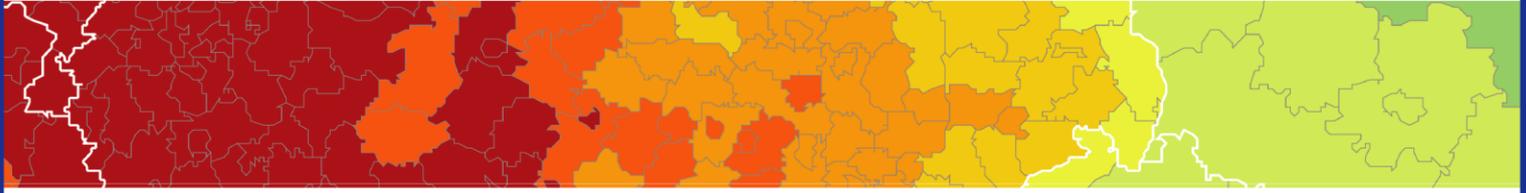


Inspire policy making by territorial evidence



Urban-rural Connectivity in Non-metropolitan Regions (URRUC)

Case study report

Västerbotten, Sweden

07/06/2019

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Authors

Nordregio, Sweden

Grunfelder, J and Löfving, L

Institutions involved

Region Västerbotten

University of Umeå

Municipality of Bjurholm

Municipality of Robertsfors

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Travel-to-work patterns between urban and accessible rural areas is the type of urban-rural linkages that is the main focus in the case study analysis of Västerbotten in ESPON URRUC.

In that context, this case study analysis includes elements on:

- Rural-urban migration
- (Long distance) commuting
- Public transport availability in rural areas.

The two main accessibility-related challenges that have been identified by the research team and the local stakeholder for commuting between urban to accessible rural areas in Västerbotten are:

- Limited attractiveness of public transport provision
- Lack of highly-skilled persons in accessible rural areas

Solutions to improve travel-to work patterns include, among others:

- Customize transport on demand for covering the “last mile”
- Combining delivery of good and services with passenger transport
- Including workplaces as strategic partners for discussions

Introduction

The following case study forms part of the URRUC project and relates to the territory of Västerbotten. Västerbotten is an administrative region of Northern Sweden, classified as a non-metropolitan region with a predominantly rural profile. The case study is split into five sections. Firstly, a contextual background of Västerbotten is presented which contains details of the Region's territorial, economic and social characteristics. This section also provides an overview of the institutional framework for transport and key policies before assessing the current situation surrounding transport provision. Secondly, the case study presents an overview of the urban-rural linkages in Västerbotten with a specific consideration of access to services and travel-to-work patterns. Thirdly, two key transport challenges are identified for Västerbotten in this case study: limited attractiveness of public transport provision and lack of highly skilled persons in accessible rural areas. Fourthly, recommendations to these challenges are outlined based on best practice, operational, non-material, specific context and general context. The case concludes with an analysis of flexible transport solutions.

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Abbreviations

ESPON	European Territorial Observatory Network
EU	European Union
NMR	Non-Metropolitan Regions
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
URRUC	Urban-rural Connectivity in Non-metropolitan Regions

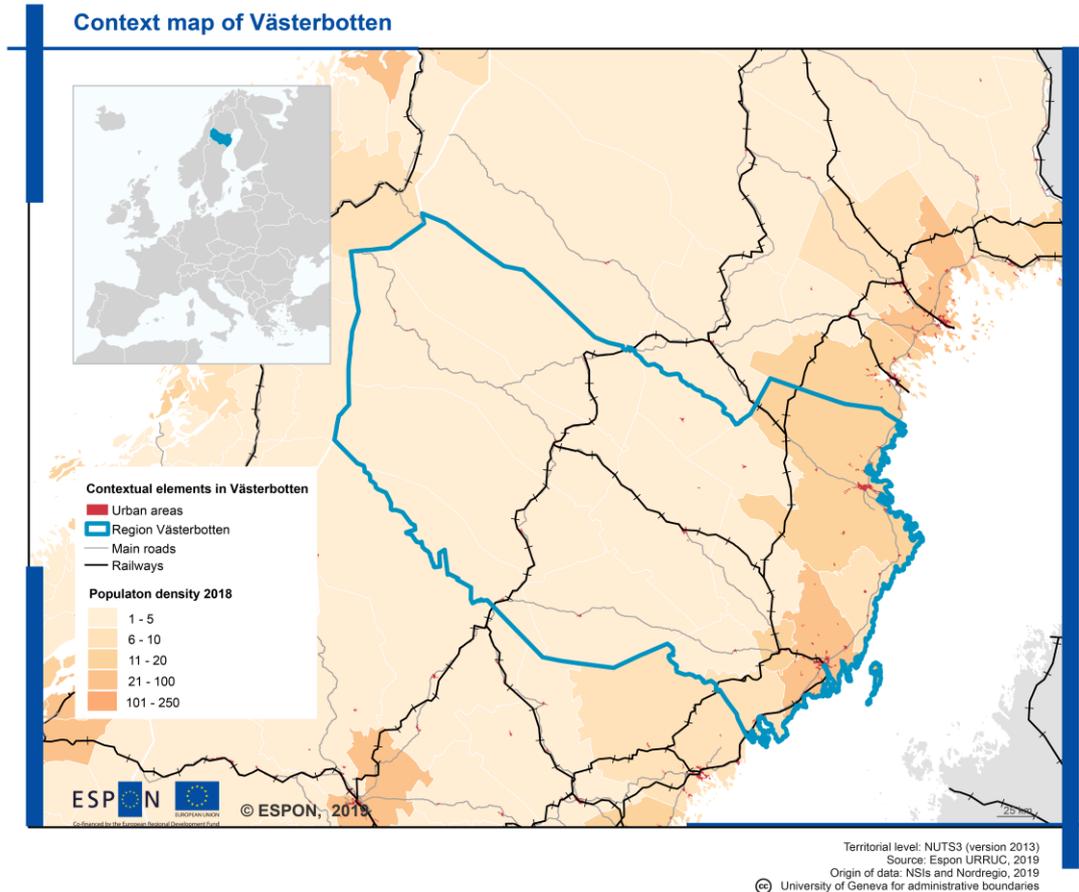
1 Contextualisation

1.1 Territorial characteristics

Västerbotten is an administrative region of Northern Sweden, classified as a non-metropolitan region with a predominantly rural profile, as defined by Eurostat classifications based on population density (Dijkstra & Poelman, 2011). With a total surface area of approximately 54,000 square kilometres and a population of around 268,000 inhabitants in 2018, the population density in the region is around 5 inhabitants per square kilometre (compared to the national average of 23.2 persons per km²) (Statistics Sweden, 2018). This makes Västerbotten one of the most sparsely populated regions in Europe. To give a better idea of the size of Västerbotten, nine countries in the EU have a smaller land area than Västerbotten (e.g. Netherlands or Estonia) and its size is about the same size as Croatia. Its population has been increasing these last ten years at an average yearly population change of +0.4%.

This number hides the geographical distribution of the population within the region. Västerbotten is indeed characterized by its divide between the coast and the interior, and a demographic diversity dominated by the main urban centre(s), as it can be seen on Map 1. Much of its population is concentrated in the coastal areas around the two largest urban areas of Umeå (population 123,382) and Skellefteå (population 32,775). The population is concentrated along the coastline with approximately 85 % living within 75 kilometres of the coast. There are, however, notable population centres in inland areas, such as Lycksele.

Map 1 Context map of Västerbotten

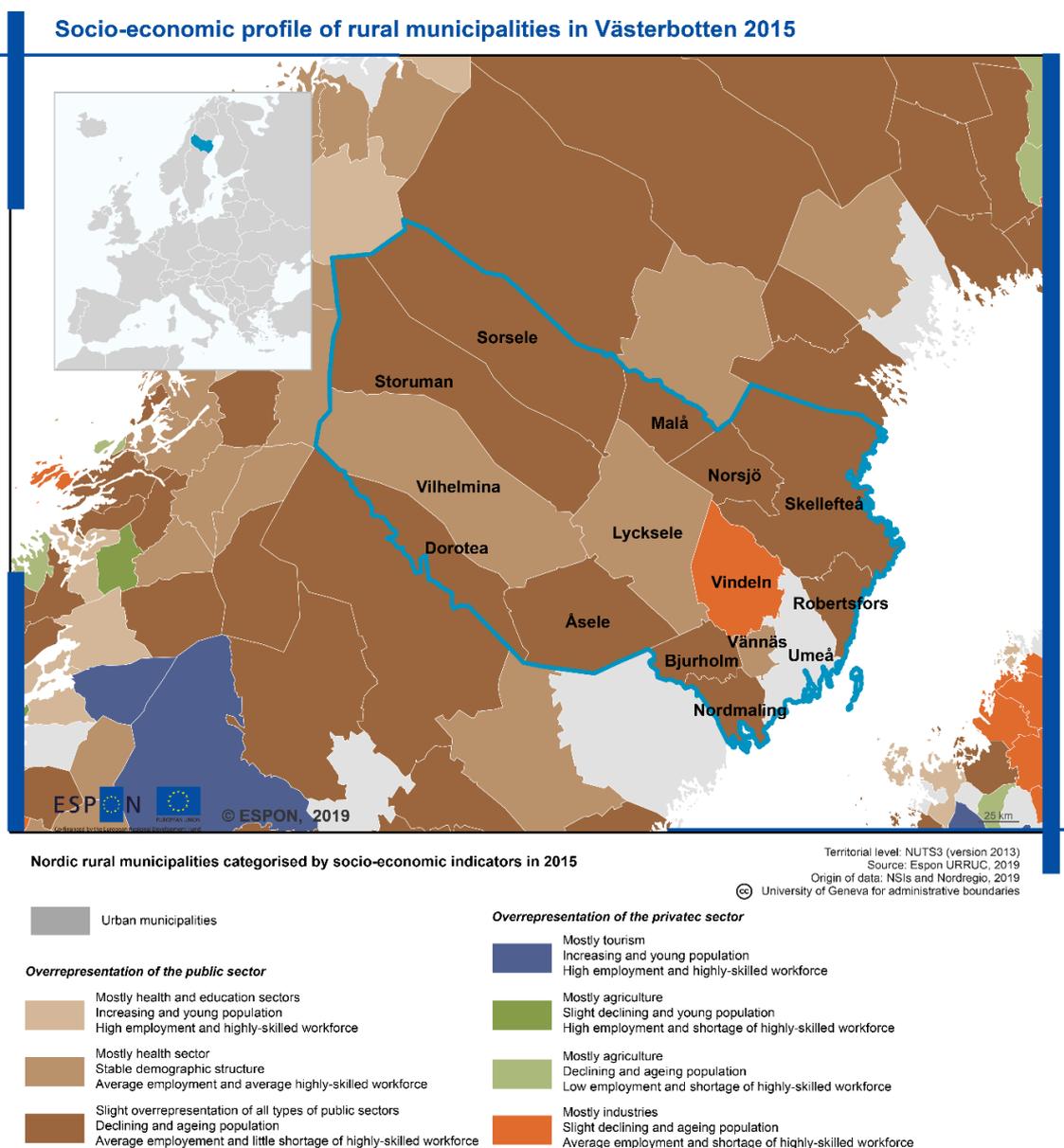


Source: Nordregio

The region of Västerbotten is divided in 15 municipalities (Map 2). 14 of them can be considered as rural (selected threshold of 20 inhabitants per square kilometre). Umeå is the only municipality considered as urban in a Nordic context with a population density around 50 inhabitants per square kilometres. The large majority of municipality (10 out of 15) have a socio-economic profile characterised, when comparing to the Nordic average, by an over-representation of the workforce working in the public sector, a declining and ageing population, average employment rate and a little shortage of highly-skilled workforce. These municipalities are located in diverse parts of the region, from the coast all the way to the inland part along the border with Norway. That is for instance the case of the municipality of Bjurholm, an accessible rural municipality, where interviews have been conducted. Three municipalities have a rather similar socio-economic profile as the one of the first group, with the difference of having a more stable demographic structure, a stronger health sector and less of a shortage of the highly-skilled workforce. That is for instance the case of Lycksele municipality located centrally within the region of Västerbotten. The remaining municipality, Vindeln, has quite a different socio-economic profile from the rest of the rural municipalities of Västerbotten. Vindeln is indeed characterised by an over-representation of the workforce working in the private sector, mostly in industries. However, the municipality also has

