

# Estonian e-Residency: Benefits, Risk and Lessons Learned

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**Abstract.** Why did Estonia create e-Residency? e-Residency project challenges traditional notions of residency, citizenship, territoriality, and globalization—with potentially profound implications for social theories of the state and citizen networks in the modern era. This paper examines the foundations of the project within the broader context of the Estonian e-state and discusses the main actors and components involved in the creation and functioning of e-Residency. It presents an assessment of the initiative’s benefits and risks to society. Finally, the paper concludes by exploring the broad implications of e-Residency for conventional understandings of the nation state.

## 1 Introduction

This paper explores Estonia’s innovative e-Residency initiative, an ambitious project launched in 2014 that, for the first time, enables people from anywhere in the world to become digital residents of another nation. Like other pioneering developments in the Estonian “e-state,” the e-Residency project challenges traditional notions of residency, citizenship, territoriality, and globalization—with potentially profound implications for social theories of the state and citizen networks in the modern era.

The study has both theoretical and policy-oriented objectives. Theoretically, it applies the principle of “flat” ontology, drawing from the Actor Network Theory perspective, to elucidate the workings and potential impact of e-Residency. At a policy level, the analysis provides the reader with the necessary information to understand the functions and aims of e-Residency, as well as the business possibilities that it offers. Moreover, the paper will discuss lessons and insights that will help practitioners identify and unlock the transforming potential of this new policy instrument of the e-state for other nations.

The paper has three sections. Firstly, it examines the foundations of the project within the broader context of the Estonian e-state and discusses the prime agents involved in the creation and functioning of e-Residency. Secondly, it assesses the initiative’s benefits and risks to society. Finally, the paper concludes by exploring the broad implications of e-Residency for conventional understandings of the nation-state.

## 2 Background and Origins of e-Residency

Why did Estonia create e-Residency? [1] The initiative's point of origin was the ambitious ideal of recruiting "10 million e-Estonians," which was conceived by three people: Taavi Kotka (a co-author of this publication), Siim Sikkut, and Ruth Annus. This principle emerged from the priorities established by the Digital Agenda for Estonia 2020, in which the Estonian Cabinet prioritized the aim of increasing Estonia's international recognition in digital affairs as follows [2, p. 3]:

*"Estonia will start offering its secure and convenient services to the citizens of other countries. Virtual residence or e-Residence will be launched, meaning that Estonia will issue non-residents with electronic identity in the form of digital ID cards. The aspiration for Estonia is to become as re-known [sic] for its e-services as Switzerland is in the field of banking."*

The concept of e-Residency was then submitted for approval to the Estonian Parliament, where it received unanimous support. In spring 2014, the "10 million e-Estonians" [3] idea was sent to the Estonian Development Fund, which was organizing a competition for the "Best Development Idea 2015." E-Residency received immediate attention and won a twelve-month development grant. The e-Residency website and subscription list went viral through social media channels. In this way, the project attracted substantial international attention even before the Estonian government began promoting it. Indeed, positive coverage by the international media (e.g. BBC World News, The Guardian, The Economist, ABC News (Australia), Wired UK) was a crucial factor in the project's acceptance within Estonian society. By 1 December 2014, Estonia had recruited its first e-resident (Edward Lucas of The Economist). Animated by these early successes, the Estonian Cabinet soon after this held a second meeting to decide the future of the project. A seven-member team was assigned to run the project beginning in April 2015 (see Table 1 for an extended list of key actors in the project), led by Kaspar Korjus (Programme Director).

