Digital Will Drive Ukraine’s Modernization

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The aim of the bipartisan and international CSIS Ukraine Economic Reconstruction Commission is to produce a policy framework that will help attract private sector investments to support Ukraine’s future economic reconstruction. To support the commission, CSIS will convene a series of working groups that will address a range of issue-specific areas that are critical for reconstruction and modernization of the Ukrainian economy, including agriculture, energy, and transportation and logistics, as well as addressing the impact of corruption on private sector investment.

Rebuilding Ukraine’s economy after the war is a significant opportunity to modernize the country, build quality transport and logistics infrastructure connected to the West, and embed Ukraine in the Euro-Atlantic community. Technology will play a crucial role in that process. Since 2014, Ukraine has been at the forefront of the digital revolution through a journey marked by strength, adaptability, and success.

Ukraine’s information and communications technology (ICT) industry was immensely successful before the war, with some dubbing it the “emerging tiger of Europe.” With more than 200,000 highly qualified workers, the sector contributed 4 percent of the country’s gross domestic product (GDP). Ukraine is one of the largest exporters of information technology (IT) services globally. Segments such as outsourcing, cybersecurity, artificial intelligence (AI), mobile applications, blockchain, and e-government were in rapid development before the war.

At the same time, digital transformation transcends and affects all economic sectors in Ukraine. Digital solutions have been applied in a wide range of sectors including banking and finance, agriculture and food production, and energy, to cite a few. In that regard, digital transformation is key to a well-functioning society, affecting democratic participation, education, and public services.

During the war, digitization has been a lifeline to the Ukrainian people and economy, on par with basic services such as banking, electricity, and water. The government of Ukraine, for example, has adapted its digital platforms to provide learning, public services, and other spaces critical to the war effort. Digitization will also be an integral component of the reconstruction process and modernization of the economy. Just as greening, transparency, and gender and inclusion are crosscutting principles of the entire postwar
reconstruction process, digitization should be viewed in the same vein. Ukraine should follow a digital-first approach to reconstruction.

**A Digital Leader before the War**

Ukraine’s digital sector has long been a source of pride for the country, which includes over 4,000 local companies and more than 100 global companies. Before the war, major companies such as Samsung, Microsoft, Boeing, Google, and Ericsson had established subsidiaries in the country. Ukrainian entrepreneurs launched start-ups with global reach, including Grammarly and GitLab. Between 2020 and 2021, the IT sector in Ukraine saw 36 percent growth, from $5 billion in exports of computational services in 2020 to $6.8 billion in early 2021.

The prewar achievements of the IT sector in Ukraine are impressive. Salaries in the IT industry reached $3,000 a month, much higher than the national average of $500. Ukraine-based IT outsourcing companies commonly have specialized skills in cloud, AI, and big data. Ukraine ranks sixth in Europe for open data and is among the first countries to roll out digital Covid-19 certificates recognized by the European Union. In 2022 Ukraine ranked fourth worldwide in number of certified IT professionals.

Taking advantage of this dynamic sector, the government of Ukraine started digitizing some of its processes and services. The government of former president Petro Poroshenko introduced a new digital procurement system called ProZorro, which became fully operational in 2016, to reduce corruption and administrative hurdles, increase transparency, and harmonize the system with international standards. Continuing these efforts, President Volodymyr Zelensky created the Ministry of Digital Transformation in 2019 to develop Ukraine into a digital state. The most important digital project launched before the war was the Diia app, a mobile app that gives citizens digital access to their legal documents and provides a single portal for public services. The platform automates government services and digitizes essential documents such as driver’s licenses and passports. The app is the main form of identification for millions of citizens in Ukraine and can house important documents. For example, the European Union has officially recognized electronic Covid-19 certificates in Diia.

**Adapting during Wartime**

Russia's invasion has posed challenges for the digital sector in terms of destruction of digital infrastructure, cyberattacks, and spread of disinformation and misinformation. As of October 18, 2022, Russia had destroyed or taken over 4,000 telecommunication stations and over 60,000 kilometers of fiber-optic internet lines. Before the war, Ukrainian authorities used digital technologies to create government transparency and allow for accountability from Ukraine's civil society. However, it has been difficult for the government to continue these programs without compromising national security or defense interests during the war. The domestic and global private sector has also been affected by the conflict, with many IT companies hesitant to continue outsourcing from Ukraine. Many IT workers are relocating to countries like Poland and Germany for more stable opportunities. There has been a mass exodus of Ukraine’s highly skilled workforce, including at least 10 percent of its technology sector workers.

