

Communicational ties between the Republic of Bashkortostan and other Russian regions

Abstract

The article aims to present social ties of the Republic of Bashkortostan based on voice mobile phone data, which covers calls from and to the region during a period two weeks. The people of the Republic of Bashkortostan have close connections with those who live in neighboring regions. Being a part of the Ural Economic Region, the Volga Federal District and Volga-Ural Macro Region, the republic has turned mostly towards Ural regions. We also found that the republic has close social ties with Moscow, St. Petersburg and Krasnodar regions. Economic relations and migrated family members are probably the main factors that could explain the pattern.

Introduction

Russia is the largest country in the world and has the highest number of subjects among federative states (85 against 51 in the USA, 27 in Brazil, 16 in Germany, 13 in Canada) (Rossijskie regiony, 2011). In this regard, spatial and socio-economic development policy of the country at a regional level is of particular interest due to diversity of the regions. The Russian school of socio-economic zoning, founded by N. N. Baranskiy in the late 1920s, remains relevant to this day (there are 12 Economic Regions in Russia). The division of the country into 8 Federal Districts has changed the grouping of the regions. These territorial units were created artificially solely for the convenience of management and do not have a deep socio-economic basis, so geographers and economists continue to compare the situation of each region, with the regions within the same Economic region, although State Statistics are often aggregated at the level of Federal districts, which somewhat complicates interregional studies. According to the "Strategy of spatial development of the Russian Federation for the period up to 2025", adopted in February 2019, and developed by the Ministry of economic development of the Russian Federation, the country is again divided into 12 Macro-Regions, but with a different composition of subjects than before.

The Republic of Bashkortostan is a part of the Ural Economic Region, the Volga Federal District and Volga-Ural Marco-Region.

There are other regional classifications as well, that do not take into account the territorial features of the location. L. M. Grigoriev, Y. V. Urazhaeva, D. S. Ivanov proposed classification based on the stage of development and industrial structure of the regions (Rossijskie regiony, 2011). According to them, the Republic of Bashkortostan along with Krasnoyarsk and Perm kray,

Belgorod, Kemerovo, Murmansk and Tomsk oblast were included into the group of developed regions with mainly extractive industry.

Among the indicators that are used to build classifications are GRP and income of the population, characteristics of the sectoral structure of the economy, the situation on the labor market, demographic and infrastructure indicators. However, the output does not necessarily reflect the regional cohesion.

The Republic of Bashkortostan connects the European and Asian parts of Russia through Federal Highways (M5 "Ural" and M7 "Volga") and railroads. Being an ethnic republic it has a high share of Bashkirs (29.5%) and Tatars (25.4%), however, Russians are well integrated as well with their share of 36% in total population. To date, regional connections have been estimated by measuring physical and economic distances, migration flows and goods turnover. Based on innovative digital data - social media and mobile phone, - researchers are able to introduce and assess social ties.

The aim of the paper is to present social ties of the Republic of Bashkortostan based on voice mobile phone data. It is a pilot study of the project intended to explore "The regional cohesion in Russia".

To date, however, we are aware of only one study that has utilized mobile phone data to measure communicational ties and regional cohesion (Blumenstock, 2011). Indeed, a novel digital source of data may be very useful in the analysis as it becomes increasingly involved in socio-demographic studies (Inferring, 2016; Yumaguzin, Vinnik, 2019). In 2018, the number of SIM-cards used in Russia amounted to more than 255 million, the level of penetration of cellular services (the number of SIM-cards per person), according to mobile operators, amounted to 179%. The highest level of penetration was observed in Moscow (249%) and St. Petersburg (248%). In the regions the average level of penetration was 164%¹. According to this indicator, Russia is among the most developed telecommunication markets in the world. At the same time, the actual level of penetration of cellular services in the mid-2010s was estimated at 75%-79% (Zubarev, Perevoznikova, 2015)². For comparison, the level of penetration of social networks in Russia in the same period was only 33% (Inferring, 2016). That is, the results of data analysis of mobile operators are likely to be more reliable due to the lower selectivity of service users.