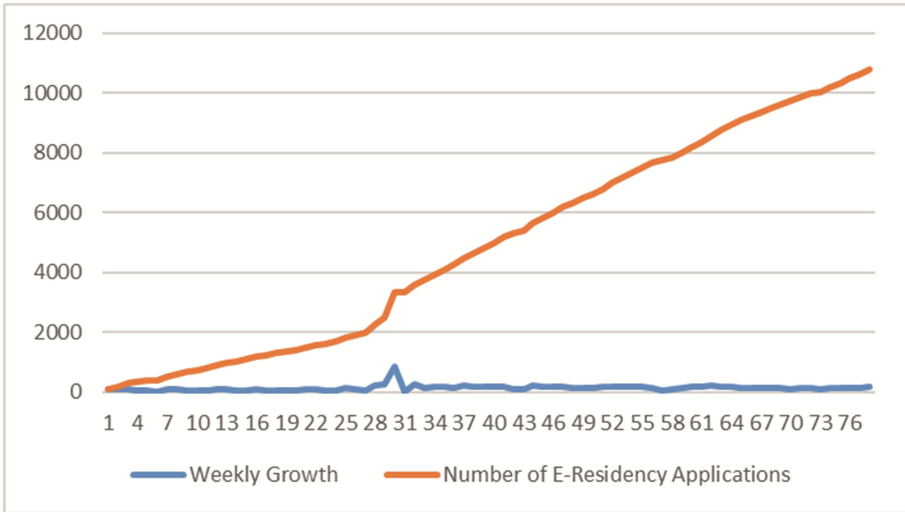
By May 2015, Estonia had launched e-Residency as an internationally accessible "beta" initiative. Henceforth, physical visits to Estonia were no longer required in order to apply for e-Residency. Rather, following a thorough background check, the applicant could visit any of thirty-eight foreign embassies from New York to Tokyo, identify herself with her passport, provide biometric data, and pick up the e-Residency eID card. Although the application process thereby became easier, obstacles to the conduct of business and other activities remain. For example, in order to open a bank account or to sell shares in a company, e-residents must travel to Estonia to meet with bank officials or notaries.

In July 2015, the Cabinet held a third meeting on e-Residency, which resulted in a resolution to adapt major legislation, processes, and e-services in order to facilitate the conduct of business activities in Estonia. As of August 2015, e-Residency remains in a public beta phase, meaning that everyone is invited to apply for residency and to help the Estonian government by providing feedback that will help the organizers tailor it to users' specific needs. In short, Estonia is developing e-Residency in the spirit and manner of a start-up enterprise: the launch and methods of improvement have been swift and institutionally nimble.

**Table 1.** Main roles of the key actors in the e-Residency project

| Key actor                                       | Role/Description   |
|---|--|
| Authors of Digital Agenda for Estonia 2020      | Government document from November 2013 which first discussed the e-Residency initiative  |
| Estonian Development Fund                       | Organised the competition that initially promoted and funded the “10-Million E-Estonian” concept   |
| 7-member team at Enterprise Estonia             | Facilitates the administration of the e-Residency project and coordinates with cooperating public, private, and non-profit sector partners.  |
| The Board of E-Residency                        | Supervises the strategy, goals, and budget of the project proposed by the 7-member team  |
| Cabinet   | Supervises the strategy, goals, and budget of the project proposed by the Board  |
| eID   | Access key for e-residents to the digital world  |
| X-Road  | Estonian data-exchange layer enabling secure internet-based data exchange between public and private sector information systems  |
| Estonian Police and Border Guard                | Monitors the application process for e-Residency cards, conducts background checks on applicants, and issues cards to Estonian embassies and consulates, which will issue the eIDs to e-residents. |
| Information System Authority (RIA)              | Coordinates and safeguards the development and administration of the national information system   |
| Ministry of the Interior                        | Develops legislation regarding e-Residency applications and processes  |
| Ministry of Economic Affairs and Communications | Manages the public-sector IT budget and formulates decisions on how to invest in applications  |
| Ministry of Justice                             | Develops legislation regarding the business environment  |
| Ministry of Finance                             | Develops legislation regarding the financial aspects of e-Residency and reviews its compliance with the law  |
| Ministry of Foreign Affairs                     | Holds face-to-face meetings with applicants, takes their fingerprints, and issues e-Residency start-up kits  |

So far, the initiative has met with great success in growing the number of users. On December 2014, the Cabinet agreed to aim for 2,000 e-residents by the end of 2015, meaning that, on average, 8 e-residents per working day would have to apply