common challenges as in other rural municipalities, e.g. ageing population and shortage of highly-skilled workforce.

Map 2 Socio-economic profile of rural municipalities in Västerbotten



Source: Nordregio

1.2 Social characteristics

In 2017, the gender balance in Västerbotten (50.6% of male population and 49.4% of female population) is slightly more accentuated than the Swedish national average (50.2% of male population and 49.8% of female population) (Statistics Sweden, 2018). In terms of age profile Västerbotten has a higher representation of 20-29 year olds than the national average. The area also has a higher than average number of people 60 years and older. In all other

categories the region is lower than the Swedish average. The region is well served from a healthcare perspective. The three main regional hospitals in Västerbotten are listed in Table 1.

Table 1 Regional hospitals in Västerbotten

Name	Location
Norrland university hospital	Umeå
Skellefteå hospital	Skellefteå
Lycksele hospital	Lycksele

Source: Region Västerbotten

Educational attainment is also higher than the national average with 22.8 % of the population having an International Standard of Classification of 5a, 5b or 6, compared to the Swedish average of 21.9 %.¹ Looking at the tertiary level education attainment (ISCED97 5A and 6) of the age group 16-74 in 2018, its share is larger in Västerbotten (22.8%) compared to the national average (21.9%). Educational opportunities are good for the region, though pockets of educational under achievement persist. Västerbotten has three campuses for its main university named Umeå University. They are located in Umeå, Örnsköldsvik and Skellefteå.

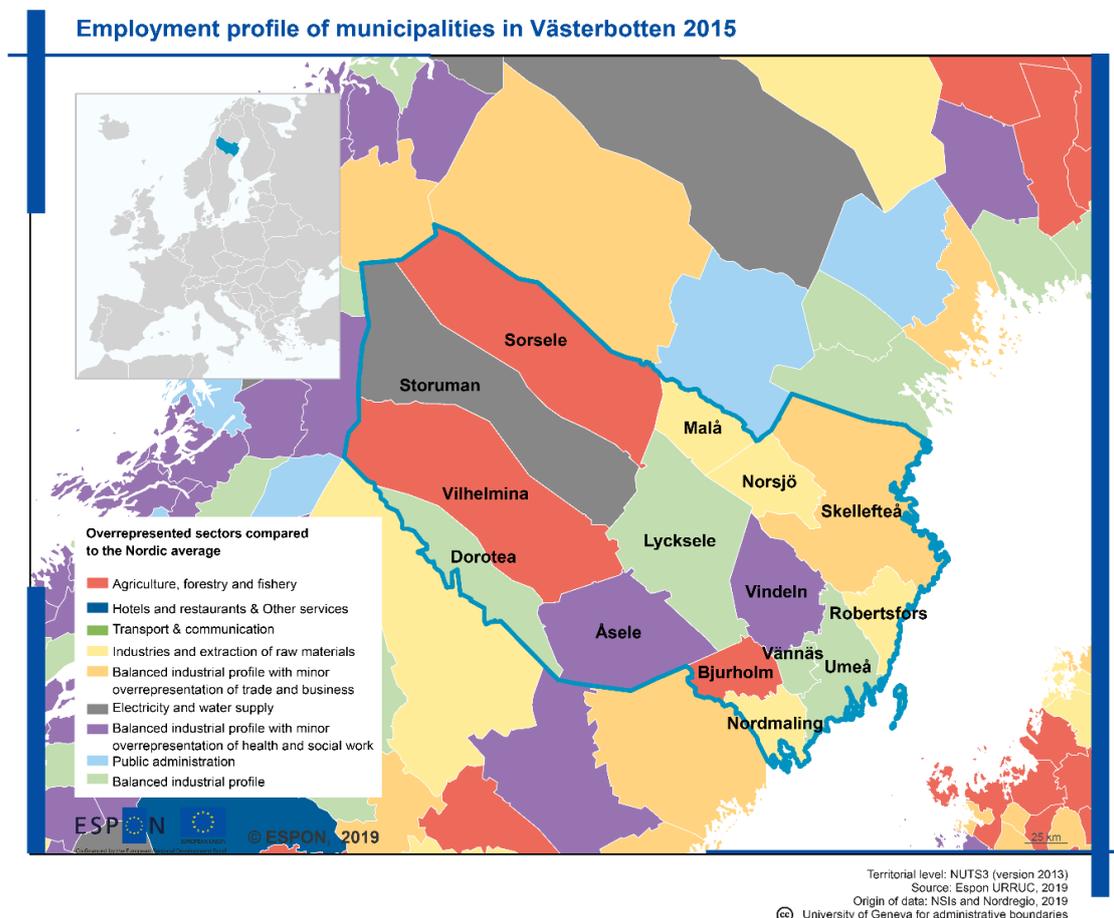
1.3 Economic structures and occupations

The economic structure of Västerbotten reflects its regional characteristics. The region is dominated by forest area (40% of the region) with a long tradition of wood processing and forest products, and a mountain area (30 % of the region) with mining, tourism, and reindeer herding as key economic activities. The Västerbotten economy has recently experienced the highest GDP growth rate of all Swedish provinces. GDP per capita currently is valued at €36,793. Despite this, the region is challenged by the spectre of long-term population decline and demographic ageing. Long commuting distances between settlements contribute to the increasing specialisation of certain areas, which cannot complement each other without creating a mutual imbalance. The formation of small labour markets in industrial and peripheral municipalities has resulted in low employment rates and large outward migration (particularly of young people and women of working age). Areas offering a wider range of jobs as well as higher education - i.e. Umeå, Skellefteå and to a certain extent Lycksele - display a more stable population growth.

¹ International Standard Classification of Education is a statistical framework for comparing educational achievements as identified by UNESCO. More details of the classification can be found at the following link. http://ec.europa.eu/eurostat/cache/metadata/Annexes/educ_uoe_h_esms_an2.htm ISCED 5 are first stage of tertiary education (5A, 5B) Programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skills requirements. ISCED 6 is the second stage of tertiary education reserved for tertiary programmes that lead to the award of an advanced research qualification.

Employment in the primary sector in Västerbotten is higher than the national average (3.4% vs. 2.0%). The same applies to figures for the secondary sector (20.5% vs. 19.5%), whereas the employment in the tertiary sector is lower (76.1% vs. 78.6%). A comparison of the employment profile of municipalities in Västerbotten highlights a diversity of sectors (Map 3). The map does not show the largest sector of employment for each municipality in Västerbotten. In fact, the map highlights the sectors where the share of the employment is over-represented, i.e. higher, than in the Nordic average. It gives an indication of the specialisation of the sectors of employment within a Nordic context. Västerbotten has six out of the nine over-represented compared to the Nordic average sectors. The two main categories are a balanced industrial profile, i.e. no significant sector is over- or under-represented (Umeå, Vännäs, Lycksele and Dorotea) and industries and extraction of raw materials (Malå, Norsjö, Robertsfors and Nordmaling). No municipalities in Västerbotten are characterised by a strong tourism, transport and communication or public administration sector.

Map 3 Employment profile of municipalities in Västerbotten 2015



Source: Nordregio

The ever-increasing labour demands associated with burgeoning GDP growth, combined with skill shortages enhances competition for the workers available from other sectors of society. A diminished labour supply relative to the population also makes it more difficult to find a

suitable competence base among new recruits. This problem is further exacerbated by the generally below-average level of education in many smaller municipalities compared with that of the country as a whole. The number of persons with tertiary level education as a share of the population aged 25-64 shows significant variation across the territory, between 18.2 % in Dorotea compared to 51.8 % in Umeå. Against this background, there is little likelihood that the demand for labour in the inland areas will be met by people moving into the area. To increase flexibility and cooperation between settlements that are narrowly specialised and experience negative population growth, an expanded range of commuting options are needed. The geographic imbalanced distribution of skills results in areas with skills shortage and areas with skills surplus. This is of relevance for analysing urban-rural linkages in Västerbotten. The primary task of the coastal area is to foster the potential for commuting that exists there by linking the towns by efficient transport solutions. Employment opportunities for residents are captured in 10 major firms, as shown in the Table 2.

Table 2 Ten largest companies in Västerbotten (by employees)

Rank	Name	Number of employees in 2016	Location
1	Coop Nord Ekonomisk förening	1145	Umeå
2	Eitech Holding AB	1113	Umeå
3	Eitech AB	1112	Umeå
4	Skellefteå Stadshus AB	908	Skellefteå
5	Thorengruppen AB	807	Umeå
6	Umeå Kommunföretag AB	755	Umeå
7	Ålö Holding AB	672	Umeå
8	Komatsu Forest AB	575	Umeå
9	Norrmejerier ek. För.	514	Umeå
10	Martinson Group AB	452	Bygdsiljum, part of Skellefteå municipality

Source: Statista

1.4 Institutional framework²

Tables 3-6 give an overview of actors involved in the governance of transport in Västerbotten. The tables are divided by administrative level, and provide information on the relevant actors including details on their responsibilities.

² Note that a change of the role of the regional level is on-going in Sweden during the writing of this case study report. Not all competences have been clearly reassigned, which might result in different information than the one included in these tables.

