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Digitalization in Central and Eastern Europe:

BUILDING REGIONAL COOPERATION

REPORT OF THE ATLANTIC COUNCIL TASK FORCE ON DIGITALIZATION IN CENTRAL AND EASTERN EUROPE AND THE THREE SEAS INITIATIVE

CO-CHAIRS: Amb. Paula J. Dobriansky · Maciej Witucki
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Cover image: Illustration of digital hubs in Central and Eastern Europe. *Source: Atlantic Council.*

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Any recommendations and ideas captured in this report are drawn from conversations with the task force and external participants, but do not imply endorsement of, or full agreement with, any or all parts of the report by task-force members and are the responsibility of the rapporteurs only.

The task force met virtually for series of private meetings, stakeholder discussions, and outreach events including relevant government officials, legislators, the business sector, and civil society to gather input and ideas throughout the CEE/3SI region on the central theme of how to take forward digitalization through regional cooperation. This task-force report is the outcome of these discussions and the generous contributions in ideas, energy, and time by the outstanding task-force members and external stakeholders. Thank you for your valuable insights.

Where possible, this paper has tried to capture debates and divergent views, approaches, or philosophies on key issues related to the way forward for digitalization in Central and Eastern Europe. This is to respect the deep and diverse experience and expertise of task-force members and to highlight the recognition that there may be more than one way to advance a dynamic, digitally fueled economy in Central and Eastern Europe.

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Executive Summary

Digitalization can become the next growth engine for the economies of Central and Eastern Europe. To successfully transition to a digital future, the region must work together to create ecosystems that foster innovation, prioritize investments in cross-cutting infrastructure and technologies, and amplify its voice in Brussels. The coronavirus pandemic can serve as a catalyst for accelerated digital transformation and add to the economic and geopolitical considerations that drive Central and Eastern Europe's digital policy priorities. This unprecedented moment—while undoubtedly challenging—provides a unique opportunity for the countries of Central and Eastern Europe to kick-start the region's digital cooperation and advance long-term strategies for sustained growth.

Equipped with strong digital fundamentals, including robust science, technology, engineering, and math (STEM) education, a range of emerging technology specializations across the region, and the benefit of regional and European Union (EU) markets, Central and Eastern Europe (CEE) is well positioned to take advantage of digitalization and seize its full potential. However, the region must also overcome serious obstacles such as undercapitalized markets, a gradual but significant brain drain, and reliance on low-cost manufacturing industries that are vulnerable to automation and artificial intelligence. COVID-19 and great power competition further test CEE countries, while underscoring the importance of digitalization for economic growth, geopolitical resilience, and national security.

These regional challenges demand regional solutions. Building on existing initiatives, Central and Eastern Europe can address its shared challenges and drive forward digitalization. An important framework to foster regional cooperation on digital ambitions is the Three Seas Initiative. Not only does the Three Seas forum encompass all eleven CEE countries—Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia—but it also has a digital pillar as a starting point, dedicated to enhancing cross-border digital infrastructure and interconnectivity.

As they chart their path forward on digital technologies and policy priorities, Central and Eastern European countries should also embrace their voice and weight as members of the European Union and the transatlantic community. The debate over Europe's digital future is in full swing. To shape the EU's digital policy priorities and legislation, CEE countries must assume their role as vital policy actors, and coordinate across the region to strengthen their bargaining power in Brussels.

In this context, Central and Eastern Europe must develop a set of shared principles and priorities to guide and galvanize regional policy action. This will help CEE governments multiply the effects of public-sector action and strengthen an overall ecosystem conducive to deeper digitalization, value creation, and innovation. The following principles should guide digital policy action and regional cooperation.

