

Executive Summary

The state and local governments do not have a comprehensive overview of the actual (primary) place of residence of their residents and are unable to contact people when necessary. According to Statistics Estonia, the residence data of more than 20% of Estonian people in the Population Register is inaccurate, i.e. they do not actually live at the address registered in the Population Register. The overall awareness of the population about the need to ensure that the details of their place of residence are accurate is low. For the provision of most public services (e.g. schools, kindergartens, social benefits and services), it is important to know the correct details of people's primary place of residence. When designing its services, the state must take into account where the consumers of public services are, what is their number and where to find people (e.g. medical care, police, conscription). Thus, the inaccurate residence data of Estonian people in the Population Register is an obstacle to the planning and provision of public services by the state and local governments. In addition to the problem of inaccurate residence data, the inefficient exchange of information with people complicates the functioning of the modern state. The development of e-services and the digital skills and mobility of people have increased, but the communication between the state and the citizens is still dominated by the exchange of information sent by regular mail, which is burdensome for both parties (large postage costs, sending registered letters, etc.) and does not guarantee the delivery of information (documents).

RITA Mobile Life, or 'Mobile lifestyle, consumption of public services and residence data in national registers', is a project that aims to provide solutions to improve the inaccurate residence data of Estonian people in the Population Register and to replace the traditional postal information exchange between the state and citizens with solutions that take into account the potential of the digital age.

As a result of the project, solutions will be proposed to achieve two main objectives:

- A. The residence data of people in the Population Register correspond to reality as much as possible (preferably no less than 95%).
- B. An electronic address or point of contact for people allows them to receive and transmit information from and to the state in an operational manner and also to electronically transmit and receive official state messages.

The project was carried out in three stages from September 2019 to February 2022. A problem analysis was carried out in the Stage I of the project and the surveys carried out during the analysis explained the patterns of the (in)accuracy of the Population Register, the factors that distort the residence data, and assessed the accuracy of the present solutions, analysed alternative data-based solutions (incl. mobile positioning) and explained the factors that hinder the transition to electronic communication. During Stage II of the project, initial proposals were prepared based on the research problem set identified in Stage I and a comparative analysis of the proposals was carried out taking into account technical, economic, legal and institutional constraints and implications. As a result of Stage II, functioning solutions for solving the research problems and achieving the objectives set were developed. The final solutions were selected and a complete package of solutions suitable for Estonia was prepared in Stage III of the project, which will make it possible to achieve the main project objectives in the best possible manner. To this end, a feasibility analysis of the solutions developed in Stage II was carried out, the package of solutions was

presented to stakeholders and the public in a public consultation, and policy recommendations, including an implementation plan, were prepared for policy-making in different areas.

Problem framework

The problem analysis carried out in the framework of Stage I of the project provided a clear overview of the causes and extent of inaccurate residence data in the Population Register (problem A) and insufficient electronic communication between the state and the citizen (problem B). An analysis of the change in the accuracy of residence data in the Population Register showed that in the second half of the last decade, the rate of discrepancy between the register-based and the actual place of residence has increased in Estonia – in 2020, the discrepancy rate exceeded the level measured five years earlier by 1.32 times. This suggests that the impact of the factors contributing to the decrease in the accuracy of the residence data in the Population Register has probably outweighed the effect of the factors contributing to an improvement in accuracy. The analysis enables the identification of several population groups for which the discrepancy between the registered and actual place of residence is significantly higher than the average, and which contribute disproportionately to the inaccuracy of the residence data compared to their share in the population. Such groups include tenants and people using residential premises free of charge; people living in shared accommodation; households sharing several dwellings; young adults (especially those aged 20-29); people in non-marital partnerships; students (especially in vocational and higher education) and people whose home and work are very far apart.

An analysis of behavioural motives showed that less than a tenth (9.6%) of all respondents have entered a place of residence in the Population Register that differs from their actual place of residence because of services or benefits. In the given group, where the use of a service or benefit is the reason for reporting incorrect residence data, the most frequently cited specific reasons were access to a place at a nursery or a school (a quarter of the group) and free public transport (also a quarter). Only a small share (5.5%) of all respondents have entered a place of residence different from their actual place of residence in the Population Register because of specific obstacles. However, this ratio has doubled compared to 2015 (2.3%). For the respondents who cite an obstacle as the reason for incorrect residence data, the specific obstacle in three quarters of cases is the lack of permission from the owner of the dwelling.