Table 3 List of main national actors

#	Actor	Responsibility
1	Ministry of Enterprise and Innovation (Näringsdepartementet)	Takes decision on national transport and infrastructure plans based on the proposal from Trafikverket. Once the draft is approved by the government, Trafikanalys performs a quality-check on both national and regional transport/infrastructure plans.
2	The Swedish Transport Agency (Transportstyrelsen)	Stipulates rules and monitors how they are followed, grants permission (driver's licenses and certificates) registers change of ownership and manages congestion and vehicle taxation. It also has the overall responsibility for commercial transport on roads in Sweden as well as to regulate the Public Transport Authority's (Kollektivtrafikmyndighet) exercise of authority.
3	The Swedish Transport Administration (Trafikverket)	Responsible for long-term planning of the transport system for all types of traffic, as well as for building, operating and maintaining public roads and railways. The Swedish Transport Administration has the main responsibility for implementing the National Transport Plan.
4	Traffic Analysis (Trafikanalys)	Reviews bases for decisions, assesses measures and is responsible for statistics.
5	TP-SAMS	TP-SAMS (Transportsektorns samverkan inför samhällsstörningar) is a way for transport sector and the public actors to jointly seek solutions to challenges that cause social disruptions. 20 partners are involved in this cooperation.

Source: Authors' own elaboration

Table 4 Main regional actors

#	Actor	Responsibility
1	Region Västerbotten	Has the region's overall responsibility for infrastructure planning that would enable commuting, competence supply and accessibility with the shortest travel time possible. More specifically it is primarily responsible for: (1) formulating a transport plan after the government has approved the general framework and (2) ensuring, in consultation with the Swedish Transport Administration, its effective implementation. The 1 st of January 2019 "Region Västerbotten" and the "County Council" merged into one organization by the name Region Västerbotten with responsibility for health care and regional development. (caution: The use of "Region Västerbotten" is in this report referring to the old organisation, this because the reorganisation and distribution of responsibilities is not yet fully completed).
2	County Council (<i>Landsting</i>)	Has a responsibility for the inter-municipal transport e.g. main/trunk lines, costs of railway transport.
3	Municipalities (<i>Kommuner</i>)	Have a primary responsibility for planning and budget for within-municipal transport.
4	Region 10 ³	A joint collaboration between 10 inland municipalities - Arjeplog, Arvidsjaur, Dorotea, Lycksele, Malå, Norsjö, Sorsele, Storuman, Vilhelmina och Åsele - to have a stronger voice regionally, nationally and internationally in questions related to regional/municipal development and growth (also in transport related matters).
5	Transport operators	Länstrafiken i Västerbotten AB has been owned by Region Västerbotten since 1 January 2012. The new law that came into

³ total geographical area - 62 600 km²; population - 49 400.

	(Länstrafiken)	<p>force at the turn of the year stipulates that each County must have a public transport authority. Länstrafiken's mandate is to procure and, through tender agreements with various transport providers, run interurban transport services for passengers and related conveyance of goods by bus in a country transport network within Västerbotten and in adjacent areas.</p> <p>The municipalities and the County Council "order public transport services" at the Public Transport Authority, which, if necessary, decides on traffic obligations, and gives Länstrafiken the task of procuring or making adjustments within the existing agreement.</p>
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Source: Authors' own elaboration

The following tables aim at giving an overview of policies in the field of transport with relevant for Västerbotten. The tables are divided by administrative level and provide information on relevant strategy/policy document with a brief description.

Table 5 National policy overview⁴

#	Strategy/policy document	Brief description
1	The national plan for infrastructure 2018 - 2029 (Nationell plan för transportinfrastrukturen 2018–2029)	The plan regulates national infrastructure and its overall objective is to create a robust and reliable transport system, with a focus on digitalization, automation, and sustainability. The Government has adopted a national plan for infrastructure for the period 2018–2029. It is a total investment of SEK 700 billion and the largest railway investment in modern times. The plan covers major investments in both new construction and restoration and modernization of existing infrastructure. The decision also covers significant investments in maritime transport infrastructure and roads.

Source: Authors' own elaboration

⁴ There is a clear and effective division of accountability and responsibility as regards infrastructure development between the government, municipalities and the County Councils responsible for municipal road network and regional public transport. The governmental responsibility in its turn is also divided between national infrastructural plan (that also regulates operation and maintenance of the entire public road- and railway network) and counties' transport plans.

Table 6 Regional policy overview

#	Strategy/policy document	Brief description
1	Regional Traffic Supply Program for Västerbotten County 2016–2019 (Regionalt Trafikförsörjningsprogrammet för Västerbottens län 2016–2019)	<p>The strategic plan for regional public transport in Västerbotten. It fulfills several functions. Although the content is governed by the law and there are general guidelines for the structure, the content of these programs varies from County to County.</p> <p>The Västerbotten´s Traffic Supply Program provides a political steering in terms of common vision and overarching incentives. Also adds structure to the Public Transport Authority's and partners' work on the development of public transport at the regional level. This means that the municipalities and the County Council themselves have plans for their public transport, and the Regional Traffic Supply Program needs to keep up with these plans.</p>
2	Transport plan for Västerbotten 2018 – 2029 (Länstransportplan för Västerbottens län 2018 – 2029)	<p>The County's Transport plan is a Västerbotten's joint steering document to co-ordinate the efforts and to mobilise resources for the development of region's infrastructure including roads, railways, bicycle and pedestrian planning, terminals, environment and climate incentives etc.</p> <p>Defines strategic development objectives for the County's transport infrastructure. The financial framework: SEK 919 million (about SEK 77 million per year).</p> <p>This plan is part of a larger ongoing strategic planning work at both national and regional levels and is influenced by already taken strategic decisions and incentives such as national infrastructural plan (that also regulates operation and maintenance of the entire public road- and railway network), regional development strategy, previous County's transport plan 2010-2021 and the speed limit revision. This implies that the strategy will contribute to the identified priorities by focusing on: (1) railway-related incentives; (2) road safety and road traffic incentives (including speed limit measures); (3) measures aimed at strengthening the East-West Co-operation; (4) walking and cycling measures.</p>

Source: Authors' own elaboration

1.5 Transport provision

In terms of transport and accessibility, most trips in Västerbotten are made by passenger cars. In addition to passenger cars and buses, the roads are also transport corridors for heavy goods vehicles, which results in declining quality of the roads as well as more traffic. The European main roads are narrow compared with similar roads elsewhere in Sweden and often lack middle barriers. The steady economic growth in the region combined with an increase in the number of routes for heavy goods shipments passing through the region has encumbered many main arteries with large numbers of heavy goods lorries, which wear down the roads. These heavy goods vehicles also drive more slowly than other road users and are frequently difficult to pass on the narrow roads.

As most employment opportunities are within urban and coastal areas, they attract large parts of the region's job seeking population. This, in turn, impacts on travel-to-work patterns; roughly 15% of the employed population in Västerbotten commutes to and from work across a municipal boundary. Those commutes occur foremost between municipalities along the coastline or between coastal and inland municipalities. Commuting across regional borders are rarer. It should be noted that municipalities in Västerbotten cover relatively large territories, resulting in a number of intra-municipal commuting flows. Analysing commuting flows at the level of urban areas and local settlements therefore gives a more precise idea of the commuting patterns in the region. At the same time, the length of the average trip to work in the region is shorter compared to other parts of Sweden. On the one hand, shorter trips indicate (formation of) small local labour markets with short distances between homes and workplaces; on the other hand, however, the travel pattern also indicates that the municipalities are located far from each other, i.e., at distances that cannot generally be spanned within reasonable travel times.

In most cases, public transport services fail to meet the demand for work commuting in the inland areas. The low population density and large distances between the towns makes it highly cost-intensive to design services for commuters, and the public transport system is at present configured almost exclusively to meet the demand for travel to and from school. Most of the inter-municipal travels by bus are located along the coast and are limited to a couple of cities in the inland sub-part of the region. There are, therefore, three key policy challenges related to conveyance of persons and urban-rural connectivity in Västerbotten:

- Improved coast-inland and intra-regional connectivity through better commuting opportunities and solutions
- Harmonisation of different transport modes to reduce commuting time
- Sustain public transport to and from less urban parts of the region

2 Urban-rural linkages

2.1 Identification of urban-rural linkages in Västerbotten

Mapping the different linkages that exist between rural and urban areas contribute to a better understanding of their interdependence. The OECD (Piacentini and Trapasso, 2010) developed a typology of types and sub-types of urban-rural linkages identified in OECD countries. Four main types were identified: demographic linkages; economic transactions and innovation activity; delivery of public services; and exchanges in amenities and environmental goods. Each of these four types have sub-types.

The urban-rural linkages identified as highly relevant in the region of Västerbotten are:

- Urbanisation (rural-urban migration)
- Commuting (long distance) and counter-urbanisation
- Public transport availability in rural areas
- Access to countryside for leisure and recreational use by urban residents

Urbanisation (rural-urban migration): because of urbanisation, there is a large lack of competence in many rural areas, in small municipalities and especially in more peripheral small municipalities, both in public and private sector. Commuting possibilities are of high importance both to and from these communities. Obviously, for attracting specialised labour from other parts of the region, and from urban areas, comfortable commuting is important. However, even if a person is interested in a job, and ready to move from an urban area to a small town, there might be another adult person in the household with less obvious employment possibilities there. Poor diversity of jobs for highly educated individuals, and poor diversity of jobs overall is not unusual. This means that in a household/couple, easy commuting from urban areas to the rural area is important in order for companies and municipalities to be able to recruit one person from the household: the other person might need to commute to an urban area over a long period.

Commuting (long distance) and counter-urbanisation: Long-distance commuting is a characteristic of sparsely populated regions such as Västerbotten. Possibility to do home working contributes to have people residing in more rural parts of the region.

Public transport availability in rural areas: Public transport is most relevant for school transport today, and the trunk lines are, in addition to commuters, used for receiving healthcare services. Public transport does have a big potential for urban-rural linkages in the future, especially PT defined inclusively, including formalised car-sharing, taxi, and other on-demand services. However, for connectivity between the most rural areas and nearby cities, traditional public transport (big diesel buses) is not a solution, it might be part of a travel chain though. A better sub-type might be “public transport mobility within, to and from rural areas”.