**RUSSIAN DISINFORMATION**

To justify the invasion, the Putin regime has deliberately released false statements to spread disinformation about the war and frame Ukraine as the aggressor. While social media platforms have been a tool for the public to gain information about ongoing injustices in Ukraine, Russian disinformation and propaganda campaigns have clouded the media space. Russian propaganda has specifically targeted countries in the developing world, especially in Africa, to garner support.
RUSSIAN CYBERATTACKS

Russia began launching cyberattacks against Ukraine shortly after its illegal annexation of Crimea in 2014. Now Russia has increased its targets, including energy and telecommunications service providers and government websites. Cyberattacks are a tool Russia commonly uses to undermine trust in government institutions and reduce military capabilities. A Microsoft report showed that Russian cyberattacks often occur in conjunction with missile or ground attacks. Among other efforts, Google has been helping stop the spread of Russian disinformation campaigns. Despite continuous efforts to overwhelm Ukraine’s cyber defenses, Russia has not been able to significantly damage Ukraine’s digital infrastructure.

A big part of the challenge is addressing the misinformation that is spreading about the realities and facts of the war in Ukraine.

—Sundar Pichai, CEO of Google and Alphabet

Despite these challenges, the sector has remained resilient and has adapted to wartime. In addition to critical budget support from Ukraine’s allies, the digital sector has played a crucial role in keeping Ukraine’s economy afloat. The sector has remained a steadfast area of economic growth, with IT industry exports reaching $3.7 billion in the first six months of 2022, a 23 percent increase from that same time in 2021. Likewise, between January and May 2022, technology companies brought in $3.1 billion in revenue, a $2.5 billion increase compared to 2021.

As millions of Ukrainians have fled the country and more are internally displaced, the government has adapted its digital services to help refugees. The Diia app now makes it possible for internally displaced persons (IDPs) to register in new communities in Ukraine. Developers also added a feature where users can change their state-registered address. The Diia app also enables refugees to register in locations across country borders. Ukrainians who escaped to Poland can now use Diia.pl to access important identification information such as date of birth and citizenship status. Ukrainians in Poland can also use the app to apply for a PESEL, a Polish identification number similar to a social security number.

Ukrainian citizens have also been able to support the war effort through various digital applications. They can use the Diia app to upload location-tagged photos and videos of Russian military activity to a map that Ukrainian intelligence services use to inform counterstrikes and defense maneuvers.

A Digital-First Approach to Reconstruction

The success of the digital sector before the war and the resilience it has shown during the war signal its potential for modernizing all of the country’s sectors. Its strength will likely have a major positive impact on Ukraine’s GDP and will provide much-needed resilience to the postwar economy. Ukraine is encouraging collaboration in digital transformation and is ready to share its experience and solutions with the world. As an example of that strength, Estonia plans to pilot a national mobile app based on the Diia app for interaction with state digital services. Digitization is also an important tool to improve accountability and transparency mechanisms in the reconstruction process and catalyze modernization. One of Ukraine’s goals for postwar recovery is to expand the IT sector’s share of GDP to 10 percent (see Box 1).
BOX 1: UKRAINIAN GOVERNMENT’S DIGITAL TARGETS FOR 2025

- IT’s share of Ukraine’s GDP reaches 10 percent.
- 100 percent of electronic public services are implemented according to plan.
- 100 percent of critical information infrastructure facilities are covered by sensors.
- 30 percent of state information resources are transferred to the cloud.
- 95 percent of the population has access to high-speed internet.


Digital initiatives that strengthen the legal environment of the IT sector are already in place to make expansion an attainable target. Diia City provides a legal framework for the IT sector and a medium for communications with IT specialists. The legal regime aims to create favorable conditions for the digital sector to attract investments, encourage innovation, and attract knowledgeable and talented workers. The platform already holds more than 300 companies and will likely boost the creation of technology start-ups in Ukraine. The Ukrainian government has labeled Diia City “the driver of Ukraine’s economy” and predicts IT revenues will grow from $6 billion to $16.5 billion in the next five years.