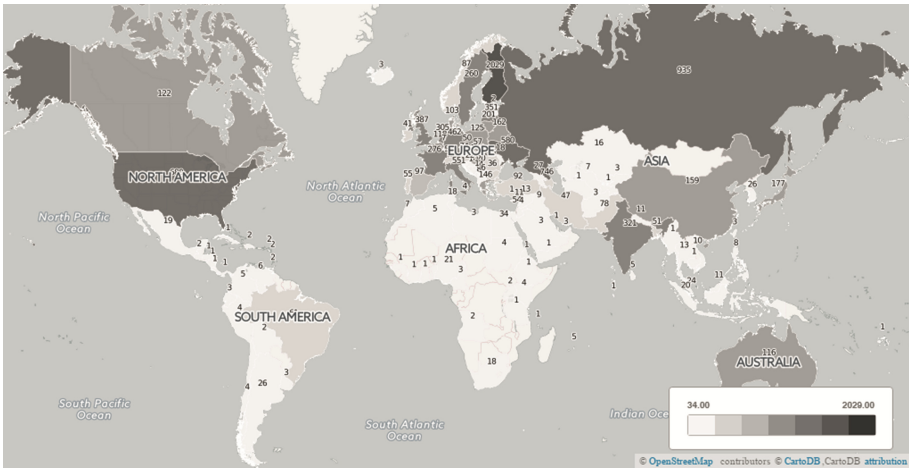
**Fig. 1.** Weekly growth in e-Residency applications

successfully. As of May 2016, there have been 10,353 applications (see Fig. 1 for weekly growth in E-Residency applications), of which 9,768 (94 %) resulted in e-Residency; 394 (4 %) are still in process; 136 (< 2 %) were denied. Thus, the initial goal of 2,000 applicants was exceeded by 128 % within just three quarters. Through May 2015, there were 15 applications per day. Since the launch of the online application form on 13 May, 43 applications have been submitted daily. If this trend continues, by the end of 2016 there will be approximately 14,000 e-residents—far exceeding initial recruitment goals.

Before the application became available online, most e-residents came from Estonia’s neighboring countries, because applicants had been required to visit Estonia twice in order to complete the process. As of May 2016, however, the top 10 countries for applicants (see Fig. 2) are Finland, with 2,029 applications (20 % of the total); Russia, 935 (9 %); the United States, 680 (7 %); Ukraine, 580 (6 %); Italy, 551 (5 %); Germany, 462 (4 %); United Kingdom, 387 (4 %); Latvia, 351 (3 %); the India, 321 (3 %); and Netherlands, 305 (3 %). Recently, the online application platform has witnessed a surge in applications from the developing world. Since its inception, 284 Estonian companies have at least one e-resident shareholder. Additionally, the e-Residency network contains 20,069 active e-mail subscribers.

### 3 Benefits and Risks of e-Residency

The practical consequences of e-Residency for citizens and for the Estonian state are not yet entirely known; they will, however, create possibilities for the project’s continued expansion or failure. Following is an assessment of the project’s benefits and risks. It is based on interviews with 29 experts and key actors highlighted in Table 1 and feedback



**Fig. 2.** Geographical distribution of e-residency applications (as of May 2016)

from 529 early e-residency applicants, which was coded, organized and structured for a summary presented in following subsections.

We argue that the positive practical consequences of e-Residency for Estonia and its citizens significantly outweigh the risks associated with the initiative; nevertheless, these risks are real and merit serious attention—particularly among policymakers in nations who may consider adopting similar measures in the future.

Although, as we argue, e-Residency is best perceived as a sort of governmental start-up, some benefits have already emerged for three types of non-governmental stakeholders: e-residents, the private sector, and the Republic of Estonia as a whole.

### 3.1 Benefits for e-Residents

Why do people become e-residents? The answer is simple and compelling. E-residents can currently access and use the following services online:

- Establish and administer a company;
- Conduct all their banking;
- Declare taxes;
- Digitally sign contracts and other documents;
- Access international payment service providers.

We can divide e-residents into three groups: visitors to Estonia; virtual businesses; and “fans,” or the community of e-residents who are motivated by personal considerations. Visitors to Estonia include diplomats, academics, even some tourists—all of whom now and again physically live in Estonia for a short period of time.

