Survey report on the result indicator 4.1

Introduction

The aim of this paper is to establish the frequent border crossers from Estonia to Latvia and from Latvia to Estonia, offering an input for assessing the cross-border mobility of labour within the framework of the Estonia-Latvia Programme 2014-2020. The study identifies the Estonian and Latvian border crossers by the method of passive mobile positioning and presents them summarised by months on county level – the commuters from Latvia to Estonia are presented by the county of destination and in the case of commuters from Estonia to Latvia by the county of residence. The researched period is the months of January, April, July and October of 2018.

Data and Methodology

Mapping of the movement of people is based on the method of analysis of activity-based activity rooms and social networks by using the data from mobile positioning and census. The passive mobile positioning used in the research is a methodology where the data collected by the operator egarding the activities of anonymous mobile users are used for studying the time-room behavioural patterns of the population. The data consist of the locations of the activities (calls and text messages) with the precision of the area of coverage. At that, it is not important if a smartphone or non-smartphone is used or how often the person uses the mobile phone. The database identifies the call and text messaging ID, caller ID, time of the activity and ID of the mobile antennae. Each client of the mobile operator has been assigned a random and pseudonymous identifier that does not change in time and that cannot be connected to a specific person or telephone number. Data collection, storage and processing process obtained through the method of passive mobile positioning is organised in Positium according to the guidelines of Regulation EU 2016/679 (GDPR).

Assessing the representation of the passive mobile positioning data is based on the *Omnibuss* 2 survey (sample of 2,000 persons) conducted across Estonia by TNS Emor, during the course of which it was identified that 95.4% of the respondents owned a mobile telephone. Furthermore, the results of the *Omnibuss* survey are the basis for generalising the data of the mobile operator for the entire population.

The mobile telephony antennae are distributed unevenly across the territory, mostly observing the location of the population and the transport infrastructure. Thus, the accuracy of passive positioning is higher in more densely populated areas or in areas with a denser network of roads, but lower in sparsely populated areas. By using the method of identifying and assessing anchor points on the basis of passive mobile positioning data, it is possible to calculate the residence, working time location, fee time stays and random destinations of each anonymous identity by their time and space pattern (read more on the algorithm in 'Modelling Home and Work Locations of Population Using Passive Mobile Positioning Data' (Ahas et al 2008)).

The data of passive mobile positioning collected by Positium LBS for 2018 are used as the source data of the survey. By using the methodology of identifying and assessing anchor points based on passive mobile positioning data, it is possible to identify the place of residence and working time location of individuals as well as distinguish between the movement between different destinations. A similar method has been used to identify the work destinations of the clients of the Latvian mobile operators in Estonia, and the counties of residence in Estonia of the clients of local operator commuting between Latvia and Estonia.

Mobile telephones with numbers registered in the EMT mobile network in Estonia and numbers of foreign operators and the locations of the respective calls do not express the exact number of work

commuters, but provide an estimation of the amount of people whose migration frequency can be used to conclude that these people go to work in the respective county. In order to find out the number of work commuters that corresponds to the reality, the generalisation model developed by Positium is used. This model is used to process the data in the database during the analysis. The correction coefficients of the generalisation model are based on several factors, such as mobile usability of different nationalities, distribution of users between various operators etc. The correction coefficients take into account the market share of the mobile operator, share of mobile users in Estonia and it is compared to the trends of the Estonian official tourism statistics.

