Patrick Kingsley

The European country where Skype was born made a conscious decision to embrace the web after shaking off Soviet shackles.

In 1995, four years after Estonia broke free from the USSR, Toomas Hendrik Ilves read a "very Luddite" book by Jeremy Rifkin called The End of Work. "It argued that with greater computerisation there would be fewer jobs," remembered Ilves, then a senior diplomat, now the country's president, "which from his point of view was terrible."

Ilves and many of his colleagues saw it differently. In a tiny (population: 1.4 million) and newly independent country like Estonia, politicians realised computers could help quickly compensate for both a minuscule workforce and a chronic lack of physical infrastructure.

Seventeen years on, the internet has done more than just help. It is now tightly entwined with Estonia's identity. "For other countries, the internet is just another service, like tap water, or clean streets," said Linnar Viik, a lecturer at the Estonian IT College, a government adviser and a man almost synonymous in Estonia with the rise of the web.

"But for young Estonians, the internet is a manifestation of something more than a service – it's a symbol of democracy and freedom."

To see why, you just have to go outside. Free Wi-Fi is everywhere, and has been for a decade.

Viik says you could walk 100 miles – from the pastel-coloured turrets here in medieval Tallinn to the university spires of Tartu – and never lose internet connection.

"We realised that if the government was going to use the internet, the internet had to be available to everybody," Viik said. "So we built a huge network of public internet access points for people who couldn't afford them at home."

The country took a similar approach to education. By 1997, thanks to a campaign led in part by Ilves, a staggering 97% of Estonian schools already had internet. Now 42 Estonian services are now managed mainly through the internet. Last year, 94% of tax returns were made online, usually within five minutes. You can vote on your laptop (at the last election, Ilves did it from Macedonia) and sign legal documents on a smartphone. Cabinet meetings have been paperless since 2000.

Doctors only issue prescriptions electronically, while in the main cities you can pay by text for bus tickets, parking, and – in some cases – a pint of beer. Not bad for country where, two decades ago, half the population had no phone line.

Central to the Estonian project is the ID card, introduced in 2002. Nine in 10 Estonians have one, and – by slotting it into their computer – citizens can use their card to vote online, transfer money and access all the information the state has on them.

"There's nothing on the ID card itself, because that could be dangerous if you lost it," says Katrin Pärgmäe, who is in charge of public awareness at RIA, the country's internet authority.

"It only gives you access to the database if you type in the right code."

You can also present the card at the pharmacy to pick up a prescription. On public transport, it doubles as a ticket.

Many people also have special ID chips on their mobile sim cards that allow them to pay people by text.

To a British audience, the ID card will have a whiff of Big Brother. But many Estonians argue the opposite: that it allows them to keep tabs on the state, rather than the other way round.

"You'd think, given our history, we'd have a problem with it," said Ilves, in an oblique reference to the days when the KGB had an office down a cobbled street in central Tallinn.

"But I feel much more secure with a digital ID. If anyone goes into my files, they're flagged. Whereas if my files – which would exist anyway – were made of paper, no one would know who was looking at them."

Every Estonian can see who has visited their data, and they can challenge any suspicious behaviour. In one famous case, a policewoman was caught accessing information about her boyfriend.

During a recent election campaign, a candidate was swiftly punished for accessing personal information about would-be constituents. "I don't know what the idiot was thinking," said Viik. "You can't hide."

To an outsider, it is not immediately clear why Estonia took to the internet so much faster than its Baltic cousins, Latvia and Lithuania. All three won independence at the same time. All three needed quick ways of revamping their ailing infrastructure. But to Estonians, the reason is simple. Estonia has a sizeable Russian-speaking minority, but the country's ethnic Estonian majority feel Nordic, rather than Slavic or eastern European. In the early 90s, this meant they looked to tech-happy Scandinavia for both inspiration and investment.

Those Finnish and Swedish businesses that did invest expected their Estonian counterparts to communicate by email rather than fax.

And pretty soon it was the newcomers who were leading the way.

"I remember when one of our banks was bought by a Swedish one, they came over and said: 'And now we're going to teach you how to do computer banking'," recalled Ilves. "And we said, 'well, you might want to look at what we're actually doing with computer banking ourselves.'" At the last count, 99% of Estonian bank transfers were online.