Because present-day Estonia is a fully digitized nation, life without a digital identity can be challenging—indeed, it is almost inconceivable. As e-residents, diplomats no longer have to carry and sign invoices to obtain VAT returns; with the digital signature feature, this process can be conducted in seconds via email. Guest lecturers or

researchers can now sign contracts from other universities even before arriving in the country. And visitors, during their stay in Estonia, can use the e-Residency card in local pharmacies to collect prescriptions; at libraries to take out books; or as a discount card in local supermarkets. Because every e-resident possesses a unique identity number, many digital services available to legal residents and citizens are also available to e-residents.

Individuals working in virtual businesses constitute the second group of e-residents. Mainly, these are people from neighboring countries who already have investments in Estonia. Before the era of e-Residency, changing a company's email address, for example, required visiting a notary, paying for postal and other fees, and waiting at least one week before the new information was entered into the Estonian business registry. Now, e-residents can go online and perform all of these functions—in a matter of seconds—via the e-business registry. The same ease of conducting business applies to tax filings, annual report submissions, shareholder meetings, and many other obligatory business tasks. E-Residency, in brief, makes the life of foreign shareholders and managers much more efficient.

It is important to note that the virtual business environment also includes entrepreneurs and freelancers from outside the EU, especially in the developing world. These people face huge challenges in today's changing global business environment, challenges for which Estonian e-Residency could be a solution. It is likely that in the coming years there will be many more self-employed freelancers whose lifestyle is more mobile, whose customers hail from various different countries, and whose services are sold via e-commerce channels. These trends put traditional nation states in a position that, instead of creating a business friendly environment for residents and citizens, holds them back from growing their businesses. Today's global citizens prefer to avoid the confines of national borders, face-to-face meeting requirements, and double taxation by governments. E-Residency provides the opportunity to run location-independent international businesses while keeping administrative costs to a minimum. Ownership and control of a company remains fully with its founders, without any need to hire and correspond with local directors as businesses must do in typical financial offshore centers such as Panama and the Cayman Islands. E-Residency offers individuals in the developing world a particularly useful set of business opportunities and advantages. First, for reasons of political or economic instability in their countries of origin, such individuals may struggle to gain trust in Western business circles, complicating the search for partners and customers abroad. Estonia, in contrast, is firmly embedded within the EU legal framework, which offers e-residents from developing countries a basis on which to build the same level of trust as residents elsewhere in the Western world. Second, many developing countries are plagued by significant levels of bureaucracy, travel restrictions, and sometimes unstable political climates, which make it very difficult to seize long-term competitive advantages. Third, the general level of Internet access in much of the developing world is low; furthermore, even countries with a comparatively broad level of Internet access may not offer standard digital services, such as online payment providers. Therefore, businesses in these countries cannot accept international payments—hence

they cannot sell their services or products via online channels. Selling digital services exclusively in local markets greatly hampers the potential for business development.

The solution to these problems is simple: as Estonian e-residents, these business owners can establish and manage a trusted EU company online; open an Estonian bank account and transfer money online; gain access to trustworthy Estonian payment provider services; and sign contracts, tax declarations, and administrative filings online. While these functions provide particular advantages to e-residents in the developing world, they also allow all e-residents the chance to run location independent international businesses—the ultimate freedom of mobility—while at the same time keeping the administrative costs to a minimum. This, then, is the ultimate goal of Estonia's e-Residency project with respect to businesspersons: to unlock the entrepreneurial potential of every world citizen.

But why choose Estonia as a basis for residency—of any kind—in the first place? First, Estonia offers a strong social and infrastructural basis for aspiring entrepreneurs. According to a 2014 study by Freedom House, Estonia ranks second in the world in terms of Internet freedom [4].

In addition, in 2015, a study by the Heritage Foundation and the Wall Street Journal ranked Estonia first among EU member states in economic freedom [5]. Second, the country has a transparent flat-rate tax system with 0 % income tax on businesses for profits that are reinvested domestically.