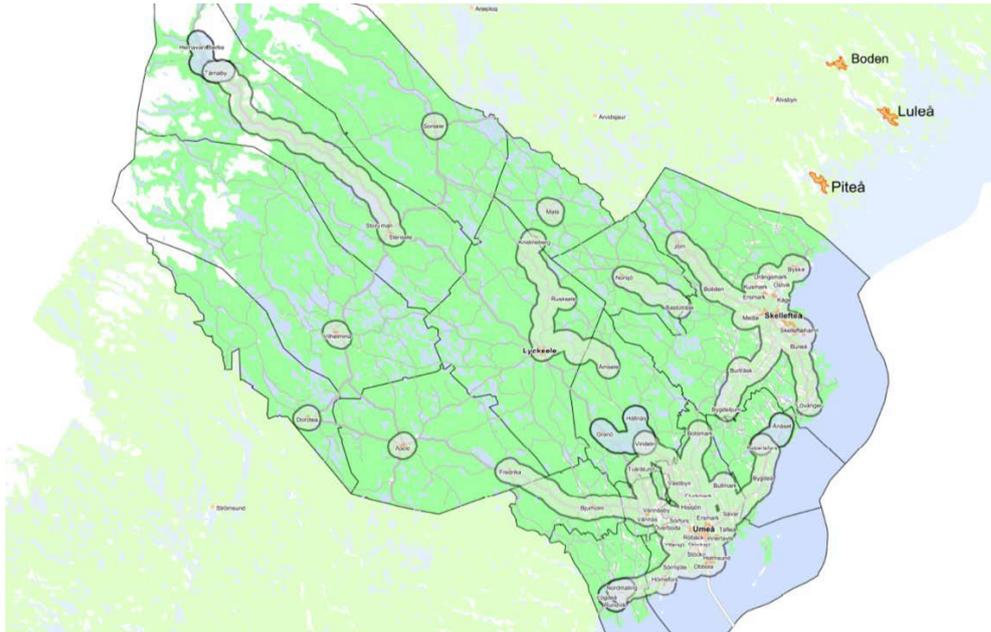
Access to countryside for leisure and recreational use by urban residents: It is important for future access to countryside for leisure and recreational use by urban residents. With climate change, leisure is likely to become more regional and local, and regional and local leisure (both for urban and rural residents) is valuable for development.

The focus of the case study analysis of Västerbotten in ESPON URRUC is on the commuting patterns (also referred to as travel-to-work patterns) from urban areas to accessible rural areas by different modes of transport. This focus includes aspects of the first three identified urban-rural linkages mentioned above. The last point about leisure and recreational use is the focus of another project run by region Västerbotten, hence it will not be analysed in this project.

2.2 Travel-to-work patterns

Figure 1 highlights the main commuting patterns within Västerbotten. Several types of commuting patterns can be distinguished. On the one hand, most of the commutes are connected to a local labour market dominated by an urban centre. In fact, the two coastal urban centres, Umeå and Skellefteå, attract commuters from a number of municipalities located both along the coast as well as more in the inland part of Västerbotten. The majority of these trips are less than an hour by car, train or bus, but some are slightly longer, e.g. between settlements located in Åsele municipality and Umeå that have to travel relatively long distances (Region Västerbotten, 2016). A similar commuting pattern, but at a more minor and local scale, can be seen between several settlements and the local labour market centre of Lycksele. On the other hand, very short commuting distance takes place within rather small rural settlements in the inland parts of the region, e.g. Dorotea and Vilhelmina. An exception is the long commuting of 128 kilometres between two small settlements (Storuman and Tärnaby) both located within the municipality of in the inland part of Västerbotten.

Figure 1 Main local labour centres and main commuting flows in Västerbotten



Source: Regionalt trafikförsörjningsprogram för Västerbottens län 2016-2019

In this context, providing a public transport service for commuting purpose is challenging in some part of the region, mostly in its north-western parts where the number of commuters is rather low and the use of car is the main or even sometimes the solely viable option. Public transport, both bus and rail services, exist along the coast as well as between the main urban areas and the accessible rural areas. The public transport services are generally good along the major commuting routes in the area around the Västerbotten coasts, i.e., trips where the distances are reasonably short and there is sufficient demand (Trafikanalys, 2014).

3 Present accessibility challenges

The two main accessibility-related challenges that have been identified for commuting from urban to accessible rural areas in Västerbotten are:

- Limited attractiveness of public transport provision
- Lack of highly-skilled persons in accessible rural areas

3.1 Limited attractiveness of public transport provision

Even if a bus or train service exists, it faces a number of challenges to attract commuters. For example, the services are intended for commuting based on business hours, which means that certain occupational groups have difficulties commuting to and from work using public transport if their travels involve commuting outside ordinary rush hours. A respondent using public transport explains:

“I have a visual impairment and therefore I can’t drive. I am stuck with public transport. If I finish early one day I can’t take an earlier bus, I just have to wait. At the moment I feel I could have more freedom working in Umeå instead (in the city).” (Respondent 2).

Public transport does not provide the possibility to have a multi-purpose trip that would include a stop between the workplace and the place of residence. Furthermore, railroads in Västerbotten are mostly single tracked. Except for the Bothnia Line, the overall quality of the railroads is rather low (i.e. low speeds and high capacity utilisation). The combination of single tracks and high capacity utilisation also renders the railroad traffic susceptible to disruptions. The harsh winters reduce the attractiveness of public transport services; delays and technical problems are often challenged for the train services whereas unpleasant bus stops (e.g. lack of light and shelter) and lack of traffic information negatively affects the bus services in more rural parts of Västerbotten. A respondent explains how the topic is discussed in her area:

“We who live here think the discussion about using public transport is a bit weird and irrelevant. It doesn’t work for us, even if it might work in Stockholm. Here we have to use what we have. Since there are so long distances there are no alternatives to the car. But we try to car pool and have web-meetings.” (Respondent 5).

According to interviewees the fear of missing the last bus in several hours or not trusting that the bus will come causes everyday stress. In general, it can be said that the deficiencies exhibited by public transport are similar to the challenges in the existing road system. For example, long distances and road conditions.

A major reason as to why people do not use public transport is that the difference between public transport and the car in regards to time and comfort is significant. From many villages the travel time, using public transport, is double or triple the length of using a car. It also

includes several changes between means of transport and extra waiting time. The buses generally depart and arrive in the main urban poles, and inland commuters need to go to Umeå before continuing their trip to another inland municipality. From interviews regarding commuting to Bjurholm we found that even though some car commuters were satisfied driving, many would rather use public transport "if it was possible". The main argument for wanting to use public transport instead of the car is to reduce costs, but also difficulties of driving in northern Sweden such as bad weather, slippery roads, wild animals on the roads and driving in the dark were emphasised by the interviewees. Some pointed to the psychological stress that came from driving during the winter. A respondent commuting with car explains:

"I'm very afraid to hit an moose, it is physically exhausting driving, both in the dark, on slippery roads and with the constant possibility of wild animals on the road. If I could travel with bus I wouldn't have to be afraid every day." (Respondent 3).

Others would like to have the travel time to relax, sleep, work or organise things. Reasons for why the car is put forward as the only functional alternative can be divided into two groups. The first is connected to the personal preferences of commuters and the flexibility of the car. People with children need to be able to leave work if something happens and cannot wait several hours on the next bus. Other people drop their children at school, if they are too young to go by themselves, or if they go to school in another municipality. In this case, they may not be entitled to alternative transport such as a school taxi. Due to the requirements of everyday life, transport needs to be flexible and fast. A respondent explains:

"I can imagine that it depends on where you are in life. If you are in a position with a family and small kids, public transport can't give you the flexibility that is so important. That it just something to realise, unless you maybe live in Stockholm. If I didn't have to take my family into account it might work IF the buses departed at least once an hour." (Respondent 8).

The other group of arguments is related to work conditions. Some people need a car for work and the number of company cars at the work place are sometimes limited. Others never know exactly what time they will finish work and cannot adjust the work hours around the time tables of the bus.

Another discussion point highlighted by public transport commuters are the high prices of the travel card. If you want to travel across municipal boundaries (from Umeå to Bjurholm for example) you need a travel card for the entire region of Västerbotten which costs 160 euros a month even though you only travel a shorter distance. From interviews with commuters we found that car commuters spend between 300-500 euros a month on fuel and for those that ride together (mostly families) the price per person is halved. Even though car commuting is more expensive, public transport commuters think the difference in price should be greater if public transport should have a chance to compete with the car.

3.2 Lack of highly-skilled persons in accessible rural areas

This situation of urban to accessible rural commuting patterns and the lack of a highly-skilled workforce mentioned in the previous section are closely linked. Harsh-winter conditions and relatively long commuting distances do not attract highly skilled workers, who are mostly living in the main urban areas of Umeå and Skellefteå. Commuting with public transport to accessible rural areas is possible, most of the time by bus rather than by train. Yet, the limited number of departures and the location of workplaces that are not always in direct proximity of the bus or train station in the rural settlement does not favour using these means of transport over the use of a car. An example is the case of a student living and studying in Umeå and employed on a ski area in Bjurholm. A bus connection is provided on the weekend between Umeå and the ski area. However, the bus arrives at the ski area after the time that the work-shift has started. The bus is therefore only designed to be used by skiers and not the employees. Hence, this student will use a car to get to the workplace.

According to an interviewee, recruiting highly-skilled persons living in urban areas to work in accessible rural areas of Västerbotten is possible. Profiles of economists and engineers are required and can be found in accessible rural areas. However, a workplace in need of such profiles can have difficulties in sustaining an economic and employment structure. The interviewee mentioned the fear at some business where employees commuting from urban areas find a similar position closer to their place of residence. The situation mostly occurs with dual-income households where both individuals need a job and are skilled, hence the more attractive labour markets in the urban areas of Västerbotten. Internal training of the workforce can happen in some specialised workplaces located in accessible rural areas. Again, this investment that is often necessary can also be at risk if the employee changes job in the near future. Another point highlighted by the interviewee is that wages can play a role in attracting and maintaining skilled workers, but it might be financially harder for the public sector than for the private sector.

The conditions in different accessible rural areas when it comes to attracting skilled labour should be recognised. For example, the municipality of Robertsfors is located along the coast within 1-1,5 hours commuter distance from the two urban poles Umeå and Skellefteå and along the European route E4. Even though they are also struggling to recruit high skilled labour such as engineers and environmental inspectors their location is more fruitful for commuting than inland municipalities such as Bjurholm. Since public transportation is relatively frequent to Robertsfors and express bus services depart every hour, in comparison to 3-4 times a day in Bjurholm, public transport is popular. Many people commute to Robertsfors from Umeå and Skellefteå even though the number of out-commuters is still higher. In addition the new railway, Norrbottniabanan, along the coast planned to be finished in 2030 will provide even better connections. Since the accessible rural areas are competing for high skilled labour from the urban poles developed roads and public transport are essential to attract and keep high skilled work force. In interviews with people commuting from

Umeå to Bjurholm we found that some are questioning the sustainability of their commute. One has bought a house in Bjurholm and another is considering working in Umeå in the future. A respondent commuting 100 km by car explains:

“I’m really happy and satisfied with the position here but if a similar position appears closer to where I live I will apply for it, the commuting is a real disadvantage.” (Respondent 8).

