other actors in planning infrastructure and transport.

The four-step principle is about ensuring good resource management and is central to the methodology for measurement studies and is about working with all modes of transport and means of transport as well as with all types of measures to achieve a certain functionality in the transport system.

Using the four-step principle, we have defined what are non-technical and technical solutions, respectively, which will be used when we discuss the concepts within the framework of the Baltic Loop project.

The four steps in the four-step principle are:

Step 1 - Re-think (non-technical solutions)

The first step is to first and foremost consider measures that may affect the need for transport and travel as well as the choice of mode of transport.

Examples of measures: Localization, land use, taxes, fees, parking fees, subsidies, collaboration, travel-free meetings, speed limit, coordinated distribution, information, marketing, travel plans and programs and so on.

Step 2 - Optimize (non-technical solutions)

The second step is to investigate whether it is possible to use existing infrastructure in a more efficient way.

Examples of measures: redistribution of areas, bus lanes, signal prioritization, ITS solutions, special operations, coordinated train schedule, increased frequency, logistics solutions, travel planners and so on.

Step 3 - Rebuild (technical solutions)

In the third step, it is tested whether it is possible to solve the problem through a minor rebuild by, for example, adding lanes, adding an intersection, extending a platform or other alternatives.

Examples of measures: reinforcements, trimming measures, bearing capacity measures, widening, platform extension, bypass tracks, ascent fields, dredging in fairways, ITS solutions, level crossings, installation tracks and more.

Step 4 - Build new (technical solutions)

The fourth step is performed if the need cannot be met in the three previous steps. This means new investments and/or major redevelopment measures. This part is the most costly measure / solution.

It is worth noting that an action in one of the steps can often have effects in several other steps. For example, building a cycle path (step 3 or 4) can secondarily provide both more efficient use of the existing system (step 2) and change the choice of transport mode (step 1).

Step 1 and step 2 measures are what we can equate with non-technical solutions. These non-technical measures affect the need for transport or lead to a more efficient use of the existing infrastructure. The measures are viewed to be able to be implemented at low costs, unlike other physical measures. Non-technical solutions can be resource-efficient solutions to infrastructural problems. Among other things, they can help reduce the transport system's climate impact.

Step 3 and 4, rebuilding or new construction of infrastructure is the last measures that will be chosen if step 1 or 2 can't be implemented. Step 3 and 4 are measures that we call technical solutions. Traditionally, the planning of the transport system has been about rebuilding or building new infrastructure, but building new is costly and usually involves a negative impact on the environment and the consumption of natural resources. Often the biggest and fastest gain is in developing and optimizing what we already have. It is important to think smart and it is important to think about the transport system as a whole together with other actors.

Today, the focus is more on step 3-4 measures than step 1-2 measures. The explanations may be different. A study carried out on behalf of Sweden's municipalities

and county councils from 2018 states the reason that there is a limited opportunity to receive state support for step 1 and step 2 measures (non-technical solutions) and therefore there is an excess demand for step 3 and 4 measures (technical solutions). The Swedish Transport Administration considers that it is difficult to measure the effect of non-technical measures and due to this it will be difficult to get money to be able to apply non-technical measures. One example is that regions in their traffic and transport planning cannot use marketing costs to transfer transport from car to train and bus.

Examples of non-technical and technical solutions

In the table below, we have described a number of measures that we have classified as non-technical and technical measures. The table can be used as support when proposing measures. The suggestions in the table are some examples are not exhaustive.

THINK DIFFERENTLY	OPTIMIZE THE USE	RECONSTRUCTION	NEW CONSTRUCTION
NON-TECHNICAL SOLUTIONS	**NON-TECHNICAL SOLUTIONS**	**TECHNICAL SOLUTIONS**	**TECHNICAL SOLUTIONS**
			
Measures that may affect the need for transport and	Measures that improve the use of existing	Limited remodeling measures	New investments and major redevelopment measures

the choice of mode of transport.	infrastructure and vehicles		
Pedestrians and cyclists - Improved opportunities to take a bicycle on a train and bus - Improved bicycle parking at stops and stations	**Pedestrians and cyclists** - Wind-protected pedestrian and bicycle connections to stations and stops - Strategic investments in walking and bicycle traffic - Improved pedestrian accessibility (can promote public transport use) - Prioritization of cycle paths at intersections - Redistribution of areas within existing streets and roads, e.g. to create bicycle lanes	**Pedestrian and bicycle traffic** - Minor measures such as pedestrian and bicycle crossings at the railway - Reconstruction of the local street to a standard that to a lesser extent increases capacity or reduces travel time sacrifices in the road network - Decommissioning of streets, roads, railways, etc. for other uses	**Pedestrian traffic and bicycle traffic** - New construction of super bike path
Parking fees - Parking policy in the cities. Pricing to make parking more expensive	**Public transport and freight transport** - Bus lane within existing road area	**Freight and public transport on the road** - Trimming and improvement of roads, ramps, ITS,	**Freight and public transport on the road** - New construction of local street that increases capacity or reduces travel