¹ Kolichestvo abonentov sotovoj svjazi v Rossii sokratilos' v 2018 godu. [The number of mobile subscribers in Russia decreased in 2018]. Rambler. March 27, 2019. URL: <https://finance.rambler.ru/realty/41936441/>

According to Micro Census 2015 data, xx% of the population live in the region where they were born, xx% have foreign origin and xx% were born in other Russian regions. Of those who were born in other regions, xx% have moved to their current region during the last 12 months.

The paper examines two hypotheses:

1. The hypertrophied role of Moscow is manifested not only in economic and demographic interaction with the regions, but also in social communication.
2. Communicational ties between first-order neighbor regions are higher than with second-order neighbors and so on.

Data and methods

Our research is based on the fine-grained data of one of the three major companies that covers a third of the whole Russian population. The data includes the number and duration of calls, which were made or received by the residents of the Republic of Bashkortostan during 3/09 per 2 hour period. We used the K-means clustering to build a map of the social ties of the Republic of Bashkortostan.

Cell phone data has its own limitations. The sample does not represent all the population of the republic, because there may be differences between people who own mobile phones and people who do not own mobile phones. In addition, our sample is restricted by persons who are using the mobile voice call data and do not include those, who communicate exceptionally via SMS, Internet or landline. According to our mobile data, on average 92% of all active SIM-cards are used for making or receiving voice calls (in different combinations with SMS and Internet), ranging from 84% to 95% in Russian regions, the rest of the SIM-cards are used solely for SMS or Internet communication. Furthermore, we are unable to observe and track voice calls that are represented by the other two main operators.

Though we are exploiting the voice calls made in home regions, i.e. by residents, there is a chance that some proportion of people buy local SIM-cards while travelling in other regions to minimize their communication costs through making local calls and calling to their home region. However, elimination of the interregional roaming in August 2018 in Russia, should have led to the demise of such practices, because communication in a guest region with a person's own SIM-card is not extra charged at a premium anymore.

The cost of interregional calls may depend on tariff plan options, which may encourage or restrain interregional communication between persons. Obviously, we cannot grasp calls made by Skype, WhatsApp and other applications via the Internet, that probably are more common among the youth, and persons for whom the price of mobile calls is expensive.

There are no data on the Republic of Crimea and its capital Sevastopol. Data on Nenets Autonomous Okrug comes with the Arkhangelsk oblast. Data on the Republic of Adygeya is combined with the Krasnodar krai. Data on the Moscow oblast and Moscow are also combined, as well as data on St. Petersburg and the Leningrad oblast. We own data on a total of 79 regions. Maps and graphs are created in GeoDa 1.14.0.24 and Gephi 0.9.2 respectively.

Despite these limitations, it is also important to point out that by using cell phone data, we have been able to propose measures of regional cohesion and access it. We compute the following statistics based on the mobile phone voice transaction history: the amount of inbound and outbound calls, their median and average length, the regional direction of the calls in relation to the Republic of Bashkortostan.

Results

Based on voice mobile traffic data of the cell phone operator, which covers calls from and to the Republic of Bashkortostan, we built a map of main interlocutors of this region (fig. 1). The people of the Republic of Bashkortostan have close connections with those who live in neighboring regions. Comparing the regional composition of the Ural Economic Region, the Volga Federal District and Volga-Ural Macro Region, we can prove that the population of the republic has turned toward Ural regions.



Figure 1. Clustering of the social ties of the Republic of Bashkortostan.

Discussion

In this paper, we provided for the first time (to the best of our knowledge) a snapshot of the social ties between Russian regions based on voice calls data and identified regional clusters with close social connections.

