

by Ben Rooney

The tiny state of Estonia, one of Europe's smallest, might be the role model for what a technology-enabled country looks like in the 21st century.

Estonia, population just 1.29 million, is well known as punching considerably above its weight as a startup champion - it was the birthplace of Skype. But its embrace of technology goes way deeper than just 20-something entrepreneurs designing apps for iPhones; it is woven into the very fabric of the state.

This starts at the very top. President Toomas Hendrik Ilves, elected in 2006, is a passionate technology advocate who learned to program at 13 and may well be the only head of state who has written in Assembler on a PDP-8 microcomputer.

Meetings of the country's cabinet have been conducted electronically since 2000. Since 2005 citizens have been able to vote over the Internet. In the 2011 parliamentary election, 24.3% of votes were cast that way. The software used was recently released as open-source material on the GitHub repository.

Tax returns have been completed electronically since 2000, school reports and other information have been online since 2002, the land register (for which there is no paper backup) since 2005, e-Health records since 2008 and prescriptions since 2010. You can even register your newborn child electronically. All of which allows Estonia to employ only 1.9% of its population as public sector administrators (by contrast France employs 3.8% and Cyprus 5.3%).

Set against the revelations by Edward Snowden of the scope of U.S. and other countries' surveillance programs, what is striking is the level of trust that remains in Estonia's online government. "Here in Estonia, people complain the state is too thin, and it is so minimalist, which it is, but on the other hand people should take comfort that we don't have those kind of capabilities," said Mr. Ilves.

At the heart of the Estonian technology revolution is the state-provided ID smart card that unlocks all of the government's electronic services, part of a service that allows every Estonian citizen to send and receive encrypted emails. The state provides the infrastructure for the system, but the authentication takes place independently of government. While the system isn't authorized for handling classified messages, Mr. Ilves admitted he did use it overseas. "I will send something to our embassy in Moscow, just a regular thing. 'Come over my house,' say, then I encrypt to give the FSB [Russian security service] something to do."

"I am surprised when I hear people saying 'we would never have an ID card because we see that as Big Brother'. I would argue the opposite. In using the system we have, that is how you thwart Big Brother."

So how does a country that was annexed by the Soviet Union in 1940 have such a high level of trust in its own government that its citizens happily adopt e-governance and are willing to share their data?

According to Mr. Ilves, getting Estonians to embrace technology wasn't too hard. "The crucial element here is the psychology of having been oppressed. You will get rid of everything you had before and you are much more willing to be an early adopter. Few people in Estonia found any value in maintaining the traditions of the Soviet system."

And then there are very high levels of accountability. Anyone accessing the system leaves a record, something that is viewable by the citizen. "We have had one case in which there was someone who abused it; it was a policewoman checking up on her boyfriend."

Mr. Ilves hopes that Estonia's lead in technology will be followed by others in Europe. He chairs the steering group on cloud computing set up by the European Commission and is pushing hard for a European cloud that is outside of U.S. control.

"The key thing is it comes under EU law. The problem right now is that all these companies that are mainly used, Google, GOOG -0.66% Amazon, AMZN -1.28% the other cloud providers, are subject to U.S. law. President Barack Obama has said if you are a U.S. citizen you have nothing

to worry about. Well I am not a U.S. citizen."

He is also hoping to persuade countries to adopt a "virtual embassy" program, where countries would be able to store national data on servers stored outside of their own country.

"We started to think about this after Fukushima when all kinds of things were lost. If the center of an earthquake is where you have all the government data, then you are in a lot of trouble. Countries like mine would have data storage in some other country. Our land registry ought to exist on a server in, say, France, and we would do the same."

There is a danger of drawing false lessons. Estonia's small population and lack of legacy systems gives it an agility that large states cannot match. The obvious question, though, is: If Estonia has been so successful in its adoption of technology, why haven't Baltic siblings Lithuania and Latvia, with whom it shares much of its history?

And while Estonia certainly stands out as a global leader in its adoption of technology, the country hasn't seen that translate into economic success. According to EU figures, the country was one of the poorest performing in 2012 - its GDP per capita was just 68% of the average for EU members. It has also seen a net migration problem, losing nearly 5% of its population since 2004.

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