- **Keep the Big Picture in Mind**: Instead of focusing on any one set of technologies or digital issues, policies should cultivate an entrepreneurial ecosystem and approach emerging technologies through their applications in specific sectors.
- **Build a Workforce for an Innovation Economy**: Education systems must be nimble and adapt quickly to meet future workforce challenges with limited lag time and appropriate skills programs. The land-grant university system in the United States is one potential model to bridge education and digital industry and foster lifelong learning, upskilling, and reskilling.
- **Think CEE and Design for Regional Impact**: Digital projects and initiatives that are of the region, not merely in the region, should be prioritized. Coalitions of the willing and clusters of cooperation around certain technologies may hold the biggest potential to foster initiatives and projects with a clear gain for CEE cooperation, knowledge transfers, connectivity, and thought leadership on digital policy matters.
- **Invest in Infrastructure**: Investments in digital infrastructure should build toward interconnectivity and interoperability to benefit the regional economy as a whole. Integrated digital infrastructure will also further enable digitalization and innovation.
- **Invest in Innovation, Not Imitation**: Rather than focusing merely on attracting more manufacturing as part of an anticipated reshoring or near-shoring of global supply chains in the wake of COVID-19, CEE countries should identify and prioritize opportunities where the region can benefit from higher value creation.
- **Capitalize on Force Multipliers**: Digital applications should match critical market demands to address strategic areas that have the highest need for improvement, and some of the biggest potential for positive spillover effects for the wider economy. These sectors may include energy, healthcare, education, transport, e-governance, and cybersecurity.

A teacher conducts an online class with pupils receiving distance education inside an empty classroom, as the Czech government shut all schools for two weeks to slow down the spread of the coronavirus disease (COVID-19), at a closed school in Prague, Czech Republic, October 14, 2020. *REUTERS/David W Cerny https://pictures.reuters.com/archive/HEALTH-CORONAVIRUS-CZECH-RC2BIJ9PIOWU.html*

- **Vision Without Resources is Hallucination**: CEE countries should leverage EU and regional funding opportunities, including the new Multiannual Financial Framework, Next Generation EU, Horizon Europe, Digital Europe, and the Three Seas Investment Fund to support and scale key digital initiatives. Recipient governments in CEE could also earmark a small percentage of their EU funds to support regional initiatives, technology clusters, and startup incubators.
- **Find a Stronger Voice in Brussels**: Central and Eastern Europe should move from its current "rule-taker" position and seek to play a much more proactive role when it comes to shaping the European Union's digital future. The CEE region can add important perspective to discussions in Brussels over the appropriate balance between open markets and regulation as the EU navigates a changing geopolitical landscape.
- **Strengthen Transatlantic Ties**: If the region can take its digital game to the next level, both in terms of unleashing a new digital dynamism in its economies and finding its policy voice, this could significantly broaden the relationship with the United States.

Recommendations

Building a Supportive Ecosystem for Emerging Technologies:

- **Map CEE digital strengths and priorities across countries, and convene clusters focused on specific technologies and applications.** Not all regional cooperation needs to involve every country; smaller clusters could focus on development of particular technologies and their applications, for example, artificial intelligence (AI) and the Internet of Things (IoT) in energy systems or e-government in procurement. They could extend to countries outside of Central and Eastern in specific sectors. The Three Seas Initiative (3SI) could provide a forum for an annual review of progress and convene private-sector representatives by cluster.
- **Launch a "Secure CEE 5G" cluster among interested CEE countries.** The cluster would bring together private- and public-sector experts to advance common implementation of the EU cybersecurity toolbox for fourth-generation/fifth-generation (4G/5G) network infrastructure, define security requirements, and develop common assessment criteria for vendors with the aim of establishing a global standard. It should invite EU and US partners to collaborate. This model could be replicated for clusters on data management in healthcare; blockchain applications in finance; and many other areas.
- **Launch a "CEE Digital University" network.** Starting with at least one per CEE country, these programs at existing universities would focus on the practical study of digital technology trends, the impact on the future of work and skills, and working with industry to develop and disseminate skills programs. These programs should also spearhead efforts to innovate within the education sector to make learning available on more flexible terms to a constantly "upskilling" workforce.
- **Establish regional innovation hubs, each focused on a specific technology.** These hubs would bring together key research institutions, private-sector technologies and startup entrepreneurs, as well as government researchers and relevant officials. By focusing on a specific technology (blockchain in Slovenia, data management in Bulgaria, etc.), each hub could become the regional locus of that particular effort, drawing in people and companies from across the region. Governments should also foster the development of cities where the hubs are based so that CEE information-technology (IT) specialists will be less tempted to migrate west in search of lifestyle and resources.
- **Launch a 3SI Digital Public Services Initiative to establish common solutions and standards.** Focusing on digital public services, and especially cross-border services and interoperability, the initiative would bring together 3SI digital agencies and private-sector stakeholders to advance common solutions and standards in five areas—digital-ID, e-procurement, e-invoicing, e-CMR,[1] and digital notary services. The grouping should also assess other paper-heavy processes as additional priority projects. It should report on progress annually to the 3SI digital ministerial suggested below.