Looking at the target groups with different registered and actual places of residence, the most significant result is that the role of purposeful behaviour (registering a different place of residence from the actual place of residence in order to obtain a benefit or to support a particular local government) or obstacles beyond the control of the individual (e.g. landlord not giving permission to register the place of residence) in the occurrence of incorrect residence data is low in Estonia. The results show that these reasons account for one fifth of all cases where the place of residence in the population register does not correspond to the actual situation. The remaining four-fifths of inaccuracies in residence data can be attributed to reasons of convenience – people are not aware of the need to register their actual place of residence, do not care about it, consider their place of residence to be temporary, and so on. One of the largest groups of them is people using multiple dwellings. Overall, however, the results of the analysis refute the myth that the high inaccuracy of the Estonian residence data compared to the model countries (e.g. Finland, Sweden) is the result of people's conscious behaviour aimed at obtaining benefits or obstacles that do not depend on them.

Although Estonian residents can no longer register their place of residence to the accuracy of the local government since early 2019 and it has been possible to add another place of residence or an additional address (which has no legal meaning in terms of taxes, services and benefits) to the Population Register in recent years, the state has not taken any further steps to increase the accuracy of residence data. The residence registration campaigns of the local governments can be considered one of the measures directly aimed at influencing residence registration. The results of the survey showed that residence registration campaigns do indeed lead to an increase in the number of residents registering in local governments during the campaign period, but it is not clear whether or not the residence data in the population register become more accurate as a result. It can therefore be said that there are a number of different reasons for inaccurate residence data, but the main ones are the low culture of residence registration and the insufficient action taken by the state to improve it. This means that improving the accuracy of residence registration in the Population Register requires a comprehensive and sustained effort by the state to address the obstacles faced by the different target groups.

When designing concrete measures, it is not worth looking for one or a couple of solutions that will quickly bring the accuracy of residence registration to a level similar to that of the model countries. Improving the culture of registration is a long-term process, which requires finding solutions that are appropriate for the many challenges involved and the different target groups. Broadly speaking, these solutions are as follows:

- part of the solution should focus on building the understanding that keeping records up-to-date is part of a modern civic culture and a prerequisite for the functioning of the e-state;
- the second part of the action could focus on the key problems identified by the analysis of the inaccuracy of residence data. One of these is certainly the opposition of landlords to residence registration;
- thirdly, all possibilities should be taken to create solutions where residence information can be kept up-to-date independently of a person's will, for example by legal entities managing shared accommodation or by people constructing their place of residence on the basis of information obtained from various registers.

Examining the experience of foreign countries taught us that supervision exercised by authorities was one of the necessary parts of a functioning registration system. Different datasets, combined with the use of modern analytical methods (e.g. cross-usage of registries), should help supervision to focus on the groups whose residence data are the most likely to be inaccurate. It would also be worthwhile to take advantage of situations where people themselves contact the authorities (e.g. to renew documents, to declare income) to clarify their residence data or remind them to do this.

More than before, it is necessary to find contact points of residents and the state/local government that ensure that the residence data of people in the Population Register are correct. One option is for owners of two homes to register multiple addresses under a simplified procedure, which takes into account the regional policy preferences of these people, i.e. a resident is allowed to live in two places at the same time. The results showed that there are also many people who have no interest in registering their actual place of residence, even though there is no direct reason not to do it. Outreach is a key activity for motivating/influencing these people, as it helps improve their inadequate knowledge of the importance to update one's residence data.

The analyses carried out within the framework of the project indicated that one of the potential alternatives for verifying and specifying accurate residence data would be the use of mobile positioning data (specifically, the passive mobile positioning method), which would make it possible to consider the mobility and spatial location of people and assessing their movement dynamically. Passive positioning means that the time of each call and the location of the mobile mast used for the call are automatically recorded in the mobile operator's database. Each mast has a specific geographical coverage area and a unique identifier. This means that mobile phone data cannot have the function of automatically identifying the place of residence with an exact address, but they are instead used to check whether the main place of residence recorded in the population register reflects the actual situation, needs to be clarified (actual place of residence and summer home have got switched) or is actually the main place of residence.

