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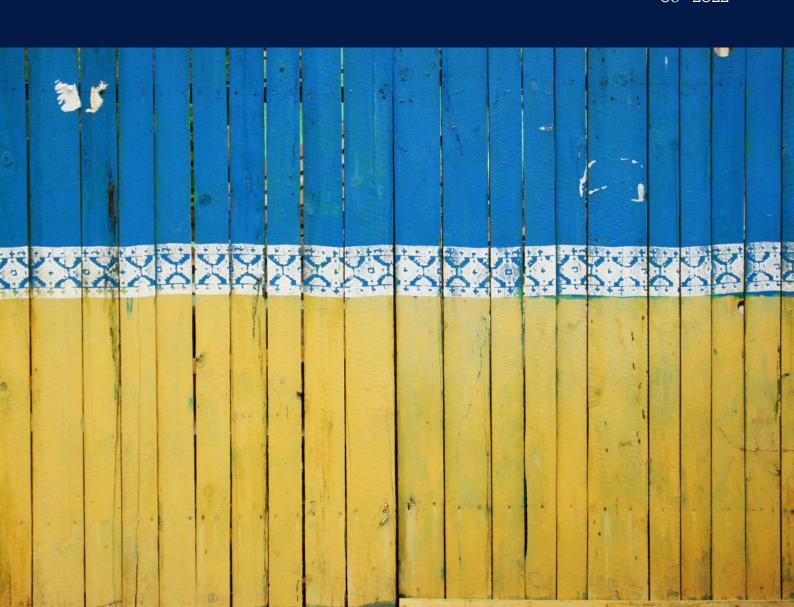# Why is Ukraine still online? An unprecedented story of resilience and international collaboration

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Russia's invasion of Ukraine earlier this year set in motion the most devastating example of combined kinetic and cyberattacks the world has seen.

Although the NotPetya cyberattack in 2017 targeted Ukrainian infrastructure, it debilitated businesses and national infrastructures worldwide, causing economic damages exceeding $10bn. Since then, businesses and governments are acutely aware of Russia's cyber activity. Many consider Russia as having the most advanced offensive cyberattack capabilities. During the invasion, Russian-backed actors launched assaults on the country's financial system and energy infrastructure, including what is likely the largest DDoS attack in history.

And yet, despite this, Ukraine remains online. Why is that?

One reason is that the world underestimated Ukraine's determination and cyber resilience. The government swiftly adopted legislation allowing the country to move critical digital registers to other locations. This came not a moment too soon: On the third day of the invasion, a Russian missile hit a central Ukrainian database. But more than 300 critical registries had already been stored in the cloud. Prior to the invasion, Ukraine used the eight years of sustained cyberattacks on its digital infrastructure to learn and improve its defences and emergency protocols. In other words, Ukraine was prepared.

Another reason is that the world overestimated Russian offensive cyber capabilities, especially their ability to deploy them at short notice. Even the Russian military was surprised by its leadership's order to invade Ukraine, leaving cyber actors insufficient time to prepare for a large-scale, sophisticated attack to take down critical infrastructure in Ukraine.

Then there is international support; the international community has come together in a consolidated effort between individuals, companies and governments to back Ukraine. Ukraine worked with partners from Poland, France and other countries to build a distributed system that replaced destroyed cell towers and fibre-optic connections. Other large technology companies, such as Microsoft, have declared support for Ukraine, pulling their operations out of Russia while actively working on digital restoration in Ukraine. Elon Musk personally provided Ukraine with distributed access to Starlink's satellite internet constellation service to ensure redundancy and constant connectivity.

In addition, around 260,000 individual volunteers in Ukraine and around the world have answered the call for digital talents to join Ukraine's "IT army." This first-of-its-kind, crowd-sourced cyber militia is aiming to protect Ukraine's infrastructure from digital assaults and proactively counter Russian propaganda.

It is an unprecedented effort of cross-border and cross-sector collaboration — and the first time that global technology companies have demonstratively taken a side.

The combination of individual and collective action and support is making a difference. Governments are offering help by providing armaments and imposing traditional economic sanctions on Russia. Although Russia's size and access to natural resources cushions the immediate impact of these sanctions, the unparalleled international backing will eventually stifle Russia's innovation and economic growth. When you're living in a country where you cannot freely use your bank account or credit cards; where you cannot buy an iPhone, you cannot use Facebook or YouTube; where you have no access to the conveniences of modern life, how can you remain innovative?

Ukraine, meanwhile, is adapting swiftly to develop and deploy digital technologies to maintain the resilience of its institutions, services and people. Ukraine's children are not able to visit schools in person and have been using e-learning instead. Many of Ukraine's internally displaced people and refugees have no access to normal medicine; Ukraine plans to develop e-medicine and telemedicine. Ukraine also will introduce e-justice systems. Ukrainians will rebuild their country, emerging stronger.

Six months into the invasion, despite the horrendous atrocities and devastating destruction, we remain hopeful and optimistic. Out of conflict arises new ideas, new technologies and new opportunities. The invasion of Ukraine and the attack on democracy itself has inspired extraordinary cooperation between people, institutions, companies and countries.

Ukraine continues to be online. It is a story of building resilience, collectively.

> The insights that guide this article come from ISTARI's 2022 summit of its global community called The Compass. The summit featured Ukraine's deputy minister for cybersecurity and digital transformation, who spoke about Ukraine's resilience in the face of Russia's kinetic and cyberattacks on digital infrastructure.