Building the Infrastructure for CEE Regional Cooperation:

- **Create a 3SI Digital Council[2] based on a twice yearly regional ministerial on digital issues and a network of digital ministries or agencies.** This council could be inaugurated at the 3SI summit, and meetings could also be held at the sub-ministerial level. This effort would demonstrate government commitment to regional cooperation in digitalization, and allow ministers and other government officials to more effectively share priorities and best practices.
- **Create a CEE CIO/CTO council with the mandate to produce an annual report on regional cooperation and recommendations to the 3SI summit.** The group should include private- and public-sector chief information officers (CIOs) and chief technology officers (CTOs), and produce an annual policy memo identifying critical obstacles and bottlenecks to digitalization. It should also develop policy recommendations to advance the adoption of digital technologies across sectors. The report

1 e-CMR refers to an additional protocol to the 1956 Convention on the Contract for the International Carriage of Goods by Road (CMR). E-CMR was introduced to support paperless versions of consignment notes, which are used for commercial transport contract purposes (business-to-business) and by law enforcement/ customs authorities for checking the goods details and consignor/consignee/carrier information for clearance in cross-border trade. See UN / CEFACT "e-CMR Executive Guide," 2018, *https://tinyurl.com/y33vt5t4*.

2 McKinsey & Company have a similar recommendation in their latest report, "Digital Challengers in the Next Normal," calling for the creation of a CEE Digital Council.

could serve as input to 3SI Summit and the Digital Council.

- **Link up CEE digital trade associations.** Compared to many Western European business communities, much of the CEE region lacks strong industry representation (with a few exceptions). By either linking arms among existing interest groups or shaping a region-wide umbrella organization, the digital sector across the region could better communicate needs to policymakers, and more effectively give impulses on regional or EU-level initiatives from Central and Eastern Europe.
- **Establish a CEE digitalization knowledge repository and exchange program.** Such a central database would make information on case studies, initiatives, lessons learned, and other developments related to digitalization in CEE available to policymakers and stakeholders throughout the region to turbo-charge their dissemination and best practices adoption. The repository could be combined with a CEE exchange program in which industry experts, digital policymakers, startup representatives, and other experts travel across the region to help advance expertise and build connections.

Finding the Resources:

- **CEE governments should compare—and, where possible, coordinate—plans for spending the 20 percent of the EU COVID-19 recovery fund allocated to digital transformation.** Although it will be difficult to organize major cross-border projects funded by the EU recovery fund, given the priority usually assigned to national projects, a cluster or two of countries should find it possible to collaborate in designing their national plans so that part of their EU funds can be used on a shared project—perhaps to support a priority such as high-performance computing.
- **CEE governments should allocate 1 percent of the funds intended for digital transformation to fund regional cooperation.** This would not include funding on actual projects, but, rather, funding for network creation and participation in joint task forces and government-to-government collaboration. Such funding is often essential to create the opportunities and incentives for collaboration.
- **The Three Seas Investment fund should allocate monies to support key cross-border digital projects.** These projects could be proposed and determined by the digital ministerial council, perhaps on the recommendations of the CIO/CTO council. The current list of projects must be significantly expanded in the digital arena.

Finding a Stronger Voice in Brussels—and in Washington:

- **A key focus of the 3SI Digital Council should be to define and drive a CEE digital agenda within the EU.** Whether through the 3SI process or separately, the CEE governments should engage both ministers for digital affairs and for European affairs to identify where the countries share interests. Especially as the EU begins to work through its ambitious digital agenda for the next few years, it is vital that CEE countries consult and plan in advance and be ready to offer alternatives when suitable.
- **Support efforts to expand the EU's Digital Single Market project.** Because few of the CEE countries provide enough of a market for any startup to scale up, the availability of the entire EU market is essential. The continual removal of internal barriers within the Digital Single Market should be a priority.
- **Establish working groups on EU-level priority projects.** These working groups should include CEE government leads on key priorities, including the Digital Single Market, but also the Capital Markets Union, e-identity, and cybersecurity. Through the ministerial council, the CEE countries should identify priority issues, coordinate coalition-building, and collaborate on reaching out in Brussels and key member-state capitals.
- **Establish relationships with digital frontrunners.** The CEE working groups above should build relationships with likeminded member states outside of Central and Eastern Europe. Here, the so-called digital frontrunners, the Nordic-Baltic Eight, and groupings like the Digital Nine (D9) might be of most interest. These relationships should seek to explore concrete proposals on priority files and build best-practices exchanges.
- **Push for greater cooperation between the United States and the EU on digital policies, especially in establishing standards.** Such rules will be more effective and attractive globally if supported by the two most mature digital markets, and such cooperation will make it easier for US and EU companies to operate across the Atlantic. CEE countries can be an important voice in Brussels and key capitals, making clear the importance of shared transatlantic values in the digital space.