A third group of e-residents consists simply of the project's community of fans—that is, individuals who join for personal reasons, not to conduct business. According to a study conducted by the e-Residency operators, 35 % of subscribers fall into this group. These individuals may be politically or ideologically minded and perceive e-Residency as a mechanism to protest against or subvert the controls of governments that are repressive of Internet freedom, press freedom, and other civil and political rights. Herein, then, lies an essential underlying premise of the e-Residency project: people everywhere resent ever-increasing restrictions in both their personal and professional lives. They do not want to choose between privacy and security—they want both. And this is exactly what e-Residency offers.

One reason why Estonians have one of the highest levels of government-citizen trust in the world is that the advanced state of Estonia's ICT infrastructure strikes a reasonable balance between user security and privacy, on the one hand, and convenience of lifestyle, on the other. E-residents find that their eIDs offer an extra layer of identity, one that is superior to those conferred by their parent states of origin, which are confined by geographic frontiers and severely limited by legal restrictions and cumbersome bureaucracies. There is a natural pool of prospective e-residents—from both the industrialized and the developing worlds—among people who are oppressed by their territorial home nations. E-residents from these nations may now enjoy a new level of belonging to an emergent, transparent, and privacy-first globalized world. For this group, the decision to become e-residents is a fundamental choice to break free from conventional restrictions of citizenship and territoriality. One cannot choose one's country of birth; one may not even be able, realistically, to choose one's country of physical habitation; but now, regardless of these two constraints, one can always choose a country of *digital* residence.

### 3.2 Benefits for Private Sector Entities

Another important group of e-Residency stakeholders comprises partner companies that offer services to existing e-residents. These partners generally fall into the following groups: authentication plug-in service providers, new eID service start-ups, corporations in need of optimizing internal business processes, and customer support organizations. E-Residency is not just a service; it is also a *platform*. The Republic of Estonia is just one party that offers services to e-residents, such as establishing a company or accepting digital signatures. But any third party can offer these (and many other) services as well, because all the necessary tools for organizations to implement e-Residency services are publicly available on the web.

Authentication plug-in service providers integrate Facebook-like login buttons that allow e-residents to enter their web sites. This feature is extremely useful for service providers who need to ensure that the other party is who she claims to be. Also, e-Residency is the first government issued transnational digital identity whose authentication procedures are treated as equivalent to face-to-face encounters. Hence, enabling e-Residency login makes sense for those who want to replace the requirement for face-to-face meetings with a digital form of authentication. This can be especially useful for financial service providers who need to follow very strict regulatory frameworks.

In addition to financial service providers, there are entirely new emerging business areas, such as virtual currencies, e-health, and the sharing economy that require this level of trust on the Internet. For e-residents, this trust is backed up by the Estonian government rather than by comments, likes, or shares on a website.

The second group of private sector partners consists of entrepreneurs who are inventing new services using eID platform functions, such as verification of signed document authenticity. The services of new start-ups may range from encrypted video-conferencing to safe file storage to data verification services.

A third type of partner consists of corporations that can optimize their internal processes using the e-Residency platform. Every employee, associate, or client of these corporations can use e-Residency cards to access internal information systems where activities can be encrypted, logged, signed, and traced. This opens new possibilities for outsourcing some internal infrastructure and maintenance costs to the Estonian government. This feature is particularly useful to businesses in the fields of logistics, construction, trade, shipping, and other industries.

A fourth partner consists of customer support service providers. There are thousands of new e-residents that need support of various kinds, such as legal, business, or accounting advice, which may not be obtainable with the eID. E-residents are highly valuable customers because of their innovative approach to international markets and their readiness to submit to strong, continuing background checks by Estonian authorities. Such partners are key stakeholders in the e-Residency project, because the Estonian government could not possibly offer all of these business services itself.



### 3.3 Benefits for the Republic of Estonia

Estonia is the third main beneficiary of e-Residency. From its very beginning, questions have arisen about why Estonia is running this project. What, then, are the benefits for Estonia and Estonians?