Estimates outline how digitization in Ukraine can lead to economic growth. According to the Forum for Research on Eastern Europe and Emerging Economies, for each 1 percent increase in digitization, Ukraine’s GDP will grow by 0.42 percent. Additionally, if Ukraine joins the EU Digital Single Market, an EU initiative that aims to expand cross-border digital connectivity, Ukraine’s GDP could increase by 12.1 percent.

Ukrainian top-tier govtech solutions are easily adaptable and of great interest to other countries seeking to digitize governments and improve people’s lives.

—Victor Liakh, President of East Europe Foundation

DIGITIZATION AS PART OF GOVERNANCE AND TRANSPARENCY REFORMS

Improving government transparency and accountability will be critical in attracting private sector investment to Ukraine and meeting EU accession conditions. Ukraine’s thriving digital sector has already demonstrated that it can be an essential tool in this space. The Ukrainian government has made a series of efforts to digitize accountability mechanisms. In 2014 the Ukrainian government created the State Agency for eGovernance, a predecessor to the Ministry of Digital Transformation. In 2018 the agency established TREMBITA, a data exchange system that ensures data protection and guarantees high-quality delivery of public services. By 2019 the Ukrainian government had launched several portals and platforms for e-governance and accountability, including eData, which provides access to the national budget and public finance.

The Ukrainian government’s progress in e-governance encourages accountability, transparency, and trust in government. These components help eliminate corruption and bring Ukraine closer to meeting EU accession conditions. The European Union has already recognized Ukraine’s digital transformation as a
facilitator of a more transparent government. The European Union recently agreed to sign Ukraine into the Digital Europe Program, which will move Ukraine’s digital infrastructure closer to EU standards while reinforcing digital capacities that can prevent Russian cyber disruptions.

Ukrainian civil society is also actively engaged in Ukraine’s future and helping the country build back better. Rise Ukraine is a coalition of Ukrainian and international organizations that, among other activities, build digital platforms to make the recovery process more transparent and make “reconstruction a model of integrity, sustainability and efficiency.”

Citizens are also eager to use digital tools to help in the war effort. High readiness to leverage digital technologies is one of Ukraine’s largest advantages. Small donations and civil activism are ways that citizens actively contribute to a resilient, more democratic society. While Russia attacks the country, Ukrainians who are hiding in the metro or shelters donate money to the army with a mobile app. The war also has reinforced the willingness of citizens to participate in local decisionmaking. In June, Ukrainians used mobile applications to rename landmarks related to the Soviet Union or Russia.

**THE ROLE OF DIGITIZATION IN MODERNIZING UKRAINE’S ECONOMIC SECTORS**

Digitization in Ukraine is also a catalyst for economic modernization. As the war progresses, the digital sector continues to grow and show incredible resilience. Investments in digital will create positive reverberations throughout the entire reconstruction process by improving efficiency and reducing costs in several sectors. Digital transformation in Ukraine applies to all sectors of Ukraine’s economy. E-services allow Ukrainians to do business from anywhere, including applying for loans online. Telecommunications systems will be the first to arrive when Ukraine regains territory, and the IT industry will facilitate modernization of particular regions. When the digital sector is financed, other sectors will feel the benefit and become more resilient.

**DIGITIZING TRANSPORT**

One area where digitization will play a critical role is transportation, especially for the rail ticketing system. Examples of this exist with the railroad ticket company Ukrzaliznytsia, which launched an app that allows customers to buy rail tickets directly from the seller with minimal fees. The app also allows users to return tickets, receive notifications about train times and route changes, gain access to their ride history, and ask questions about their journey—all of which greatly improve efficiency and reduce costs for the rail systems. Similar apps should be created across the rail system.

**DIGITIZING CUSTOMS SYSTEMS**

Increasing connectivity between Ukraine and its Western allies through trade and logistics is a key part of reconstruction, and efficient customs systems are a critical component. Digitizing customs can automate clearance systems, support risk management, and validate processes for border control agencies and customs officers. Using digital trade documents instead of paper documents decreases costs and the time required to complete cross-border trades. Passport control inspections and passenger entry across country borders can be streamlined through mobile passport control systems, where passengers can submit their identification and customs declaration information through a mobile app. Cross-border connectivity

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through ICT networks can also facilitate opportunities for communication between cross-border regulatory agencies, which harmonizes customs services around the world.