Introduction

Digitalization has been heralded as "the next engine of growth" for the economies of Central and Eastern Europe, and the idea that digitalization can become a game changer for the region's economic model has never been more relevant than in the current crisis.[3] The region enjoys several strong digital fundamentals that could be leveraged to develop new drivers for sustainable long-term growth—from high-quality digital infrastructure and a large STEM talent pool to vibrant startup ecosystems and a lack of legacy industries. These fundamentals position Central and Eastern Europe well to take advantage of the ongoing digital transformation of the global economy and seize its full potential. But, if they are to succeed in driving forward digitalization, CEE countries will need to double down on their existing digital strengths and regional cooperation. As it charts its path forward on digital technologies and digital policy priorities, the countries of the region should also embrace their voice and weight as members of the European Union and the transatlantic community.

People look at the visualisation during the Locked Shields, cyber defence exercise organized by NATO Cooperative Cyber Defence Centre of Exellence (CCDCOE) in Tallinn, Estonia April 10, 2019. *REUTERS/Ints Kalnins https://pictures.reuters.com/archive/ESTONIA-CYBER--RC171AD8CA50.html*

If there ever was any doubt about the central role of digitalization in the economy of the future, COVID-19 has made it inescapable. The impact of the pandemic on how consumers, businesses, and the public sector use digital technologies gives the conversation about the future of the digital economy in Central and Eastern Europe a renewed sense of urgency. The region, thus far, has stood out for its comparatively strong performance in digital adaptation during the crisis, and has shown greater digital resilience than some of the larger economies of Europe. Both businesses and governments in the region have relied on digital solutions to respond to the crisis, manage relations with citizens, customers, and suppliers, and ensure operational continuity. As policymakers look ahead, they cannot miss the opportunities this accelerated digital adaptation under the pandemic's restrictions creates for the CEE economies to fuel their economic recovery and emerge from the crisis stronger.

If the impact of the COVID-19 pandemic is one major motivation for a renewed push to take forward CEE's digitalization, so are the broader geopolitical dynamics. Central and Eastern Europe and digital technology represent two arenas in which the return of great power competition is playing out today.[4] Russia's open revisionism since the annexation of Crimea and China's plays for influence through investments across Central and Eastern Europe have come into sharper focus. Moscow's attempts at influence may seem historically more familiar to CEE governments and citizens. But, Beijing in particular has elevated technology as a field for great power competition. Chinese engagement in the region's communications network infrastructure is only the most tangible manifestation of a challenge that cuts across technology, national security, and geopolitics. Broader questions loom about what emerging technologies—from artificial intelligence to the Internet of Things—may mean for the region, the European Union, and the transatlantic partnership. Control over the development and application of these new technologies will be key in determining who benefits. Against this backdrop, leveraging digitalization to ensure future growth and competitiveness is not purely an economic policy challenge. It is also a matter of national security, geopolitical resilience, and strategic relevance for Central and Eastern Europe.

Even with this renewed sense of urgency, Central and Eastern Europe's strong fundamentals and its digital performance during the pandemic will not automatically translate into innovative tech leadership, dynamic economic growth, or greater competitiveness for the region. Wider adoption of digital services and technologies alone does not equal true digital transformation. If CEE governments and businesses are to succeed in driving digitalization forward and emerge as digital leaders in a post-COVID-19 world, they

3 Jurica Novak et al., "The Rise of Digital Challengers," McKinsey Global Institute, November 2018, *https://tinyurl.com/y6kc96h2*.

4 Frances Burwell, Jörn Fleck, and Eileen Kannengeiser, *Beyond 5G, Central Europe Will Be Key to Countering Chinese Technological Influence, Atlantic Council*, August 14, 2020, *https://tinyurl.com/y6rebyz3*.

must create an ecosystem that empowers innovation, as well as technological adaptation and business development. This will require a concerted regional digital agenda.