In spring 2014, when the discussion on e-Residency began, the main rationale for undertaking the necessary legislative changes was that these changes would facilitate business activity for foreigners who had some connection with Estonia. Previously, for example, if an Estonian company had at least one foreign shareholder, then everybody in the group not only had to sign contracts and attend board meetings in person, but occasionally also had to meet physically with governmental agencies. This resulted in higher administrative costs for both the companies and the government. In addition, the Estonian diaspora was the second target market; e-Residency was recognized as a tool to maintain closer relations with them.

So, while the initial benefits of e-Residency for Estonia were mainly related to increased efficiency in both the public and private sectors, the “10 million e-Estonians” idea refocused this aim in a way that sought to enable location-independent businesses for businesspeople outside the EU. This pivot has also made the government redefine the business value of e-Residency for the state. The most obvious revenue model would be tax collection from companies. Yet for many reasons the government has not taken this route. To begin with, in many cases taxes are payable to the country where the business value is created or where most of the board is situated; if Estonia, too, were to tax these businesses, then the companies would likely reject e-Residency because of the prospect of double taxation. A second reason why the Estonian government did not consider direct taxation as a revenue model for e-Residency is more straightforward: the government never planned to become a tax haven for businesses to optimize earnings.

For Estonia, the ultimate business purpose of e-Residency is to build stronger relations with different nations worldwide. If entrepreneurs from Ukraine, for example, can utilize e-Residency to build international businesses, sell services abroad, receive credit card payments, and pay their taxes in Kiev, then the project would increase Ukraine’s GDP. And it would do so in a short period, compared to the amount of time needed for traditional economic boosters, such as education reform, and without necessitating any investment by the Ukrainian government. Instead, Ukraine can simply leverage Estonia’s existing platform to boost its own economy. Therefore, instead of directly collecting taxes from e-residents’ companies, Estonian companies can offer them services and bring new foreign money and investment to the country (e-residents pay for bank accounts, credit cards, tax and legal advice, physical address providers, and many other services).

With a current pool of 10,000 e-residents, the resulting income may not yet be substantial, but it will grow if the long-term goal of recruiting tens of thousands—or even millions—of e-residents is attained. As long as Estonia continues its policy of tax exemption and so long as it enables people all over the world to grow their businesses within their own countries, it is simply a matter of time before a large number of people becomes interested in this new initiative. Furthermore, in the coming years there will be 1 billion new Internet users [6]. Forty percent of the U.S. workforce alone will consist

of freelancers [7]. As people become more digitally connected—and thus, in principle, more mobile—the necessity for location-independent business platforms will only grow.

In sum, the main reason why Estonia seeks to expand e-Residency’s reach is to increase the country’s economic size—not through direct taxation levied upon e-residents, but through the extra income generated by Estonian companies that offer products and services (e.g., bank accounts, postal services, legal and tax advice) to them. There are, moreover, secondary reasons why Estonia is building the e-Residency project. As a result of the initiative, the country has garnered sustained positive media attention with no marketing costs. This attention by itself can, in the long run, increase foreign trade investment, tourism, and export business. If and when Estonia has signed up millions of e-residents worldwide, then arguably the resulting new economic relationships may increase Estonia’s national security by, for example, fostering “soft” ties to people abroad, which may help to deter future conflicts or generate increased international support should Estonia find itself in a conflict. One other intangible benefit of e-Residency for Estonians is the simple matter of national pride: the feeling that through the initiative the country is positively influencing international relationships and businesses. Much of the emphasis in the country’s transition following the collapse of the Soviet Union was on internal rebuilding; now e-Residency can help Estonia project its transitional successes to the external world.

### 3.4 Risks

Having reviewed the benefits that may ensure e-Residency’s continued growth and durability, we now proceed to discuss the factors that might imperil the project. The analysis would not be complete without considering the potential for these risks.

What are the risks? How does the government tackle them? What returns on investment are required to overcome the inherent limitations of existing political, financial, and business boundaries? These questions, which have inspired much of the international interest in the project, are difficult to answer: how can one identify or manage risks when the final outcomes and implications of e-Residency are not yet clearly understood? Moreover, for national security reasons, the Estonian government does not publish its official risk analyses. Despite these obstacles, the discussion below will illustrate some of the risks by drawing from current experience and publicly available data.