	- Increased public transport by sea - Initiatives for better train traffic on existing lines - Bus lanes where passability is ensured - Special lanes for the distribution of goods in the big cities; the lanes can also be used by public transport	signals and lanes - Road constructions that increase accessibility - Reconstruction of separate bus lanes at the entrances to larger cities and where accessibility needs to be secured - Reinforcement (at edges) of 2 + 1 roads - Speed-reducing measures (bumps, gates, tapers) - Establish a meeting-free path - Separate bus lanes on the approaches to major cities and where accessibility needs to be secured	time sacrifices in the road network - Additional lanes - New construction of traffic area - New construction bypass - Circulation site - New construction of motorway - Commuter parking - Combiterminal - Regional BRT solutions (Bus Rapid Transit)

Subsidies - Lower tariffs in public transport (increased subsidy for public transport) - Better fare structure that reduces the threshold effect with monthly passes - Deduction for commuting by bicycle	**Planning** - Improvement of terminals for goods, combined terminals - Flexible times for goods deliveries, so that the flows are spread over the day - Flexible opening hours/round-the-clock reloading centers - European train planning/scheduling with international freight channels - Flexible times for goods delivery to spread flows over the 24-hour period	**Public transport and goods by rail** - Minor measures for platform relocations for longer trains - Separation of traffic flows by rail (if parallel tracks exist). Distribute trains at the same speed to the same track - Upgrading of parts of the existing railway to be able to use faster trains, for example 250 km/h - Expansion of separate freight trains by rail	**Public transport and goods by rail** - Railway connections to airports - Separate tracks for fast and slow trains respectively - Double tracks on railway tracks - Expansion of separate freight lines by rail - Longer platforms - More tracks for night stands in the entire route
Collaboration - Increased coordination of business transport between the modes of transport	**Governance, regulation and legislation** - Adapted speed limit - Digital signs	**Goods on shipping** - Improvements or rebuilding of connections to ports and terminals, including adaptation of circulation sites	**Goods on shipping** - Fairway investments

- Collaboration with transport buyers	- Higher degree of filling for freight transport - Regular scheduled time channels for freight traffic through the route (ex 2 per hour) - Allowed longer and heavier trucks in certain relationships	for heavy and long trucks entering the port	
Mobility management - Marketing public transport with conventional advertising and try out campaigns - Direct processing and marketing of public transport and bicycles at workplaces, residential areas, etc. - New services such as commuter cards on high-speed trains, etc. - Encourage employers to introduce a flexible working week for a more even distribution	**Protective measures** - Adapt measures to the environment to reduce negative impact. (Noise protection, water protection, adaptation to biological functions, outdoor life and cultural environment) - Intrusion-protected railway / tramway with, for example, fencing and camera surveillance - Attention-enhancing measures such as grooving in the road	**Bearing capacity investments**	**New station locations**

of the need for commuting - Flexible workplaces and increased telework - Carpooling portals and developed by the municipality - Coordinated distribution of goods - Green travel plans, travel plans for schools and businesses	- Road safety cameras		
Information - Information campaigns and training on IT for travel-free meetings, etc. - Increased use of information technology for travel-free meetings	**ITS** - Speed reminder - Traffic signal with signal priority for public transport, as well as pedestrian crossings - Real-time information about the traffic situation		**Electric motor roads**
Localisation and planning - Develop coastal shipping	**Supply** - Increased frequency		**Connections to airports**

- Better integration of land use planning and infrastructure planning - Encourage co-location of service functions in rural areas - Fewer parking spaces at e.g. workplaces	- Coordination between different modes of transport - Carpooling system, coordination via social media - Higher quality in public transport with regard to comfort and service - Expansion/improvement of commuter car parks (preferably free of charge) and bicycles (under roof) - Loan cycle system for e.g. travel centers, train stations and bus terminals - Combined passenger and freight trains (pre-loaded freight wagons that can be easily and smoothly connected to long-distance trains) - Car pools and bicycle lending for public transport users		

Charges/taxes - Fees / taxes for use for certain types of traffic e.g. charges for heavy traffic - Higher tolls for trucks, if there is a train or shipping on the route Taxes or charges on air travel for reduced air traffic	**More resource-efficient, safe and environmentally efficient vehicles** - Longer passenger trains - Safe vehicles - Energy efficient vehicles - Better access to renewable fuels (biogas, ethanol, etc.) for heavy freight traffic on the road - Safe vehicles (ISA and alcohol ignition interlock systems)		**New meeting tracks**
Speed - Custom speed limits - Speed control to change the competitiveness of the means of transport	**Travel planners** - Better ticket system (eg SMS ticket) - Real-time travel planner - information on travel time, traffic disruptions, own costs and external costs		

Regulation and legislation - Instruments and rules that affect the choice of transport - Licensing, regulation of activities Changed tax legislation/deduction rules that benefit walking, cycling and public transport	**Standardisations - introduce the control system ERTMS on the railway**		

Table 1: [Examples of non-technical and technical solutions]

References

Website

Swedish Transport Administrations website, https://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/fyrstegsprincipen/

Swedish Transport Administrations website, https://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/Atgardsval/

Reports

Strategic Choice of Measures – A new step for planning of transportation solutions, Handbook, 2013:176, Swedish Transport Administration, Swedish Association of Local Authorities and Regions

Steg 1- och 2 åtgärder i regional och kommunal planering, Hinder och uteblivna nyttor, Studie genomförd på uppdrag av Sveriges kommuner och Landsting, 2018-01-09, WSP

Åtgärdsvalsstudier – nytt steg i planering av transportlösningar, Handledning 2015:171, November 2015, Trafikverket i samarbete med Boverket och Sveriges kommuner och landsting