As they chart their path forward on digital technologies and digital policy priorities, the countries of the region should also embrace their voice and weight as members of the European Union and the transatlantic community. By becoming leading digital innovators, Central and Eastern Europe can also play a role as "digital influencers," shaping the EU's approach to emerging technologies, innovation, and competitiveness. With a stronger role in the EU, CEE governments can also work to alleviate some of the strains with the United States over digital policy, while also promoting greater EU-US cooperation in this field.

If the region is to overcome some of its own limitations—from market size and fragmentation to access to capital and the investor appeal of local technology clusters—there seem to be few alternatives to working together at a regional level. But, for a variety of reasons, it has proven challenging to build greater cooperation and policy coordination among CEE countries in this area. Even though there is a general consensus on the digital potential of the CEE countries, there is little clarity about *how* Central and Eastern Europe as a region can best move forward with digitalization to secure its full benefits and become a leader in shaping its future trajectory.

Convinced of the role digitalization can play in Central and Eastern Europe's economic future and encouraged by the new momentum in the debate, the Atlantic Council convened a task force of US and CEE digital innovators, experts, and thought leaders. The group sought to move beyond the generalities about digitalization in Central and Eastern Europe and explore that missing piece—the "*how*?" How does Central and Eastern Europe capture the potential of digitalization with concrete steps toward regional cooperation? How can public- and private-sector decisionmakers leverage Central and Eastern Europe's existing strengths, while avoiding getting stuck in merely servicing higher value chains and responding to external demand? How do the CEE countries make the most of both healthy region-wide competition and diversity on the one hand, and the potential of economic scale and policy coordination on the other? How does Central and Eastern Europe as a whole get the balance right between unleashing private-sector ingenuity and leveraging public-sector investment? How does the region advance its strategic digitalization objectives through regional efforts such as the 3SI, at an EU level, and through transatlantic cooperation?

This report deliberately does not focus on an analysis of, or recommendations for, the national policies, initiatives, and reforms that remain crucial to the success of digitalization in every individual country in the region. That would have exceeded the scope of this effort. Instead, the report seeks to explore and develop a way forward for how regional cooperation can help advance the digital transformation of Central and Eastern Europe. This, of course, cannot be separated cleanly, and at all times, from any national efforts and developments. But policymakers and other readers should consider this a guide to the CEE regional policy dimension, and not be disappointed to find the report does not lay out a detailed national strategy for their respective country.