Distribution of labour commuting

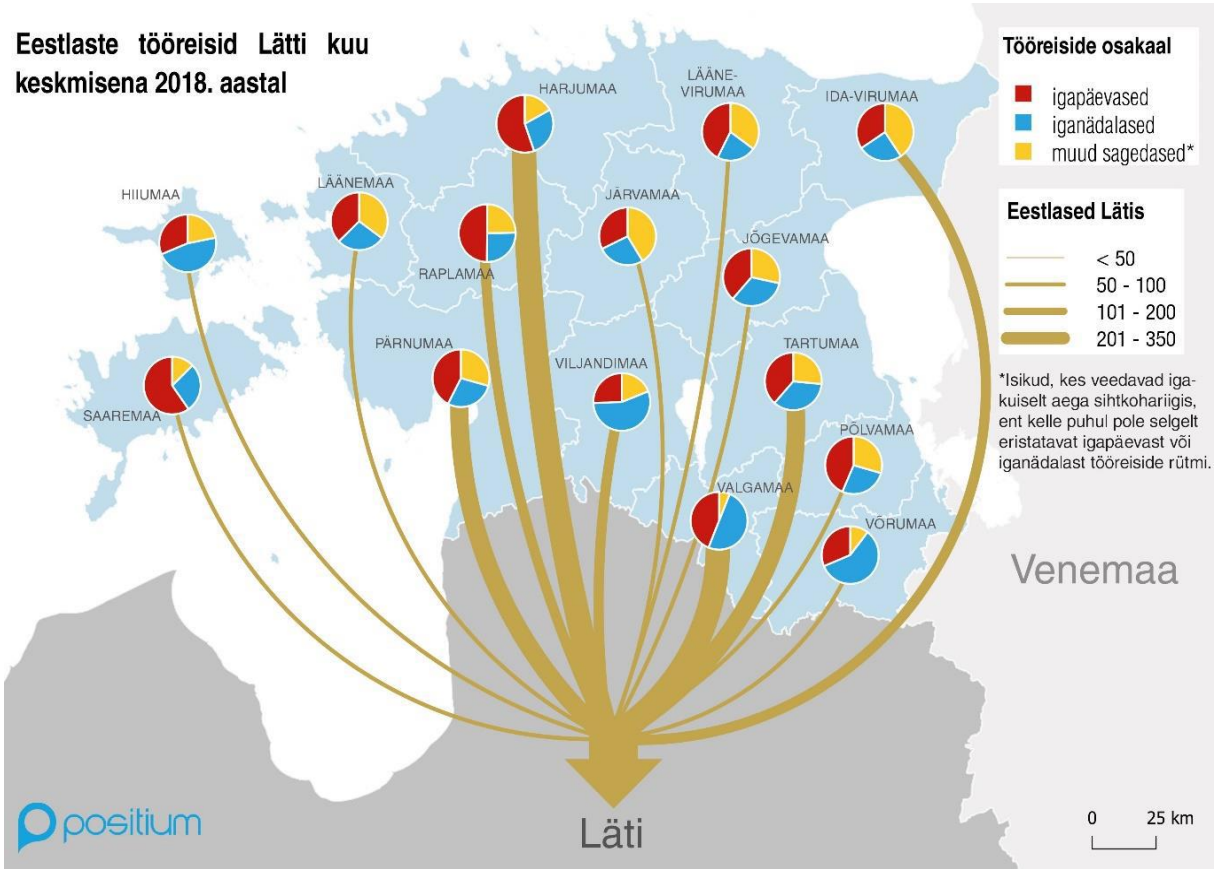
Migrant labour is presented in two categories:
• People living in Estonia who are working in Latvia and
• People living in Latvia who are working in Estonia.
The call activities performed by all clients of the mobile operator in foreign countries and Estonia have been identified for the movement between Estonia and Latvia. The persons whose main destination during the given month has been Latvia are filtered out from all persons who have made calls from foreign countries. This means that the researched group excludes persons who make frequent calls from Latvia, but who are only in transit there (transit travellers).
As the stay in the country of origin or any other foreign country is unknown for foreign visitors, the movement between Estonia and Latvia is identified only by the calls performed in the Estonian mobile operator by the numbers of Latvian operators. Based on the frequency and time of the calls, the foreign visitors are classified as frequent work commuters and regular tourists who are not taken into account in this study. Considering the peculiarities of this methodology, the labour commuters between Estonia and Latvia may also include the so-called transit workers who often go to Russia, Finland or Scandinavia through Estonia.
As the home network reaches across the state border to a certain extent, the number of commuters related to border areas may be underestimated. This means that in border areas, for example in Valga and Valka, Latvian can make calls in their own network while they are in Estonia and the clients of the local Estonian operator remain in the network of the Estonian mobile operator and thus do not have to use the roaming service to make calls, and thus the fact of crossing the border is not registered. Based on the times, dates and frequencies of making the calls, the labour commuters between Estonia and Latvia are divided into three groups:
• Daily commuters
• Weekly commuters
• Other frequent commuters

The daily work commuters are persons who commute between the country of destination and the country of origin with a frequency that allows concluding that the border is crossed daily. This group includes persons with a fixed working time and job location as well as commuters between various job locations and people employed in transportation.
Weekly commuters are employees who generally spend their business days in the country of destination and go to their country of origin for weekends.
Other frequent commuters are persons for whom it is difficult to identify a clear daily or weekly rhythm, but who clearly spend two weeks or more in the country of destination every month. For the

purposes of data protection and protecting the privacy of people, the numbers of commuters from counties with less than 10 commuters have been rounded to ten in each group.