We have found empirical evidence of the importance of the first order neighboring regions. Chelyabinsk oblast is truly a sister region of the Republic of Bashkortostan. In fact, the Bashkir Far Ural (“Zaural’e”) territories and towns (Sibay, Uchaly, Beloretsk) tend to cooperate with developed cities of Magnitogorsk and Chelyabinsk, which are close to the East Bashkir border. On the other hand, the Bashkir capital, Ufa, may attract citizens of Magnitogorsk and Chelyabinsk that forms reverse flows of people. K-means clustering has revealed a huge role of the Moscow region and St. Petersburg as well (figure 1). Khanty-Mansi Autonomous District – Yugra is a second order neighbor region, indeed, being an oil-producing region it draws in specialists from different regions, especially those that have Oil Technical Universities. One of them is located in Ufa. Interestingly, both Ivanovo oblast and Krasnodar kray play significant roles in relationships with the republic. Krasnodar kray is a huge region, which along with Moscow and St. Petersburg, belongs to the centers of attraction for migrants (Naselenie, 2018), due to the economic development, low unemployment rates and a high level of housing construction. The population of the capital of the region, Krasnodar, has increased by 200 thousands people in the last two decades; now its population is close to 1 million citizens. The city had the highest rate of migration increase among federal cities and regional capitals between 2006-2016 (Naselenie, 2018). Moving to another region, people retain connections with parents, relatives and friends in their home regions. It would be useful to examine the migration ties between relatives in further research, and analyze communication between persons with the same surnames alongside identification of the child-parent relationships.

Zamyatina and Yashunskij (2018) presented migration flows and friendship between users’ cities and regions based on Russian social network “VK”. They found that the regions of the Ural Economic Region have multidirectional migration flows. Huge flows of users interconnect the Republic of Bashkortostan and Chelyabinsk oblast. In addition, there are one-way flows to the Republic of Tatarstan and Khanty-Mansi Autonomous District – Yugra from the Republic of Bashkortostan, among the 30 the largest migration flows between Russian regions, excluding Moscow and St. Petersburg. The interregional friendship maps (Virtual’noe 2020) shows that Bashkir users have friends mostly in Khanty-Mansi Autonomous District – Yugra, Yamalo-Nenets Autonomous district, Chelyabinsk oblast, the Republic of Tatarstan, Orenburg oblast, Amur oblast, Penza oblast, the Udmurt Republic and Sverdlovsk oblast. Overall, based on social media data, we

can confirm that first order border regions of the Republic of Bashkortostan have higher connectivity with it.

According to different classifications, the Republic of Bashkortostan is part of the Ural Economic Region, the Volga Federal District and the Volga-Ural Macroregion. As we found, communicational ties between the republic and the first-order neighbor regions are much more solid than with higher-order neighbors. Being surrounded by the regions of the Ural Economic Region, the republic tends to be mostly a part of this group, however the republic has close social ties with Moscow, St. Petersburg and Krasnodar regions as well. In this regard, the case of a centrally located region has its own limitations. That is why further research is necessary to build a communication matrix for all regions, and eventually form cultural clusters for a better understanding of the spatial diversity of our country, and propose additional to demographic and economic criteria for regional classification. We would also be able to test the hypothesis that border countries have a bigger impact on Russian border regions, compared to the hinterland.

Conclusion

The people of the Republic of Bashkortostan have close connections with those who live in neighboring regions. Economic relations and migrated family members (including those who went to get education) are probably the main factors that could explain the pattern. Comparing the regional composition of the Ural Economic Region, the Volga Federal District and Volga-Ural Macro Region, we can prove that the population of the republic has bonded more with Ural regions. We reaffirm the validity of the Soviet economic grid, which considers the republic as part of the Ural Economic Region.

Our paper is intended to stimulate further research at the intersection of international and regional relations, cultural studies, demography and economics. We propose a further assessment of the interconnections and relationships between all Russian regions, to assist with an evidence based socio-economic zoning grid for effective country management, which in turn would lead to balanced spatial development, strengthening the interregional collaboration in infrastructure, investments and social policy.

Our research relied on voice traffic data of the cell phone operator. Increasing the availability of the Internet and widespread of the Social Media will lead to further shift of mobile voice communication into Internet space (for example, voice and text messages, voice and video calls on Skype, WhatsApp, etc.), that cannot give any information about directions of the calls. That is why we think that the current decade may become the last one, when researchers can estimate the social ties according to the voice traffic.

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