If a commuter decides that he/she doesn’t want to commute anymore the options are either to change work or to move to the place where you work, as the interviewee mentioned above. However, a problem in many municipalities in Västerbotten, Bjurholm and Robertsfors included, is the absence of properties. The houses are not for sale even though many are vacant most part of the year. This because of the low estimated value of the houses and the limited profit of selling. Because of the low valued houses, it is also difficult to receive loans from the bank to buy a house in the inland. Further, some houses are tied to land with forestry. The possibility of keeping an employee that doesn’t want to commute anymore is therefore not very high. A respondent explains:

“When I got the position in Bjurholm I tried to buy a place here but there were none, so I started looking in areas around Bjurholm instead. There are so few properties in Bjurholm. The houses are either connected to land with forest or the houses are valued so low that people rather keep the houses even though they don’t live in them.” (Respondent 7).

3.3 Stakeholder concerns

The local stakeholders in Sweden, Region Västerbotten, are developing their new strategic plan for public transport in Västerbotten in 2019. Their main concerns in the context of the ESPON URRUC project are related to public service provision and urban-rural linkages in Västerbotten. These concerns are expanded below:

- How public transport, together with other sustainable modes, including less traditional modes of mobility like digitalised car sharing, Mobility As A Service and folding bikes can improve long distance commuter’s lives and improve recruitment in smaller municipalities and their industries. This is partly a behavioural issue but also concerns design of transport services and infrastructure. Region Västerbotten work with this issue intensively during 2019 in the project HAR (Hållbara arbets- och tjänsteresor; Sustainable commuting and visitors’ trips). This is an issue relevant in the decision process of choosing a location for both inhabitants (i.e. place of residence) and companies (i.e. office or manufacturing location), whether they decide to locate in the rural or urban parts of the region.
- Urban-rural linkages for tourists and other visitors. Accessibility is a top 3-theme for tourism companies and other tourism stakeholders in Västerbotten. It is especially a challenge for reaching sights and places by public transport that are located outside of the main urban areas. A currently active project, Mobevi, aims at creating a

transport or mobility solutions that will be part of the future policy toolkit for urban-rural linkages in Västerbotten.

The case study analysis of Västerbotten in ESPON URRUC could focus on either of these two main issues. They are closely linked to the urban-rural linkages that have been identified as highly relevant in Västerbotten, namely urbanisation, commuting and counter-urbanisation as well as and public transport availability in rural areas. A discussion between the local stakeholders and Nordregio ended in a decision to focus on the first issue mentioned above. Nordregio conducted qualitative analyses of commuting patterns of urban dwellers to workplaces located in the accessible rural areas of Västerbotten, i.e. within 75 minutes commuting time by car from the largest urban areas. This is the case for the municipality of Bjurholm that can be reached in circa one hour by either car or bus from Umeå, in which several interviews have been conducted. The main idea is to understand the motivations of commuters, to gain insight on their willingness to work in the rural area, among others. This analysis would be completed by interviewing students and experts from Umeå university who are either commuting to accessible rural areas or have an in-depth knowledge on the opportunities and challenges of urban to accessible commuting in Västerbotten. Below is a preliminary list of interviews of actors for this case study analysis:

- The municipality of Bjurholm located in accessible rural part of Västerbotten (municipal staff).
- Umeå University (professor and students in the fields of tourism and planning)
- Region Västerbotten (our local stakeholders dealing with public transport, mostly)
- Staff from the municipality of Robertsfors

The choices of actors to interview for the study in Västerbotten are made to get a broad perspective of rural-urban migration and to understand how public transport availability play into that. The actors will both be able to reflect on challenges as well as wishes for the community and the region. How the different ideas relate to each other and fit into a broader institutional structure are of importance to provide relevant policy recommendations anchored both with the local community, the industrial life and the public authorities. Input from the university is of importance to understand the bigger picture of historical change and trends needed for us as outsiders in the community.

One of the main obstacles to improving public transport in general is limited financial resources. The political view in Västerbotten has been that the resources should not increase but neither decrease. The stakeholders therefore want to find innovative solutions that can be combined with the already existing traditional public transport system but also with less traditional modes of mobility like digitalised car sharing, folding bikes and Mobility As A Service. The lack of financial resources is often coupled with a lack of time for civil servants, which reduces efficient cooperation between actors in the transport sector. Since there is not always time for a meeting to coordinate and brief other affected actors, the work process can

be subject to double work or missed opportunities to collaborate. The stakeholders mean that because the different actors have separate budgets, which are all limited, it is even more important to coordinate the actions and view the whole transport system as a whole entity. And in this process also look at solutions over municipal and regional boundaries as well as between means of transport to save resources.

The development and the testing of new solutions project funding is essential. The actual testing of new vehicles/systems in traffic is however very expensive and in projects funded by the EU money cannot be used for that purpose. To change the behaviour of people and make them use a new public transport solution it is essential that the project is allowed time to spread and be familiar to people. Since this testing period requires big resources pilot project are hard to implement or they are tested to short time and in to little frequency to actually make a difference, which is a problem according to the stakeholder. An example of a pilot project is MOBEVI that aims at finding a way to combine transport of goods with transport of passengers.

Changing the perception of public transport and making people more aware of the benefits of using public transport, are important goals for the stakeholders. To do so, information needs to be collected about the citizen and visitor's needs. How, when and where would they like to travel and why are they not using public transport today? This is also a first step towards finding out where the resources can make biggest difference, where needs can be combined, and which public transport systems should be reprioritized. This is partly already happening through the project HAR (Hållbara arbets- och tjänsteresor; Sustainable commuting and visitors' trips). To target commuters is especially important for the stakeholders since commuters are a large group with a lot to gain from travelling with public transport. Except from having a more relaxing trip they can also work during the trip and thereby reduce time at the workplace and save a lot of money that before was spent on gasoline. Improving public transport for commuters will also help attract and sustain highly skilled work force in rural accessible areas.

Finally, the stakeholders are also asking for more specific goals from the politicians and a clearer political opinion about who the public transport system should benefit. The existing strategies are broad and have an overarching perspective, which is desirable, but since the rural areas often are forgotten the strategies could benefit from highlighting rural areas as a separate entity with specific goals. The broad perspective together with a zoom in on the rural setting would make it easier to analyse the effect a policy can have on the urban and rural areas as well as on the linkages between them.

4 Potential solutions and recommendations

4.1 Best practices

Best practices listed below corresponds to relevant examples for Region Västerbotten which focus on improving urban-rural commuting conditions. The examples are taken from a list of rural mobility solution database created for the Interreg Baltic Sea project MAMBA (Maximising mobility and accessibility of services in rural areas of the Baltic Sea Region), available at mambaproject.eu/map. The database contains tens of best practices examples that are categorised by type of solutions. Several types of solutions are of particular relevance for Västerbotten in the context of the ESPON URRUC project.

Firstly, two projects⁵ in rural Finland initiated and run by Aalto university in cooperation with the Ministry of Transport and Communications of Finland deal with transport on demand solutions. The first project, *Föli*, is a joint public ToD transport services for six municipalities. It has a fixed pricing scheme and the tickets that are valid across the region, aiming at making it easier and more attractive for the citizens to use the public transport. The second project, *LIIKE*, is a program aiming to accelerate bottom-up transport innovation. As a part of the project, a village association in Tervakoski planned their own village bus 'Tassu-bussi', that now runs permanently.

Secondly, three projects on combined transport solutions are also of interest. In Beskidzki⁶(Poland), the local governments (the Bielsko district and nine municipalities) have created a common union that has merged their common interests and organized public transport from rural to urban areas. Transport also reaches areas where private carriers do not provide services. Linking transport at the municipality, county and voivodeship level. The Rad+Bus mobilstation⁷ in Münsterland (Germany) offers customers holding a monthly bus subscription to use pedelec bikes. The aim is to promote the use of the local bus and bikes either for combined or separated trips. This project is the result of a cooperation of the municipality of Mettingen, 2-Rad Wulfekammer and Optimal Reisen Forsmann. Söderåstrafiken⁸, in Bjuv (Sweden) in cooperation with other municipalities and regional and national transport administration, is another good example combining different public transport services within the municipalities, e.g. school bus services with regional bus lines.

Thirdly, car or ridesharing projects can be highlighted. ELLI⁹ is a transport solution that provides a ridesharing service self-organized by the inhabitants of the area, where voluntary

⁵ <https://www.janakkala.fi/palvelut/liikenne-ja-kadut/joukkoliikenne/aikataulut/>

⁶ <http://www.bzpg.pl/>

⁷ <https://www.rvm-online.de/regionalverkehr-muensterland-unternehmen/projekte.php>

⁸ <https://www.bjuv.se/Invanare/Gata-park-och-trafik/Resor/Soderastrafiken/>

⁹ <http://komob.de/wp-content/uploads/2018/01/2017-12-18ELLI-Start.Bericht.pdf>

drivers offer rides with cars provided by ELLI to complement the public transport offer. Hämta¹⁰ is a pilot project of a digital platform for car-pooling aiming at complementing public transport with car-pooling. Mitfahrscheibe¹¹ is another ridesharing solution, initiated by a student, that uses park discs to identify the drivers' cars as well as logos on parking lots to highlight the location of the stops.

Finally, a service-to-people solution should be mentioned: Kombibus¹². This project initiated and run by district Uckermark (Germany), Uckermark Transport Company and private consultants. Kombibus correspond to regional passenger busses that are equipped with a trailer to transport goods. People can send their packages, goods or mail from the bus stops to other parts of Germany.

4.2 Suitable Alternatives to Private Car: Operational Level

Transport on demand (bus or car): Bus on demand or "call cars" with fixed routes exist in Västerbotten. However, public awareness is low. With the high costs of trips for call cars, municipalities want to prioritise the usage of them. Finding the right target group where the cars make the most difference is therefore of importance. A process to map where the cars are used has started, and after that a ranking of which routes should stay on is required. Transport on demand has been widely discussed for several years but less so recently. It is however considered an important solution to investigate since it contributes to connecting urban and rural areas, hence improving living conditions in the region.

Intermodal Parking Facilities: Commuters from urban to rural areas would benefit from living in the urban areas, as they wish to do, and have a good accessibility by public transport to rural areas. More intermodal parking facilities with engine heaters a roof to protect from snow (necessary in winter) is needed, for both cars and bicycles.

Redesigning the bus layout: Redesigning the bus layout and fleet could contribute to increase its attractiveness for a larger group than school children and students. Since bus services between urban and accessible rural areas are usually not overcrowded, maximizing the number of seats should not be the priority. It should rather be comfort and services (WIFI, silent zone, etc.).

Non-Material and Digital Solutions

Dematerialisation of services: Because of long distances and good internet access, digital services can reduce the need for some travel while at the same time making public services

¹⁰ <https://24blekinge.se/privata-forare-den-nya-kollektivtrafiken>

¹¹ www.mitfahrscheibe.de

¹² www.uckermark.de

more accessible throughout the region. The use of the existing high performing level of broadband for people to access services digitally (e-learning, e-health) should be seen as a tool to reducing their need to travel. Digital solutions should be accompanied by training programmes for the target users, who will be utilising these services. Projects of E-health, E-learning and implementation of E-services exists but can be improved and extended.