**DIGITIZING ENERGY SYSTEMS**

Digitization also enables the development of more sustainable and resilient infrastructure within the energy sector. **Digitizing the power sector** improves efficiency in buildings, reduces maintenance and operations costs, and provides real-time data on the stability and reliability of power grids. **Digital power plants** allow better performance optimization by automating reporting and maintenance while increasing fuel efficiency. In Ukraine, virtual power plants can ensure access to energy supplies throughout the war, and cloud computing can make use of excess energy. **Electric energy meters**, or smart meters, are an important part of digital-first reconstruction efforts in the energy sector. They provide customers with detailed information about their energy usage, enabling more efficient energy employment. Smart meters reduce the need for additional power plants as consumers decrease their energy usage.

**Conclusion: Realizing Ukraine's Digital Vision**

Rail ticketing, customs, and energy systems are just some of the sectors where digital transformation will play a key role in facilitating modern reconstruction efforts. Going forward, Ukraine will need support and continued cooperation from the world's leading technology companies to realize this vision. Alongside Group of Seven (G7) donors and companies, there are five areas where Ukraine should redouble its efforts.

1. **Press Ahead with Regulatory Reforms**

Prior to the war, Ukraine began digitizing several of its government services to support transparency and accountability efforts. These regulatory reforms should be continued as part of reconstruction efforts, especially given their importance for private sector investment. During the war, the Ukrainian government made continued regulatory reforms, including a law President Zelensky signed to provide government entities with cloud-based IT infrastructure and services. The law reduces corruption risks and budget expenses by streamlining processes. The government should continue implementing state-of-the-art technology to increase the country's resiliency across wartime and peacetime.

2. **Invest in State-of-the-Art Physical Infrastructure**

Rebuilding Ukraine's digital infrastructure is a critical first step in supporting Ukraine's reconstruction. High-speed broadband connectivity is an essential component in this regard. Local telecom operators have been extremely effective during the war, restoring services almost immediately following Ukrainian territorial victories. However, they will benefit from international support through bilateral donors and financial institutions, not just to rebuild digital infrastructure but to upgrade it as well.

3. **Strengthen Human Capital**

Digital literacy has been a significant source of resiliency for Ukrainians throughout the war. With a third of Ukrainians experiencing unemployment and 7.5 million displaced, citizens will need to learn new skill sets to adapt. **Diia Digital Education** is a new platform that serves as a digital literacy and online education resource. The platform has around 1.5 million users and over 100 free online courses. Ukraine already has an impressive IT workforce, but unemployment is a significant challenge. Helping people develop the skills necessary to quickly transition to IT jobs is important. Many efforts have been ongoing during the war to provide this type of training. For example, leading companies have dedicated program initiatives that enable Ukrainians to acquire skills in a condensed, targeted manner. These types of programs can be very effective in helping people find employment quickly.
4. **Support the Small and Medium-Sized Enterprise Ecosystem with Digital Tools**

Small and medium-sized enterprises (SMEs) are going to play a critical role in Ukraine’s economic reconstruction, not only by creating economic growth but also by providing employment opportunities. To move quickly and effectively, Ukrainian SMEs must be digitally smart. The core mechanisms for supporting SMEs will be to help them get online, grow their online presence, and export to wider audiences through digital platforms. These types of support programs already exist. For example, tech companies help SME owners with the basic skills to get online.

5. **Update Software and Incorporate Western Technology**

Legacy software and unpatched vulnerabilities are a significant cybersecurity risk around the world, including in Ukraine. Although the government has developed critical e-services solutions, such as the Diia app, cybersecurity will continue to be an issue, both during the war and as part of long-term reconstructions efforts. The United States, other G7 countries, and other Ukrainian allies should continue to support the Ukrainian government to integrate state-of-the-art cloud-based solutions that are critical to current defenses and long-term reconstruction.

Ukraine's digital sector was one of its greatest strengths prior to the war. Building on its potential will be a critical piece of modernizing Ukraine’s economy. The impact of digital transformation will reverberate across Ukraine’s workforce, infrastructure, and businesses, creating the environment necessary for successful reconstruction.

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