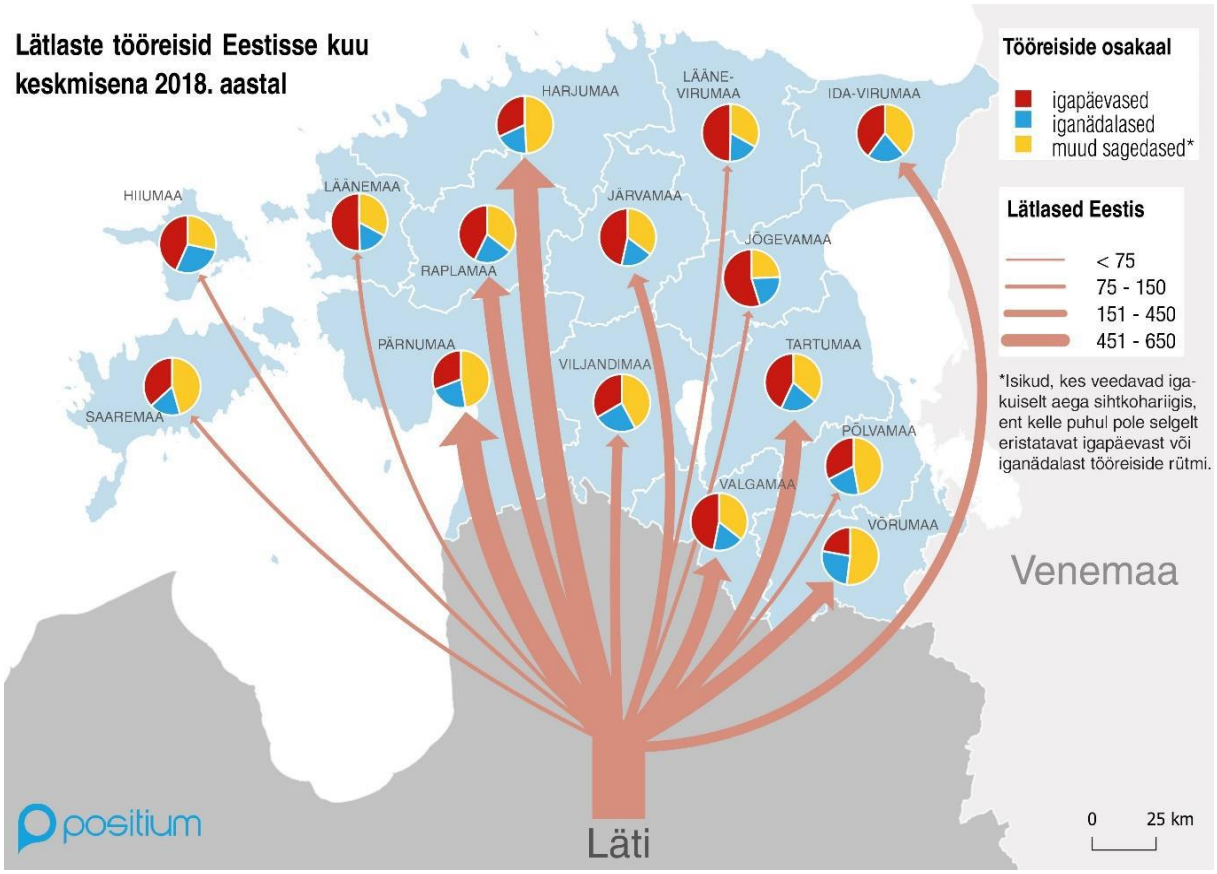
Results

Based on the above described methodology, it was identified that in 2018 there were 1266 frequent commuters from Estonia to Latvia, which is 43% more than in the year 2013. The biggest change was observed in Valga and Pärnu counties, because in these counties the share of weekly commuters grew fourfold, and the amount of daily and other frequent commuters more than doubled. Unfortunately, we do not know if this is due to free movement of labour or the significant effect of cross-border trade. The change in the seasonality in Pärnu county when comparing the years 2013 and 2018 remains on the same level, while in Valga, the change has been recorded towards growth in the months of autumn, winter and spring. However, the share of daily commuters of Harju county decreased by a third over a five-year period. The map below shows the share of **Estonian work trips to Latvia** as monthly average in 2018.



Share of the work trips:
Red: daily
Blue: weekly
Yellow: other frequent (*individuals who spend time in the destination country every week, but who do not show distingushable clear daily or weekly sequence of the work trips)
Amber arrows: Estonians in Latvia

There were in total 2566 frequent commuters from Latvia to Estonia in 2018. This is 82% more than according to the data from 2013. The increase is on the account of the groups of other frequent and daily commuters, while the movement of weekly frequent commuters grew only 10%. By regions, the highest growth was in Pärnu county where the share of other frequent commuters grew more than other groups. While the share of other frequent trips grew also in Harju county, the numbers of daily and weekly travellers decreased in Harju county as compared to the year 2013.
The map below sets out the share of **work trips made by Latvians to Estonia** as monthly average in 2018.



Share of the work trips:
Red: daily
Blue: weekly
Yellow: other frequent (*individuals who spend time in the destination country every week, but who do not show distingushable clear daily or weekly sequence of the work trips)
Dark pink arrows: Latvians in Estonia