4.3 Recommendations for the specific context

Combining service and good delivery with passenger transport: Sharing transport of passengers and goods is highly relevant in Västerbotten. The project, MOBEVI, between Umeå institute for design, Swedish Agency for Economic and Regional Growth and the Swedish Transport Administration are doing a pilot study on how transport for visitors and food transportation can be coordinated. Passenger transport could also be coordinated with public services such as the mobile post office, medical prescriptions at pharmacies or mobile library. It is especially worth investigating how passenger transport and freight transport can be integrated due to its specific context, i.e. a non-metropolitan region with low population density and a lack of critical mass.

Issue of funding for pilot project: There is a lack of knowledge surrounding mobility solutions between urban and rural areas in (sparsely populated) Non-Metropolitan Regions (NMR). EU and national funds for mobility and transport projects contribute at gaining some insight on this topic. However, they do not allow for testing the possible solutions. This is especially important in this kind of regions where commercially profitable solutions are limited.

Workplaces as Strategic Partners: A key priority for the Region is to improve commuting between urban and rural areas. The improvement of commuting habits between urban and accessible rural areas is something that public actors cannot resolve alone. The inclusion of workplaces in accessible rural areas is highly relevant and would allow to not only discuss commuting habits but also larger structural changes.

4.4 Recommendations for the general context

More support for rural areas: More support could be given from national authorities for planning in rural areas, as well as between urban to rural areas. Even though rural areas are quite diverse in Sweden, similar tools and instruments could contribute at implementing concrete mobility solutions between urban and rural areas, with a more systematic approach of rural-regions.

Solutions beyond administrative borders: Administrative borders should be less important in the development of transport solutions since they occur in functional areas. The allocation of resources and capacity for local and regional stakeholders in the field of transport should therefore not be neglected.

4.5 Delivery plan

The table below captures a plan of action for the recommendation mentioned above for which a level of priority and complexity has been attributed. Additional information of relevance for their implementation, such as time frame and provider, are also included. These have been worked out in consultation with the stakeholders in an attempt to facilitate the reading and understanding of the suggested measures. The colour scheme used in the table indicates the degree of deliverability, which is the result of the combination between the priority and complexity. The following four colours have been used.

Deliverability	High	Medium-high	Medium-low	Low
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Table 7 Delivery plan

Recommendations	Priority (1-4. 1=Highest Priority, 4 = Lowest Priority)	Complexity (1-4, 1=Least Complexity, 4 = Most Complexity)	Time Frame (Short, Medium, Long-term)	Provider (Public, Private or Third Sector)	Actions (Steps which need to be followed to put solution into place)	Outcomes (Who Benefits and impacts)
OPERATIONAL RECOMMENDATIONS						
Transport on demand (bus or car)	2 Connecting urban and rural areas in Västerbotten where the current bus and train services are not well developed requires a more flexible system. Transport on demand is seen as having a great potential, especially for covering the "last mile" between a public transport stop and the passenger destination. Trips to cities to access services (grocery, shopping, restauration) for small groups of rural dwellers is another target group.	3 - An on-demand service is costly. It therefore refrains municipalities to fully implement it. - On-demand trips can occur across municipal borders, increasing the complexity of the solution that is decided at municipal level. - Digital solution that integrate the "last mile" or for booking transport on demand might not fit all target users, especially elderlies.	Medium	Municipalities in cooperation with Region Västerbotten, as well as bus companies and professional drivers (public and private sectors)	For existing solution, the local level should: - better integrate this transport option within their public transport offer. - better inform the population about the existence of this service Two options for new solutions: - Decide on a regional initiative towards a comprehensive system to take place in all municipalities in Västerbotten (top-down approach) - Start with a pilot project in one municipality and to learn more about potential users and how to market this service and then scale it up to other municipalities.	- Inhabitants/passengers: improved accessibility for infrequent trips (e.g. trips to urban services for rural dwellers; and trips to natural areas for urban dwellers) - Transport on demand providers: supporting commercial taxi services.
Intermodal parking facilities	3 Commuters from urban to rural areas would benefit from living in the urban areas, as they wish to do, and have a good accessibility	3 - It is difficult to price the intermodal parking facilities since too high prices will not attract commuters and too low pricing will instead make	Medium	Mostly public sector: most probably a cooperation between private	Improve the conditions of existing intermodal parking facilities (e.g. fair pricing for commuters only, good facilities adapted to the specific	-Provide better accessibility for urban-rural commuters, in both directions but with a bigger focus on urban dwellers working in rural areas.

	by public transport to rural areas.	non-commuters use the space. - It is not the competence of the Region, but it can promote it.		landowners, the national road authority or a municipality, depending on who owns the road, with a participation of the regional level.	weather conditions) Identify the most suitable locations for new facilities.	
Redesigning the bus layout	3 Such busses, more targeted to commuters, should rather focus on being more comfortable and providing good conditions for teleworking (WIFI, silent zone, tables to work, etc.). Furthermore, the commuting distances can be rather long, so comfort is even more important.	2 - This can be done, but it is difficult to do unless the regional and local stakeholders have identified the needs for commuters and eventually from other target groups. - A bus tends to be used for different purposes over the course of a day, making the customisation of its layout for commuters only more complicated.	Long-term	Municipalities in cooperation with Region Västerbotten, as well as bus (public and private sectors)	Identify the routes with the highest potential for commuters using a comfortable bus, for working while commuting, on a rather regularly basis. More generally contracting a company for a bus service should be less about the number of passengers than about the comfort of the bus ride for potential commuters.	More attractive bus rides for commuters Increase the quality of working conditions by allowing the commuter to use the time more efficiently.
Dematerialisation of services	1 Low population densities and long distances makes it highly relevant to have digital solutions for a number of services, such as health.	2 -National legislation and limited resources of municipalities can be a barrier for extended digital services in practice.	Medium	Mostly public sector, in cooperation with the private sector	Improve and expand the existing digital solutions Include the possibilities for users to be accustomed to such new solutions (e.g. focus on digital skills)	A more efficient delivery of public services Reduction of travel time and waiting time for the users.
Specific						
Combining service and good delivery	1 Due to low population densities and a lack of critical	3 - There is always complex to combined goods and	Medium	Mainly the public transport	A more flexible layout that can be adjusted to the needs of a specific route	More commercial traffic making transport more beneficial for its provider(s).

with passenger transport	mass, it is worth investigating how passenger transport and freight transport can be integrated/coordinated.	passengers, because the use of space in the vehicles is different. - The regional actor is not responsible for the transport of goods. - high cost to customize a vehicle for different purpose. - Investment risk, especially if the newly built vehicle might be under-used.		provider (public sector) contracting bus companies (private sector)	would be beneficial. The solution should mainly be created for passenger transport since goods traffic is not the competence of the regional level. An overview of existing fleet that can combine good and passenger transport should be made to find cheaper solutions. The assumption being that vehicles already available on the market might be a cheaper solution.	Can improve the delivery of goods to both dwellers and businesses in rural areas.
Issue of funding for pilot project	1 There is a lack of knowledge on mobility solution between urban and rural areas in (sparsely populated) NMR. EU and national funds for mobility and transport projects contribute at gaining some insight on this topic. However, they do not allow for testing the possible solutions.	3 No funding for testing means that the rural area has to take a relatively important risk in investing for new mobility solutions. Need to acknowledge the rural dimension, i.e. probable lack critical mass to implement commercial solutions. The testing of a solution is more difficult than for intra- and inter-urban areas flows, since there are fewer potential users living in less densely populated areas.	Medium	Mostly public sector	European and national funding schemes can be better design to allow (more) resources to be spent on testing a pilot project, contributing a more tailored solutions for urban-rural mobility solutions.	Local and regional stakeholders: getting more customized solutions getting more time to test pilot projects before implementing them. Reducing investment risk. Passengers: possibility to test pilot solutions, provide inputs and get familiar with the solutions.
Workplaces as strategic partners for improving urban-rural	1 Projects including workplaces in accessible rural areas to discuss and optimize ride sharing solutions are highly	3 The limited role of Region makes it complex. The Region can try to	Short	Mostly private sector (workplaces) and individual commuters.	- The Region can create and initiate projects or discussion forums and help through projects like the on-going project (HAR).	- The highest potential benefit is for the workplaces. It contributes at securing that the workforce composed by urban dwellers

commuting in Västerbotten	relevant. Including this partner would also provide the opportunity to discuss other structural changes at the workplaces to facilitate commuting or reduce the need to commute when possible; e.g. increase the possibility to work from home or work while commuting by public transport.	promote the solution through projects (such as the on-going HAR project): But in the long run it is not the main focus of the region, since it is about influencing behavior		The Region can promote this solution through projects.	- Workplaces could be involved in discussion on ride sharing and other flexible urban-rural mobility solutions.	remains in accessible rural areas, by making rural workplaces attractive. - Better use of commuting time by commuters if it is possible to work in the public transport vehicle or work from home. Especially relevant for long-distance commuting.
General						
More support for rural areas	2 More support could be given for planning in rural areas, as well as between urban to rural areas.	4 The limited role of Region makes it complex. It is a decision taken by national stakeholders.	Medium	Public sector (e.g. national authorities)	National actors should identify this issue as a priority and take the steps to make it happen.	Even though rural areas are quite diverse in Sweden, similar, similar tools and instruments could contribute at implementing concrete mobility solutions between urban and rural areas, with a more systematic approach of rural-regions.
Beyond administrative borders	1 Administrative borders should be less important in the development of transport solutions. The allocation of resources and capacity for local and regional stakeholder in the field of transport should therefore not be neglected.	4 The limited role of Region makes it complex.	Long	Public sector (e.g. national authorities)	National actors should identify this issue as a priority and take the steps to make it happen.	More flexible mobility solutions where the functional territory replaces municipal and regional borders.

5 Potential impacts of flexible transport connections / improved accessibility

A re-organisation of the governance of the regional and local transport systems can contribute to more user-centred mobility solutions. Indeed, the organisation and the provision of public transport in Västerbotten could be done more from a functional area perspective rather than administrative units. This change would contribute to a design of public transport possibilities more adapted to the needs of the users and potential users, e.g. commuters between two adjacent municipalities. This is particularly relevant in two types of urban-rural mobilities in Västerbotten:

- Inter-municipal, both between an inland municipality and an urban area along the coast; and between two inland municipalities.
- Inter-regional: along the coast, between two urban centres, as for instance between Umeå (Västerbotten Region) and Örnsköldsvik (Västernorrland Region).

Commuting conditions, which is one of the highly relevant urban-rural linkages identified in Västerbotten, could be improved thanks to more flexible transport solutions (e.g. car sharing schemes or better parking facilities located near public transport hubs). It would contribute both:

- Urban to accessible rural commuting patterns: it would facilitate the recruitment of specific working forces who desire to live in urban areas to commute to accessible rural areas where their skills are needed.
- Accessible rural to urban commuting patterns: populations working in urban areas of Västerbotten who want to live in rural settings, due to natural assets, could have a more realistic option of using public transport.

