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Conference Paper**Author(s):**

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Publication date:

2018-01-15

Permanent link:

<https://doi.org/10.3929/ethz-b-000225599>

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Measuring Transnational Migration with Roaming Datasets

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Abstract. Transnational population mobility can be defined as living and working in two or more countries. Transnational lifestyle is becoming more and more commonplace in various parts of the world thanks to the rising population mobility, changing labor market, opening borders, and developing information and communication technologies. Measuring, understanding, and the managing of such communities is complicated; we can see that traditional statistics and register-based data are not suitable to describe the transnational community. In this paper, we are proposing and testing a methodology for measuring the transnational mobility of a population with the help of the roaming databases of mobile network operators.

Keywords. Transnational population mobility, Roaming data, CDR

1. Introduction

These days globalisation and European integration has increasingly caused us to talk about transnationalism. Transnationalism refers to a situation where a person has close ties to or is active in several countries (Schiller et al 1995). In the field of economics and business, transnationalism is a well-known phenomenon, but using the term for describing migrants has become a growing trend in the last decades. For understanding and discussing transnationalism, we must adopt a new concept of society: many social phenomena and institutions (workplace, residence, family, etc.) are no longer confined within the borders of just one country (Levitt & Schiller 2004). Migration has also changed – research shows that a lot of migration is not undertaken with the aim of changing residence permanently but is,

instead, short-term. As transnationalism is a rather new phenomenon, there are no clearly-formed positions or generally-accepted definitions for it as yet.

Transnationalism is hard to measure because this is a new phenomenon and there are no statistics suitable for describing it. Most statistical data concerning population is location-centred, and defines the stay, arrival and/or departure of a person within the context of one country. Data describing dynamic, cross-border movement flows are harder to obtain. Further, transnational people are not easy to catch with a census or a survey, because they are very mobile and often do not even want to participate in studies.

The aim of this paper is to develop methods for measuring transnational population mobility with roaming databases of mobile network operators and to test it with Estonian case study. Part of this material was presented in Estonian Human Development Report 2016/2017 (Ahas et al 2017).

2. Methods and results

By transnationalism, we mean operating actively in two or more countries. The study is centred on Estonia: a person who is transnational in the context of this study has to stay in Estonia often while also visiting one or several other countries on a regular basis. The study is a starting point for developing a method for measuring transnationalism based on mobile phone usage.

We are proposing a methodology for measuring transnational mobility of a population with the help of the roaming databases of mobile network operators. We developed a conceptual and methodological framework for detecting tourists, cross-border commuters, transnationals, and foreign workers from roaming CDR datasets (Table 1). The Eurostat methodological manual was used for defining population segments (Eurostat, 2014). We used data from two of the largest mobile network operators in Estonia with market shares of 39% and 34%. Total population of Estonia is 1.3 million.

Segment	Number of trips to destination country	Number of days spent in destination country
Tourist	1 to 4 trips	1 to 182 days (<50%)
Commuter	52< trips	52< days

Transnational	5 to 52 trips	92 to 273 days (25% to 75%)
Foreign worker	1 to 52 trips	182< days

* 52 trips – in average once a week.

** The place where a person spends most of the year shall be taken as his/her place of usual residence – Eurostat 2013, p 22.

Table 1. Criteria for segmenting visits to foreign countries based on the number of trips and duration of stay.

Results show that using roaming CDR data from mobile networks it is possible to distinguish between different segments of outbound travelers. Methodological challenges are related to data management, trip definitions and validation issues. Special methodology was developed for integrating CDR data from two mobile network operators as they use different hardware and software and data formats for CDR data. It is also challenging to define features of trips for outgoing travelers as tourists, commuters, transnationals and foreign workers because there is no commonly respected methodological framework for defining and measuring such population mobility. We developed corresponding definitions and relevant features for data processing algorithms based on Eurostat and OECD methodologies and scientific literature.

Our study based on 3 years of data from 2 mobile network operators has allowed us to calculate statistics about transnational population mobility for Estonia. An average outbound traveler carried out a total of 4.4 trips annually with an average duration for each trip of six days, but this averaged result is significantly influenced by high share of tourists in outbound travel. Transnationals carried out 15.7 trips with a duration of each trip lasting 13.3 days. A total of 2.7% of transnationals were connected to two or three foreign countries. Cross-border commuters carried out 85.3 trips annually with an average duration of 1.9 days and foreign workers 9.6 trips with an average duration of 89 days. Results show that the most popular countries to be visited by transnationals from Estonia are Estonia's closest neighbors in Scandinavia and Western Europe. One unexpected result was the relatively small proportion of transnationals going to Russia, as Russia is a very important tourism destination and is closely connected to the Russian minority living in Estonia (forming 27% of the total population). The travel behavior parameters and the social profile of visitors allows us to differentiate between tourists, cross-border commuters, foreign workers, and transnationals.

The results are interesting, but validating the results is a rather complicated task. Additional problems arise when it comes to finding alternative sources of data for validation. We discuss the strengths and weaknesses of such data

and the methodology from the point of view of international migration research and statistical system.

Methodological challenges are related to integrating data from two mobile network operators, defining trips, and proposing theory based and distribution based parameters for segmenting population groups.

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