One risk is political: the governmental consistency required to sustain funding and legislative priorities across different coalitions of power may erode. A new governing coalition would not necessarily end the project, but for this kind of multi-actor initiative to work, many different government agencies must be committed to its success. The main political challenge, then, is to sustain the project’s relevance to the governing coalition (whatever it be), thus ensuring that the necessary mandate to expand the project endures, while at the same time preserving the project’s independence from any particular political or governmental grouping so that the project attracts support across the domestic political spectrum.

Another important risk relates to public relations and communications, both in Estonia and internationally. E-Residency was launched without a clear business model or end-goal in sight. In today’s start-up world, the concept of using a technological

platform to build a global “user base” is more common in business than in an entity such as a nation-state. The key to success is striking the right balance of involvement among Estonian citizens and global e-residents and remembering that the investor in the e-Residency project is the Estonian taxpayer. Moreover, the project needs to face the external challenges of managing unrealistic expectations.

Technological risks are also a concern. Possible abuse of the eID is the greatest threat, because the security of users’ identity is the chief prerequisite of e-Residency. In addition to thorough background checks, capturing and analysis of biometrics, and face-to-face meetings with trained authorities, Estonia should also consider establishing a single infrastructure for all users that is optimized for the prevention and detection of misuse. In principle, this is possible: like residents and citizens, every foreigner leaves a digital fingerprint on every activity she conducts with the eID.

There are further technological risks in the threat of cyberattacks, which might threaten the stability of the eID platform that is necessary to scale up the project to over ten million users. Despite numerous security precautions, in April 2007 Estonia suffered a massive cyberattack that was reportedly perpetrated by politically-motivated Russian hacktivists angered by the Estonian government’s relocation of a Soviet war monument from the center of Tallinn. The attacks prompted one of the most important strategic adjustments in Estonian and European security doctrine. Today, the protection of digital services and databases is of paramount importance to national security. Within this new security culture, Estonia has become a pioneer in the area of cyber defence, as illustrated by the establishment, in 2008, of the NATO Cooperative Cyber Defence Centre of Excellence in Tallinn. The e-Residency project reinforces this perception by sending a clear message to the world: Estonia is so confident about its technical e-government platform that it is not afraid to make it publicly available to everybody everywhere.

In sum, e-Residency opens up a whole new realm of debate about the opportunities for and challenges to national security in the digital era. Existing risk analyses suggest that e-Residency will not generate new critical risks to government functions; however, the risks could scale up if they are not adequately addressed by policymakers. Instead of trying to face these challenges in isolation or in secrecy, Estonia has opted to confront them in a spirit of public scrutiny and open discourse. Anyone from anywhere in the world is invited to identify, solve, and learn from the risks associated with e-Residency.

## **4 Conclusions**

Estonia is the first country to offer a transnational digital identity. The implications of this move are difficult to foresee, because the world has never before experienced this level of trust in the implementation of the e-state. When users obtain digital identities, they cease to be random users and become real beings. Without a physical passport, one is not trusted to travel across countries; similarly, on the Internet one cannot be trusted without a secure digital identity. The chief implication of a secure transnational digital identity is that it makes possible a world in which every Internet user possesses a trustworthy digital persona. Several trends in this regard can already be noted. For example, e-Residency reduces the need for middle-level controls or institutions that reduce the

risk of fraud in business. In addition, the project increases the pool of people who can comfortably interact with each other across national borders, thus boosting the development of peer-to-peer services within the so-called sharing economy.

These trends mean that governments could in principle adopt the habits of client-oriented service providers—just like the private sector—in order to keep citizens, residents, and non-resident clients satisfied. No government can afford to lose its resident- and citizen generated expenditures to other governments. Nor can any government afford to “sell” its services only to local residents. In the digital era, economies of scale in the management of information systems are enormous; achieving these economies requires that the system architectures are uniform—whether they serve one million national citizens or one billion e-residents. This trend paves a way for the emergence of *Country as a Service (CaaS)* concept.