The re-organisation of regional and local transport and the improvement of commuting conditions would indeed benefit the economic development and the demographic structure of Västerbotten. However, innovation in other sectors than transport would contribute in both better accessibility and the reduction of the need to travel. It is for instance through the well-developed digital infrastructure in Västerbotten, where services such as health and education can be satisfied remotely. Teleworking is also made possible. Such innovations have a positive impact on:

- The quality of life of population living in rural areas of Västerbotten, as for instance saving hours of commuting time on a daily basis; this time can be dedicated to other purposes to households.

- Reduce the stress for commuters, especially in the winter.
- Less trips done by cars in the rural parts of Västerbotten, where public transport is not a realistic option, contribution to less CO2 emission.

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List of interviewees:

Respondent	Work place	Date
1. Commuter with public transport or car	Bjurholm municipality	2019-01-30
2. Commuter with public transport or car	Bjurholm municipality	2019-01-30
3. Commuter with public transport or car	Bjurholm municipality	2019-01-30
4. Commuter with public transport or car	Bjurholm municipality	2019-01-30
5. Commuter with public transport or car	Bjurholm municipality	2019-01-31
6. Commuter with public transport or car	Bjurholm municipality	2019-01-31
7. Commuter with public transport or car	Bjurholm municipality	2019-01-31
8. Chief administrative officer	Robertsfors municipality	2019-02-08
9. Master students in tourism	Umeå university	2019-01-22
10. University professor specialised in regional planning and rural development	Umeå university	2019-01-29
11. Civil servant	Region Västerbotten	2019-02

Appendix

Appendix I: Specific and general contexts in Region Västerbotten

Specific context in which the action/service will be developed

Region Västerbotten (focus on urban-accessible rural)

	Category/topic	Current condition	Implications and recommendations
Market – demand <i>Market niches relying on / interested in alternatives to private car</i>	Commuters	For commuters the general interest to use public transport is quite high. Many want to use the travel time better, be healthier and save money. But public transport is not a realistic alternative, it creates to many problems in everyday life. TO some extent it can also be that all is not aware of the available options of public transport because they haven't tried it only heard that is doesn't work.	<ul style="list-style-type: none"> - Important to see all data together and create solutions that can meet as many of the needs as possible. For example, could passenger transport be coordinated with freight? - Public transport should be more customised to the travellers' needs. . At the moment we have a "norm traveller" not based on the needs of the actual people but just assuming that the needs are the same as they have always been. We should ask and engage the people/users more and from that come with more flexible solutions for different groups. - Today the public transport system is based on kids and youths. If we want other groups to travel with public transport we might have to design the bus services to appeal to them, for example cleaner and calmer busses. Wifi etc. - More information about the bus stops/times
	Territorial assigned	<p>This is the group that use public transport the most in rural areas. For commuters it is very difficult, also because the traffic is adjusted after students.</p> <p>Only people with no other option (almost) use public transport. Many people probably try to get around getting lifts from other people instead of traveling with public transport. For example, if it is a long way to closest bus stop, they have difficulty walking or it is cold.</p> <p>Limited information and unreliable "real time" information.</p>	

	Tourists	<p>Tourists generally do not want to drive in the winter, they have good reasons to travel with public transport. Also, they often arrive by train or plane, so they do not have their own car. Further, many tourists are students with no access to cars or with limited money.</p> <p>This is an identified group that would benefit from public transport. They want to travel inland and to the countryside, why urban-rural connectivity is important. Important to acknowledge is that they usually travel in the opposite direction than the people in the villages which can create problems for the system. They also have different hours than commuters and citizens.</p>	<p>in general. Important to also adjust after people that can't speak Swedish, again think about the need of the traveller/visitor. It is harder to start to travel with public transport if you don't know where the bus stops and when there is no information.</p> <ul style="list-style-type: none"> - Pick low-hanging fruit. There are simple things to do to improve for commuters while at the same time facilitating skill and competence needs. Targeted actions towards commuters are needed. This is one group that has so much to gain from losing the car, working on public transport, reducing accidents, or driving while tired etc. Especially with long distances commuting the potential is big since walking to the bus stop can be a threshold if the travel time is not that long. And you neither work on the bus if it is only 20-30 min.
	Students	<p>They belong to the group without a car, so they are of course interested in alternatives. And the parents would probably be happy not having to drive the kids around everywhere. There are also parents to students that study in a different town (for high school for example) who have complained because their children can't come home during the weekend with public transport, This because there are no public transport or that the hours are not adjusted to school hours.</p>	
Customer perceptions <i>Attitudes of people who</i>	Public transport	<p>Territorial assigned and students are the groups that use public transport the most. But also, for them it is problematic in some areas.</p> <ul style="list-style-type: none"> - Few departures, if you miss one you have to 	<ul style="list-style-type: none"> - Public transport should not be a last resort only for them who has no other option. The solutions need to be more flexible and based on the need of different groups.

<i>are supposed to use the service</i>		<p>wait hours.</p> <ul style="list-style-type: none"> - Long distance to bus stop - Expensive (a card in the county is 160 euros/month) 	<ul style="list-style-type: none"> - Digital services could help with information for visitors, but it can also reduce the need to travel in form of e-health, e-learning etc. (See general context).
	Rural dependency on main urban pole(s)	No information	
	Digitalization of services	Good connectivity when it comes to broad band (80 % in the county). Several apps to download and easy for visitors (with mobile id and swish) to pay for the ticket digitally in the app.	
Stakeholder <i>Stakeholder concerns, political environment, know-how</i>	Political will	<p>The knowledge level among politicians are generally quite low when it comes to the public transport system, which in turn affects the will to make changes.</p> <p>The mainstream opinion is that we should not increase nor decrease the money spend on public transport, but it should remain the same.</p> <p>There are no clear opinions about who and how the public transport system can benefit, and a lot of the steering and prioritization comes from the civil servants, this is also the case regarding the division rural-urban.</p> <p>Politicians to the left are generally more prone to public transport, but the opinions do not differ that much. Not a lot of people that are pushing for the question on the regional level.</p> <p>Nationally there have a big campaign last year that provide all children with free public transport over</p>	<ul style="list-style-type: none"> - Knowledge and interest about the public transport must be improved. - Since the lack of coordination between levels and actors in many ways are dependent on lack of resources, it is difficult to give recommendations that does not involve more resources. But coordination and communication between actors and levels could also be improved.

		the summer. This was however changed with the new budget this year.	
	Vertical & horizontal (among sectors and among territorial units) coordination	There is a will to coordinate and discuss more between levels and actors. Time and resources make it difficult and most are very careful with their own money. However, the general trend is that we are moving more towards coordination and a cross-sectorial approach. A non-hierarchical societal structure.	
	Know-how	Overall the knowledge about the public transport system is low in society. But in some areas, we see that the interest for public transport is increasing, the reason for it is unknown.	
	Alternative transport providers	There are some private providers, for example SJ (train) and the night train traffic or ybuss. They have to follow the laws when it comes to traffic providers, but other than that they can decide for themselves. The Swedish transport administration decide who are allowed to use the tracks and when. In addition, there are some private ski busses belonging to ski resorts and other temporary traffic solutions. But there are no cooperatives or social businesses (non-commercial and non-public).	

General context that influences the specific context and the operational level

Region Västerbotten (focus on urban-accessible rural)

		Current condition	Implications and recommendations
Policy and government	Spatial planning tools/strategies (disperse, monocentric, polycentric structures; sprawl; ...)	<p>There is a regional development strategy (RUS) that according to law should exist in all counties. The strategy in Västerbotten however does not regard the public transport system a lot, in comparison to for example Skåne. In the regional development work it is foremost the infrastructure that is prioritized and highlighted as tools to meet the goals, not public transport or sustainable travelling.</p> <p>Different to many other European countries, the regions in Sweden do not have a physical plan (a map) for the regions. This can be problematic since the public transport system is a regional system where a broad perspective is needed.</p> <p>Another strategic document is the regional public transport programme (Trafikförsörjningsprogrammet). It is connected to the RUS. For infrastructure we follow the county transport plan (Länstransportplanen). It contains plans about bus stations and travel centres but nothing about the actual traffic.</p> <p>Questions about rural areas in a broader perspective are generally placed on the national authorities. Therefore, the investigation of rural areas (landbygdsutredningen, SOU 2017:1) was done in 2017. A suggestion in it was for example that for every decision in planning there should be a consequence analysis for the rural areas to avoid fast</p>	<p>The implications of having general and broad strategic documents is that the rural areas often are forgotten. It is unfair that a part of the population always receives less and have to provide for themselves to make things work.</p> <p>A way to move around this could be to formulate more specific strategic plans for traffic in rural areas and between urban and rural areas. This could also be done in the regional development strategy, even though the entire region needs to be considered, the rural areas could be pointed out since they are often forgotten.</p> <p>More support could be given from national authorities for planning in rural areas. This should be done through research, networks or handbooks. An example is "reg-lab" which is a collaboration between 21 regions, Vinnova (Sweden's government agency for innovation; contributing to sustainable growth by funding innovation/research projects)-, Swedish association of local authorities and regions and Swedish agency for economic and regional growth that studies the "rurban region", the relationship</p>

		decisions that could affect rural areas negatively. If the investigation should be fully implemented the national steering would be much stronger.	between the urban and rural.
	Transport regulation and licensing (Region västerbottens roll, who is in charge?)	<p>The formal decisions about public transport in the region is made by Region Västerbotten and the county traffic (Länstrafiken). The budget power however is placed within the municipalities and with the County Council (Landstinget). In 2019 Region Västerbotten and the County Council merged and became Region Västerbotten together, which means that there are now different people in the same organisation responsible for the formal decisions and the budget.</p> <p>All public transport within the municipality is decided on by the municipality while the inter-municipal traffic and train traffic is decided on by Region Västerbotten. Norrtåg (a company connected to counties in the north) have their own delegation and their own politicians and can decide a lot by themselves.</p> <p>In addition, there are other commercial traffic that follow national legislation. For example, SJ, the night train traffic or ybuss. In the end it is the Swedish transport administration that decides who can use the tracks and when.</p>	<p>In the questions regarding political structures, our stakeholders were a bit evasive since they are civil servants and can-not directly comment on political issues.</p> <p>The divide in transport regulation and licensing between actors and levels can create problems. Since the different actors have different resources and “money bags” (dedicated budgets) a question about who pays is sometimes discussed. An example is if an inter-regional bus (paid by the region) crosses the boarder to Umeå municipality where many people get on to travel to Umeå. The bus is too crowded that another bus is needed. The region considers that Umeå municipality should pay for another bus within the municipality since the people live in Umeå. While Umeå considers that it becomes very inefficient and messy to have an additional bus line.</p>
	Accessibility policies (special plans for non-urban/weak areas to improve accessibility)	From the region there are not any specific documents that focus specifically on rural/weaker areas when it comes to accessibility.	It is generally good that the public authority tries to limit the amount of strategic document and that they have a broad and full perspective on the region. However, since questions about rural