It helped that many politicians in the early 90s were unusually quick to "get" the internet. "The people in power after the collapse of the Soviet Union were really young," said Jaan Tallinn, the co-founder of Skype, the Estonian internet telephone company, and a co-developer of file-sharing website Kazaa. "They knew what was going on."

Mart Laar was 32 when he became prime minister in 1992. Ilves is slightly older, but had learned to code as a child, growing up in exile in the US.

"I thought if I can do it, anyone can," he said in his strong New Jersey accent. "I was completely at ease with computers."

The internet was also seen as a buffer to Russia.

"We were afraid that Russian armies might take down the TV tower, the central radio station, or newspaper press," said Viik.

"Three addresses shut down, and we would have been disconnected from the rest of the world.

"But the internet would still work – and so we realised that this would be a great way of keeping in touch with the world in case of emergency."

Ironically, when an attack did finally come, it came via the internet – and promptly disconnected Estonia from the rest of the world.

In 2007, the government infuriated its Russian-speaking minority by moving a Soviet war memorial from central Tallinn to a cemetery on the city's outskirts. Violence flared on the streets, and later reached the internet. The first cyberattack was simplistic, and easily dealt with: thousands of unknown individuals bombarding government, media and banking websites with "denial of service" (DoS) attacks.

"It was like an internet riot," said Hillar Aarelaid, who led Estonia's response, at the time.

But what started as an emotional backlash soon became a far larger, longer and better co-ordinated assault on Estonia's very being.

It lasted three weeks and could only be contained by restricting internet traffic in and out of the country. It was, in effect, a cybersiege.

"This is how a lot of myths were created," remembered Pärgmäe. "Those outside the country couldn't access Estonian websites, but they didn't realise that people inside still could."

Rumours circulated about the collapse of the Estonian online banking system, and how people were struggling to buy groceries. "But actually the longest downtime for a bank's website was just one and a half hours."

The debacle had two positive effects. First: Nato founded a cyberwarfare thinktank in Estonia, to learn from the experience. Second: the government set up the Cyber Defence League, a network of 100 volunteers from the cybersector who, among other roles, will form – a kind of territorial army during future strife.

"Traditionally in western countries," said Ilves, "you've had a weekend-warrior thing where volunteers run off into the woods and do target practice. In Estonia, we have a unit of IT people from banks, software companies who in their spare time for one day a week work on cyber issues."

This kind of collaboration between private and public sectors was also central to Estonian innovation in the 90s, Viik claims.

"The government started several IT programmes as a catalyst," he said. "But only in a few was it the main sponsor. From the early days, government philosophy was not to hire programmers, but to use the services of private companies, which in turn increased the competitiveness of the Estonian IT sector."

Case in point: the ID card. "It's private companies who developed and manage the service – and who can now export their new-found competencies to other countries."

Viik argues that this benefits both the private sector and the state, who otherwise would not have the resources for ID card technology.

But some think the overlap between occasionally threatens Estonia's open internet.

For many years, each Estonian citizen had the right to a free domain name. In 2010, that changed: the government outsourced the responsibility of allocating domain names to private registrars, who now charge Estonians about £15 for the privilege – one of the highest rates in Europe.

Many academics and high-profile techies were outraged, and some founded a pressure group – the Estonian Internet Community (EIC) – that campaigns to give ordinary citizens more of a say in how Estonia's internet is run.

More generally, it is feared that the same politicians who had such enlightened attitudes to the internet in the 90s may be starting to lose their progressive edge.

"They're still in power," said Jaan Tallinn, "but I'm not sure they still understand what's going on. Technology keeps progressing. Young people follow the curve. But as they get older they get

inertia, and they start deviating from that curve."

Ilves himself is fairly critical of parts of Acta, the hugely controversial international agreement that opponents fear will curtail the rights of individual internet users.

But there is a perception that other politicians could be doing more to oppose its introduction.

"It's difficult because it's actually an EU agreement," admitted Jaagup Irve, a PhD student at the Tallinn University of Technology, and an EIC board member. "But the government isn't doing enough to stop Acta."

Viik says that among politicians of all stripes there has always been "a silent consensus" about the importance of the internet. For many years, Estonians could expect whomever they elected to have the best interests of the internet at heart.

But Irve thinks the public can no longer be so complacent. "People think a government is like a smart missile: the thing practically flies itself," he argued.

"But today it's more like a bomb that we have to guide. We have to guide the government, and that's what the internet society has woken up to."

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