These ongoing developments of the e-state present both positive and negative implications for the security and welfare of nation-states. Governments that do not partake in digital initiatives or that experience losses because of them might perceive these trends as a plan to “steal” their residents and citizens, producing political and economic tensions. But as this study has suggested, the emergent digital single market might also enhance interstate cooperation in new ways. The joint Estonian and Finnish X-Road project represents a promising case in this respect [8].

More fundamentally, the e-Residency project may lead to the redefinition of the nation-state itself. Perhaps individual identity should be based less on one’s place of physical birth or residence and more on intangible values and senses of belonging. In time, the e-Residency project may radically alter the perception of belonging so that it is no longer anchored to the territorial nation-state. In this way, e-Residency challenges prevailing theories of the state.

#### 4.1 Further Research

These developments open up a new field of enquiry in the study of government, government technology and public administration (see [9] for Estonia’s policy and legal environment analysis for e-Government services migration to the public cloud). The options for academic research on e-Residency are vast. Future studies may analyze questions such as:

- What will life will look like in 2018, after regulation to expand the use of electronic identification and trust services in the EU (eIDAS) has been enforced? [10]
- What would be the political and legal implications if the EU changed its policy so that every Estonian e-resident could also become an EU e-resident?
- If secure transnational digital identities became widely adopted in the coming decades, what would the implications for nation-states be?
- If e-Residency is adopted and applied by more countries, would one be able to choose multiple countries of digital residence?

Each of these questions begets opportunities for interdisciplinary collaboration. Research on the sociology, political science, public administration, computer science, and international relations of the e-state is necessary to understand the broader

implications of the e-Residency project and how it will affect citizens, governments, politics, and indeed the very future and meaning of the nation-state in the digital era.

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## References

1. Kotka, T., Liiv, I.: Concept of estonian government cloud and data embassies. In: Kö, A., Francesconi, E. (eds.) EGOVIS 2015. LNCS, vol. 9265, pp. 149–162. Springer, Heidelberg (2015)
2. Ministry of Economic Affairs and Communications: Digital Agenda 2020 for Estonia, Tallinn (2013). [https://www.mkm.ee/sites/default/files/digital\\_agenda\\_2020\\_estonia\\_engf.pdf](https://www.mkm.ee/sites/default/files/digital_agenda_2020_estonia_engf.pdf)
3. Kotka, T.: 10 Million ‘e-Estonians’ by 2025! Tallinn (2014). <https://taavikotka.wordpress.com/2014/05/04/10-million-e-estonians-by-2025/>
4. Kelly, S., Earp, M., Reed, L., Shahbaz, A., Truong, M.: Tightening the Net: Governments Expand Online. Freedom on the Net 2014. Freedom House, Washington, D.C. (2014)
5. Heritage Foundation: Country Rankings: World and Global Economy Rankings on Economic Freedom. 2015 Index of Economic Freedom. Heritage Foundation, Washington, D.C. (2015)
6. Internet Live Stats: Number of Internet Users (2015). <http://www.internetlivestats.com/internet-users/>
7. Kvovhko, E.: The Online, Freelance, Globalizing World of Work. Techonomy, March 2014. <http://techonomy.com/2014/03/online-freelance-globalizing-world-work/>
8. Pau, A.: Finland and Estonia on Joint X-Road Starting November. Postimees, Tallinn (2015). <http://news.postimees.ee/3264073/finland-and-estonia-on-joint-x-road-starting-november>
9. Kotka, T., Kask, L., Raudsepp, K., Storch, T., Radloff, R., Liiv, I.: Policy and legal environment analysis for E-government services migration to the public cloud. In: Proceedings of the 9th International Conference, ICEGOV 2016, Montevideo, Uruguay, 1–3 March 2016, pp. 103–108. ACM Press (2016)
10. The European Parliament and the Council of the European Union: Regulation (EU) No. 910/2014 of the European Parliament and of the Council on Electronic Identification and Trust Services for Electronic Transactions in the Internal Market and Repealing Directive 1999/93/EC. Official Journal of the European Union, July 2014
11. Kotka, T., Vargas, C., Korjus, K.: Estonian e-Residency: redefining the nation-state in the digital era. University of Oxford, Working Paper Series – No. 3, pp. 1–16, September 2015