In addition to mobile data, the project also included looking at other data sources that could provide input on people's mobility and place of residence. The analysis took a closer look at data on fixed Internet connections and electricity consumption. The data of fixed Internet connections were analysed in the hope that they could be used to determine the occupancy of a dwelling. Unfortunately, 57% of dwellings did not have a fixed Internet connection (data for 2019), so the data on fixed Internet connections are not yet usable to determine permanent dwellings. However, in the coming years, this network will expand rapidly and new perspectives for determining the occupancy of dwellings may open up. The production of national statistics may benefit to some extent from large-scale data on electricity consumption. In this case, the maximum accuracy would be the dwelling, not the individual. Electricity consumption data can have a major impact in identifying permanently occupied dwellings and in providing rapid estimates in the case of sudden relocation of people.

Inadequate e-communication between the state and its citizens (problem B) is largely caused by the fact that a large share of Estonian residents does not have an e-mail address (which is not mandatory in Estonia), and many of them also have outdated addresses and they often lack an understanding of what constitutes a functioning e-mail address and what does not. Factors stemming from people's behaviour, the state's functioning as well as data capability and technological possibilities are among the main problems of the registration of inaccurate e-mail addresses. On the one hand, the transmission and updating of contact details in the Population Register is not an important activity for many people, as they do not understand the importance of this activity and do not see the benefits for themselves. Also, the absence of data does not create significant problems for people, as the state uses alternative means of communication and the responsibility for the effectiveness of the communication generally rests with the state (i.e. the citizen does not often want to receive information from the state). The state does also not control or implement sufficient measures to ensure the accuracy of the registration of the e-mail addresses of residents, *inter alia* because it does not have a more accurate systematic knowledge of the e-mail addresses of individuals.

The analyses carried out as part of this project showed that a large proportion of the groups surveyed prefer electronic communication, but that some groups face barriers in terms of their knowledge of e-services and tools and their ability to use them. These are mostly older people who lack the knowledge and tools to communicate electronically. Secondly, there are groups who live/work in Estonia but do not share the same information space (e.g. migrant workers, Russian speakers). They should also be able to submit their data and communicate in the traditional way, i.e. with officials on the spot. Electronic means of communication cannot be implemented for groups who cannot use digital tools themselves due to their

health condition. Careful consideration should therefore be given to exceptions – not all population groups will be able to communicate electronically in the future either, and the option of using traditional mail or creating solutions for intermediation that do not overly restrict the speed of transactions should be retained. Some people will want to have face-to-face contact with officials in the future as well.

Updating one's contact details and electronic address is also linked to receiving essential services and therefore to communicating with officials. For some groups, communication with officials is routine, as resources and opportunities for this are good and the use of services is vital. On the other hand, there are groups whose point of contact or e-mail address is not working or has expired. These groups are also either not active consumers of services (older people) or it difficult for them (people in other cultural spaces, Russian-speaking population). The main motives for keeping one's point of contact correct are the speed and flexibility of dealing with the authorities and the suitability of the communication format and the added value that draws people back (e.g. useful warnings, the possibility to report potholes). An important incentive to keep one's e-mail address up to date is to receive various notifications (expiry of driving licences, expiry of medical certificates, etc.). The choice of communication mode based on group preferences could be considered in order to ensure that people provide their points of contact and keep them correct. For example, the development of a single point of contact/'bürokrat' for people with greater communication needs. Young people tend to prefer chatting, which could be used more with chatbots. The older generation continues to prefer face-to-face communication, including by phone.

Solutions to problem A

To address problem A, i.e. inaccurate residence data in the Population Register, the authors of the paper proposed a solution that includes, on the one hand, measures to facilitate the specification of the residence data of the population, by providing easy ways for the population to update/specify the data through the use of e-services, and, on the other hand, communication activities to raise people's awareness. On the other hand, the solution recommends the addition of rights and obligations for the processor of the register and for the processors of residence notices in local governments, which will further improve data quality, particularly in cases where there are grounds to suspect that inaccurate data have been intentionally provided. The solution also includes registry-based data correction solutions that make it possible to use an algorithm to construct a person's place of residence from public and private datasets, which are specified, if necessary, with personalised mobile positioning data, taking into account the person's actual location. If the constructed place of residence differs significantly from the results of mobile positioning, the person can be subjected to a residence check to clarify their data.