		<p>On the municipal level there is a growing interest to create plans also the rural areas. There is no requirement to do so but many municipalities are doing it on their own initiative. When they do this, it is very possible they also include the transport system, but our stakeholders are not sure.</p> <p>The state often emphasises the importance of the rural areas, for example in the “investigations of the rural areas” (SOU 2017:1). Also, in the Swedish rural development programme funded partly by the EU, improved infrastructure for social participation and local development is for example mentioned.</p> <p>Some flight to inland municipalities in the north are also subsidies by the state, for example to Vilhelmina.</p>	<p>areas are marginalised, an accessibility plan for the rural or rural-urban areas would be beneficial.</p> <p>If we look at accessibility beyond transport, there is extensive work in Västerbotten about digital solutions to reduce distances. Broad-band, connectivity, e-health, e-learning and e-services are some aspects that could facilitate living and working in rural areas. However, they do not improve transport; but decrease the need to travel.</p>
	<p>Governance structure (the cooperation between actors/levels)</p>	<p><i>The different parts and the responsibilities are mentioned under “regulation and licensing”</i></p> <p><i>There is cooperation between the different levels and actors, also between the regional and the state (Swedish transport administration).</i></p>	<p>Even though cooperation exists it can always be improved. At the moment the reason for inefficiency or double work is lack of resource and time. Sometimes there is no time to discuss between sectors and levels and then mistakes occur.</p> <p>As mentioned under “regulation and licensing”, the money comes from different actors which sometimes lead to a conflict between the region and the municipality regarding who is responsible to pay.</p>

<p>Economic</p>	<p>Public investment in local transport services (har det förändrats?)</p>	<p>Regarding interregional public transport it has been decided that the public investment should stay the same, not increase nor decrease. If something should be improved there should be a restructuring of money not additional money.</p> <p>When it comes to the municipalities in the rural areas it has not increased. The municipalities have a shortage of resources both regarding social services and care and they are very careful and restrictive with there money. It is the municipalities that finance school and social transport as well.</p> <p>The two coastal municipalities (Skellefteå and Umeå) have increased the investment in public transport.</p>	<p>The implication is that it is really hard to try something new without project funding. Maybe there is an efficient solution^s that could improve connectivity in a cost-efficient way but since they have to pay themselves and also risk losing money it will not happen. More projects would in this situation create development.</p> <p>Inequalities between municipalities between regions. Creates an imbalance.</p>
	<p>Affordability of the car</p>	<p>A car is expensive when you buy it but it is not expensive to own and use. People are generally ready to pay to be able to use the car. There are very few people in rural areas without cars.</p> <p>For the person that has a car a public transport card is not beneficial.</p>	<p>The relatively cheap use of the car and its flexibility in connection to the inflexible and limited public transport system makes it difficult for public transport to compete. Especially if a family travel together and share expenses.</p> <p>Prices for the car and gas, as well as public transport should be looked over to create a more even competition. We need to work to make sustainable travel as functional, flexible and accessible as with the car</p> <p>A recommendation is to work more with the</p>

			Maas concept (mobility as a service).
	Growth / Shrinkage	<p>It is different in different municipalities, but many inland municipalities are shrinking. They have limited resources and low tax revenues. The villages that is still living and growing are the ones closer to the big cities and those close to a big road or train stop.</p> <p>Important is also the cohesiveness within the municipality.</p> <p>The coastal municipalities are growing. Therefore, the whole of Västerbotten has a small population growth.</p>	<p>Improve transport, especially for commuters and tourists that can help the economy and more people would want to stay.</p> <p>In some municipalities it is impossible to buy a house. Some houses are empty because the residents only live there during the summer. Some houses -are tied to land with forestry why they can't sell. Because the low value on the houses it is very difficult to get a bank loan to buy a house in the area.</p>
Sociocultural	Demographic trends	Aging population in the inland.	See answer above.
	Environmental concerns	<p>People are generally more anxious about the climate after the warm summer. We see an increase awareness about the need for action. The general idea in the rural areas is that the change needs to happen in the cities since people in the rural areas are very dependent on the car and usually do not have a high climate foot print in other areas such as consumption.</p> <p>There are no big local environmental issues connected to the</p>	Action is needed to transform to a more sustainable society. One way to do this is through better solutions to public transportation.

		car in the rural areas. The air is good.	
	Time-space geographies (24-h society, ...)	Only essential services are open during the night, such as hospitals. It could be a problem for people working evening or night shift. But food stores are usually open to 8 or 9.	Not a relevant issue for this area.
	Social conscience	Very different in different villages. Some villages are more places to stop over a night while other places have a very high sense of community with several sports organisations etc. This is important for the migration to the village.	This has implications for the ability to try new solutions and to activate and engage the people. An active community can also push politicians and public authorities.
Technological	Technological advances (i.e. in programming and software)	<p>There is a pilot study to try automatic buses (rullande busskur). It is a pilot done by Sweco in Skellefteå.</p> <p>The company "Space time" is important in Västerbotten. It focuses on combined mobility and innovative solutions through the concept Maas, mobility as a service. A platform to facilitate travel.</p> <p>The Design school in Skellefteå have several programmes focusing on transport design and service design. They work together with companies within the transport industry to find solutions built on new technology. Mobevi is an example of one project.</p> <p>There are several apps to use to locate public transport, for example "take the bus" (tabussen.nu)</p>	We should look around to see what is going on in the world. Create more national and international contacts and influence the technological development in a rural and "north of Sweden" perspective. We should take part in different national processes and project to develop new solutions based on new technology.
	Digitalisation (provision and	The broad band is developed in Västerbotten (approx 80% coverage). On the other hand, there are still bad phone	Continue working with digital solutions but keep parallel analogue systems to avoid digital

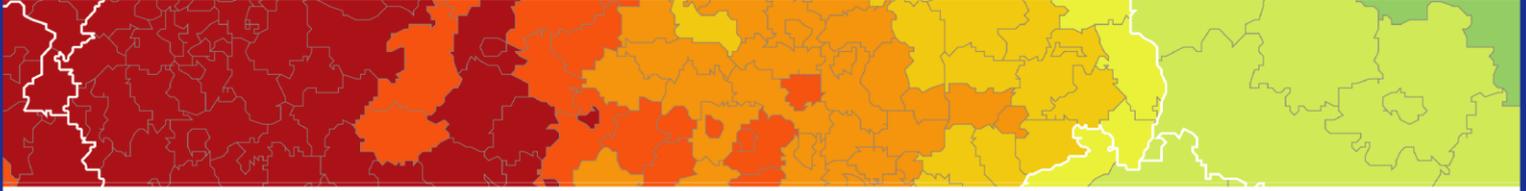
	competences)	connections in some places, which can create problems. Most people know how to use the technology, but a digital divide exist because of the high age of the population.	exclusion.
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Appendix II: Operational level – Non-material and transversal actions. Region Västerbotten.

		Digital platforms and smart ticketing	Territorial mobility management	Dematerialisation of services
Description <i>General description, not referred to the specific stakeholders' territories</i>		<p>Digital platforms can help users in each phase of their trip. Examples of integrated platforms are:</p> <ul style="list-style-type: none"> - trip planners, which help the user to choose the best solution for his trip, providing information on the route, cost, journey time, public transport lines and timetables, etc... Trip planners can be multimodal or single-mode; - ticketing platforms, which help the user to get his ticket for single or multiple transport services or modes; - ride-sharing platforms, which bring together supply and demand, and ease their interaction. <p>While the above-mentioned actions are mainly aimed to ease the user, smart ticketing can help both the user and the provider of the transport service. With smart ticketing the purchase operation can be dematerialized, and validation is digitalized so that information on demand can be automatically collected and analysed.</p>	<p>The aim of the territorial mobility manager is to improve mobility on the territory within its competence through the collaboration and coordination of local institutions (municipalities, schools, health services), local transport companies and associations of companies / category present on the territory.</p> <p>Within the competencies of the territorial mobility manager there is also the harmonisation of LPT services with school/work schedules. Plans for home-work and home-school trips can be also developed independently from the establishment of a territorial mobility manager.</p>	<p>The dematerialisation of public services has several economic, environmental and social benefits. As regards mobility and accessibility, the dematerialisation of public services allows to reduce the need to travel, making service virtually accessible everywhere.</p> <p>Examples of dematerialisation of public services are telemedicine, telecare, e-learning and e-government.</p>
Territorial level / competence	<i>Local (LAU2 or equivalent)</i>			
	<i>Västerbotten Region (NUTS3)</i>			
	<i>Regional (NUTS2)</i>	Not applicable / Not relevant		
Barriers / criticalities	Lack of resources			

	Digital provision			
	Know-how - providers			
	Know-how - users			
Experiences in the stakeholder territories	<p>A digital platform, Tabussen (website and application), offers information on both regional bus in Västerbotten Region as well as on local bus in the city of Umeå. The platform includes information on schedules, ticketing, prices and traffic, among others. It is possible to buy the ticket(s) in the application. The platform includes the following transport options: city busses, airport busses, regional busses, regional trains and car-on-demand.</p> <p>If relevant: On national level, the digital platform Resrobot allows to plan trips and buy tickets from door to door between the 3,500 largest cities in Sweden.</p>	<p>Region Västerbotten has the collective responsibility for planning of infrastructure with mission to develop a transport structure that enables commuting, increasing of competence of employees and high accessibility with the shortest travel time possible. The person responsible is an infrastructure strategist.</p> <p>The guidelines are stated in the regional transport plan (Länstransportplanen) but the guidelines seem to be more general and does not go into detail on how to coordinate between different institutions and municipalities.</p>	<p>The Rural medicine centre in Storuman (funded by County Council) have a pilot study with 9 "Virtual health rooms" (3-4 in Västerbotten) where citizens can go for easier tests or to be connected to a doctor on remote. E-learning or "remote teaching" is used frequently within education for native languages through cooperation between municipalities. In some cases, it is also used in other subjects even though it at the moment is forbidden by Swedish law (there are discussions about changing this law).</p> <p>The regional project "Digital Västerbotten" have focused on e-services and competence improvement. 40 new e-services are now created on a common platform accessible to all municipalities in Västerbotten. It includes for example applications for remodelling or placing your child in preschool.</p>	

	Scarcely relevant
	Moderately relevant
	Highly relevant



ESPON 2020 – More information

ESPON EGTC

4 rue Erasme, L-1468 Luxembourg - Grand Duchy of Luxembourg

Phone: +352 20 600 280

Email: info@espon.eu

www.espon.eu, [Twitter](#), [LinkedIn](#), [YouTube](#)

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