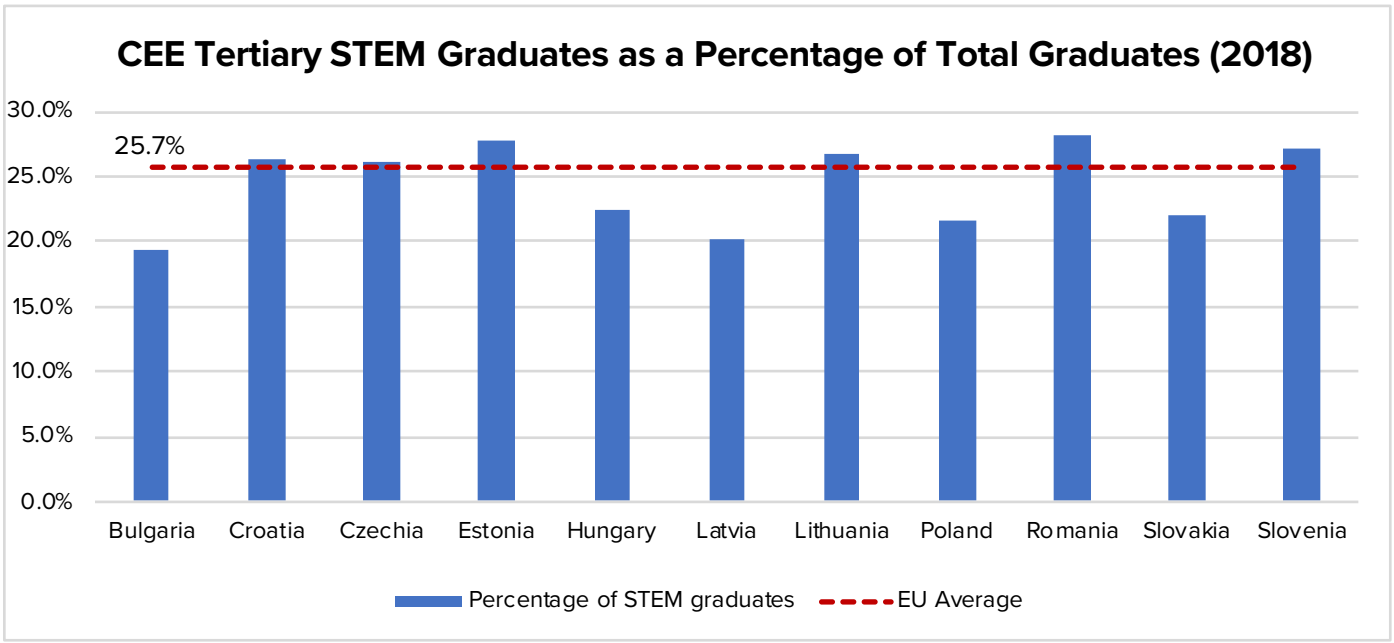
Background

STRENGTHS OF CENTRAL AND EASTERN EUROPE

Central and Eastern Europe can showcase several strengths when it comes to digitalization. These include strong foundations for further digital development, significant progress in the expansion of digital access and infrastructure, and real success stories of digital excellence and innovation at company and sectoral levels. Specifically, Central and Eastern Europe should look to leverage the following strengths.

Robust education systems, including at the tertiary level and particularly in the so-called "STEM" subjects—science, technology, engineering, and mathematics—have been a key asset for the region's digital development. Together, the region produces the largest talent pool of STEM graduates in the European Union.[5] Romania and Estonia consistently exceed the average percentage of STEM graduates among EU member states, with nearly 30 percent of graduates concentrating in STEM. In 2018, Slovenia, Lithuania, and Croatia also surpassed the EU average and had 27.2 percent of graduates, 26.8 percent of graduates, and 26.3 percent of graduates in these specialty fields, respectively.[6] This educational foundation combines with a traditional focus on applied research and engineering in many CEE countries.

The lack of legacy technologies is another advantage for Central and Eastern Europe. It allows the region to pursue digital transformations without the inertia of outdated systems. Central and Eastern Europe's high adoption rate of digitally enabled contactless payments is one case in point. By 2018, 50 percent of transactions were contactless in Hungary and Croatia, and Poland had reached 80 percent.[7] Similarly, with a lack of widely available telephone services in some CEE countries as a result of inefficient communist-era telecom providers, the advent of the Internet created a surge in demand for connectivity solutions, especially in rural areas. This helped spawn an industry focused on wireless-connectivity equipment for Internet service providers (ISPs). In the Czech Republic, for instance, this combined with local and regional ISPs in the rural space to provide some of the fastest and most



Souce: Eurostat

5 Jurica Novak et al., "Digital Challengers in the Next Normal in Central and Eastern Europe," McKinsey Global Institute, October 13, 2020, 22, *https://tinyurl.com/y2xu39sw*.

6 "Graduates by Education Level, Programme Orientation, Sex and Field of Education," Eurostat, accessed October 6, 2020, *https://tinyurl.com/y5lnzt8x*.

7 "Europe Leads Contactless Adoption as Almost 1 in 2 Transactions Are Now Contactless," MasterCard, September 17, 2018, *https://tinyurl.com/y8ctxswu*.

affordable Internet access in an EU-wide comparison.[8] Therefore, the absence of preexisting legacies has allowed Central and Eastern Europe to "leapfrog" over intermediate technologies in some cases, and quickly adopt and implement new digital technologies. In addition to absent legacy technologies, there is also a lack of legacy industries or companies. Unlike in some larger EU member states, there are few former telecom giants or major equipment producers, for instance, which could slow down the roll-out of new technologies due to their market position.