As one of the most important changes, the authors of the paper propose a solution of two addresses with legal significance for each person in the Population Register – primary residence and contractual residence with legal significance. These residences may, but don't have to be the same. This means that on the one hand, the current system (registration of the primary place of residence on the basis of a residence notice) will continue, but a residence will also be constructed for each person on the basis of different databases, which the person will have to confirm or refute. If the constructed place of residence is the person's actual and only place of residence, they can confirm it. If this is not the case, the person will be additionally asked whether they want to change the constructed residence to a contractual residence. People already have additional addresses in the Population Register, but they have no legal content. By answering 'yes' to this question, it is possible to give legal content to another place of residence and to enter into a contract with

another local government and order services from. For example, if a child goes to school in another local government or if a person's summer home is in another local government, it is possible to sign a contract with that local government for the required services. If a person does not want to set the constructed residence as the contractual residence as well, the constructed residence will remain an additional address, as a person can have several additional addresses in the population register today. If a person has another place of residence in addition to their primary place of residence, they can enter a contractual place of residence with legal effect in the Population Register by entering into a contract with the relevant local government. All persons do not have to sign a separate contract with the local government, but can set the same place as the primary residence and the contractual residence. Entry into a contract is an option for the people who live in several places and want to receive services from different places of residence as well. The solution does not require changing the organisation of voting rights or receipt of tax revenue.

Main challenges and final policy recommendations for implementing solutions A:

- **Problem:** people do not update their residence data in the Population Register. The solution to the problem proposed by the authors of the paper as a policy recommendation is **the improvement and further development of the current e-service system**. For this purpose, a reminder to specify one's residence data should be displayed when e-services are used. A single entry point (portal) could also be created for the Population Register, which could be used for e-services. The existing system (X-road) should also be developed further so that the data in the Population Register could be specified through this when e-services are used. A rental platform should also be set up and communication activities aimed at raising awareness among different target groups should be carried out.
- **Problem:** there is no system for verifying data. As a policy recommendation, the authors of the study proposed **strengthening the analytical capacity of the Population Register and extending the powers of local government officials in data verification and specification. Possibilities for imposing sanctions should also be created**. Additional rights and responsibilities should be given to local governments for this purpose and they should be provided with resources to verify that residence data are accurate and up-to-date. The system of sanctions should be adapted. The Population Register should introduce a regular feedback and monitoring system. National and regional surveys should also be carried out at certain intervals (e.g. 3 years) to check the accuracy of the data.
- **Problem:** there is no system for verifying data. As a policy recommendation, the project proposed **the creation of a digital automated analysis centre, the content of which would be the specification of the primary residential address on the basis of public and private databases**. Registers should be connected via X-road for this purpose (possibly by further development of the present systems). An algorithm for determining the primary residential address should be developed and an analysis centre should be set up. Cooperation agreements should also be established with the private sector to connect private databases. A digital confirmation form should also be created for the person to confirm or refute their primary residence data.
- **Problem:** public services are planned on the basis of the data of a single place of residence in the Population Register, the inaccuracy of which affects service delivery and quality. Increasingly more

people are mobile and have multiple places of residence, but the current system only allows for one address to be listed as the place of residence in legal terms. The authors of the paper proposed as a policy recommendation that to solve the problem, **people could be allowed to register two addresses with legal significance in the Population Register – the primary residence and the contractual residence with legal significance.** Primary residence is currently based on a person's declaration of residence, where they are always guaranteed to receive all the services they need. Primary residence may also be implicitly based on the residence constructed by the analysis centre. If a person has a constructed place of residence that is different from their registered primary residence, they will receive a notification with a confirmation form to confirm or refute the place of residence. This solution would allow people to add a contractual place of residence (including, for example, on the basis of today's additional addresses), thereby entering into a contract with the respective local government, which has legal significance and can be used to order services from the respective local government. If the primary residence specified by the analysis centre is not confirmed, the person may add this place of residence as the contractual place of residence by entering into a contract with the respective local government. In order to request services, a contract must be entered into with the relevant local government, on the basis of which the local governments do their billing. The contractual place of residence will enter into force legally in the next budget year, allowing local governments to better plan personalised services. The solution does not require changing the organisation of voting rights or receipt of tax revenue.

- **Problem:** existing datasets do not take into account people's mobile lifestyles and the use of services linked to the selection of a single place of residence. To solve the problem, the authors proposed **the regular use of personalised mobile positioning data as part of the main algorithm for the specification of residence data or for verification of the data in the register.** For this purpose, the mobile positioning data should be linked to the residence data included in the population register. Mobile positioning data should also be linked to the algorithm of determining the place of residence in the analysis centre. An automatic data analysis and verification system and a digital confirmation form to confirm or refute the person's specified primary residence should also be created.

Solutions to problem B

In order to address problem B, i.e. the inadequate e-communication between the state and citizens, the authors proposed a solution that combines improving the accuracy of contact information upon the better performance of the state's existing obligations and directing citizens to update their data through the use of e-services, while improving the presentation of communication between the state and the citizens, introducing a national mailbox service, constructing an official e-mail address based on public and private databases, and replacing written communication with verbal solutions.

On the one hand, the state should continue motivating people to ensure that their contact details in the Population Register are correct and up-to-date by making it as easy as possible for them to use various e-services. This means that, over a period of time, the person will receive a reminder to update their data in the Population Register when they use various e-services (e.g. e-TCB, digital health records, etc.). Carrying out various communication activities, which would help people better understand the importance of up-

to-date contact data in the Population Register, also remains important within the scope of this solution. It is also important to many target groups that their data are easily accessible, easily modifiable and their use is traceable, which is why eesti.ee should continue to be developed with the digital twin functionality. On the other hand, the state should develop automated solutions to improve the e-communication between the state and citizens. A national mailbox service is already being developed for this purpose, which will allow people to send and officially receive messages in one environment. The most up-to-date and usable e-mail address should also be constructed based on other registers, the results of which people can confirm themselves.

Also, e-communication is constantly evolving, so the solution roadmap also includes the most innovative solutions to transform e-communication from an e-mail address to a chat room format and/or to a verbal format. In developing this, the state should continue to work on solutions like Bürokrat, which would allow people to quickly interact with the state in a convenient online environment or via a phone app. The solution also includes legalising the meaning of conversations and/or other verbal interactions, using various technical identification systems, which would greatly simplify official business.

Main challenges and final policy recommendations for implementing solutions B:

- **Problem:** people lack the knowledge and motivation to keep their contact details up to date. The solution to the problem proposed by the authors of the paper as a policy recommendation is **the improvement and further development of the current e-service system.** This requires strengthening the analytical capacity of the Population Register (including the development of solutions to detect inaccurate e-mail addresses) and creating a single entry point (portal) for e-services. The existing system (X-road) should also be developed further so that the contact data in the Population Register could be specified through this when e-services are used. Communication activities aimed at raising awareness among different target groups should also be carried out.
- **Problem:** there are a number of national and private databases, unconnected to each other, which contain different information about people. The policy recommendation proposed by the project for addressing the problem is **the creation of an analysis centre for the automated construction and/or specification of a person's official e-mail address on the basis of the data in public and private databases.** This should be done by linking the different registers through the X-road and by setting up an analysis centre. An algorithm for the identification of the exact e-mail address should also be developed. Involving the private sector would also be important. A confirmation form should be created for the person to confirm or reject the constructed/updated data.
- **Problem:** the lack of a single online environment where individuals can see all the data about them and their movement, which would increase trust in the state. As a policy recommendation, the authors proposed **the further development of Eesti.ee into an online environment with a digital twin functionality that would include all the national data of a person.** The digital twin functionality should be added to eesti.ee for this purpose.
- **Problem:** the lack of a single system to provide a platform for communication between public authorities and citizens, where the individual could choose the appropriate channel themselves. The solution proposed by the authors to the problem as a policy recommendation is **that increasing the efficiency of e-communication should continue with the further development of**



the national mailbox service. A machine interface between different communication channels should be developed for this purpose, so that it would be possible to connect an eesti.ee account to the person's chosen communication channel. E-solutions for document delivery should also be developed. Various public (and also private) institutions should be linked to the proposed solution.

- **Problem:** finding the necessary information on different websites is difficult and time-consuming for individuals, and communicating by e-mail does not take into account innovative e-solutions. To address the problem, the authors proposed as a policy recommendation **the creation of verbal communication channels that replace correspondence, which would allow for verbal communication with a legal meaning.** This should be done by creating a chat window and developing a network of chat box, and the development of a mathematical solution (the RIA Bürokrat) should also continue. A virtual assistant and a virtual assistant that allows for calls to be recorded should also be developed. It is also important to develop authentication solutions.