Specializations in digital technologies and services within CEE countries also benefit the region's overall digitalization. Lithuania leads Central and Eastern Europe in financial technology (fintech), with more than two hundred fintech companies, and ranks fourth in the world for its fintech market.[9] In Slovenia, groundbreaking research has positioned that CEE country as a pioneer in AI—a trend that will be further supported by Slovenia's new International Research Center on Artificial Intelligence (IRCAI) under the auspices of the United Nations Educational, Scientific and Cultural Organization (UNESCO).[10] Furthermore, Bulgaria and Lithuania rank in the EU top three in AI adoption by enterprises.[11] Meanwhile, Estonia—labeled a "Digital Frontrunner" in the 2018 McKinsey & Company "Digital Challengers" study—is a European powerhouse for e-governance, leading the way with services such as e-Residency.[12] Estonia, the Czech Republic, and Romania also have vibrant clusters of cybersecurity companies—from global players such as Avast to startups specializing in a variety of cybersecurity subsectors. Poland, Romania, Slovakia, Hungary, and Bulgaria are also well known for having acquired a globally competitive position for business-process outsourcing and shared-service centers (together, "BPO/SSC"). These combine specialty services in accounting, human resources, sales and marketing, tech support, and other areas with a variety of digital solutions and software services. This diversity creates opportunities for the region to exchange expertise and best practices on emerging technologies. In addition, with each country positioned to develop distinct areas of comparative advantage, Central and Eastern Europe can expand its global impact across a range of technologies.

The size of the regional market is another intrinsic strength of Central and Eastern Europe. Combined, CEE countries constitute one hundred million people and a gross domestic product (GDP) of nearly €1.5 trillion.[13] The EU Single Market underpins the region's market potential, facilitating the free flow of goods and services. Such cross-border exchange provides access to a larger number of consumers, enabling CEE startups to scale and improving their ability to compete with global companies.

Finally, Central and Eastern Europe enjoys ***existing integration into critical supply chains,*** in Europe and beyond. Compared to other EU member states, CEE countries offer relatively inexpensive labor. As a result, Central and Eastern Europe has secured its role in labor-intensive fields, including manufacturing, warehousing, and logistics. The location of and labor costs in Central and Eastern Europe have made the region particularly attractive for Western European automotive players and global online retailers. Through its current industries, CEE countries already service target markets and customers.

These factors have cultivated a ***growing technology ecosystem in Central and Eastern Europe***. The region has a rich pipeline of rising stars within its startup sector. A dozen CEE companies have even achieved "unicorn" status, with a value above $1 billion. Allegro and UiPath, founded in Poland and Romania, respectively, are among the region's success stories, while Estonian-founded Skype is the region's leading unicorn.[14] Combined, CEE unicorns are worth an estimated €31 billion and venture capital investment throughout the region has increased almost five-fold between 2015-2019.[15] Clusters around key technologies and their applications, from cybersecurity to gaming, are emerging across the region. Global companies have recognized the potential of Central and Eastern Europe and are moving quickly to anchor their presence in the region. This includes US tech firms Google and

8 Ondrej Maly, *Czechia, a Country of Small Internet Providers, Institut Pro Politiku A Spolecnost*, September 2019, *https://www.politikaspolecnost.cz/paper/cesko-zeme-malych-poskytovatelu-internetu/*.

9 "Lithuania's Impressive Fintech Growth Extends into 2020," Invest Lithuania, February 17, 2020, *https://tinyurl.com/y3nc6gko*; "The Global Fintech Index 2020," Findexable, December 2019, *https://findexable.com/wp-content/uploads/2019/12/Findexable_Global-Fintech-Rankings-2020exSFA.pdf*.

10 Mark Minevich, "Here's How Slovenia Is Shaping The New Human Centric Society And Pioneering The World In AI," Forbes, April 13, 2020, *https://tinyurl.com/y67gwakd*.

11 "European enterprise survey on the use of technologies based on artificial intelligence," European Commission, July 28, 2020, *https://tinyurl.com/yy6uwjtr*.

12 "eGovernment Benchmark 2019: Trust in Government is Increasingly Important for People," European Commission, accessed August 19, 2020, *https://tinyurl.com/y4wyfshk*.

13 "Population, Total–European Union," World Bank, accessed October 1, 2020, *https://tinyurl.com/y4g8pbzm*; "GDP and Main Components (Output, Expenditure and Income), European Union," Eurostat, accessed October 1, 2020, *https://tinyurl.com/y64rdzco*.

14 "Central & Eastern Europe: Startup & Investment Landscape," Dealroom, March 18, 2019, *https://blog.dealroom.co/wp-content/uploads/2019/03/Google-CEE-v25.pdf*.

15 Novak et al., "Digital Challengers in the Next Normal," 25-29.

Central and Eastern European Unicorns

COUNTRY	UNICORNS (COMPANY WORTH $1 BILLION +)
Estonia	TransferWise, Bolt, Playtech
Poland	allegro, CD PROJEKT
Romania	UiPath, eMAG
Hungary	LogMeIn
Slovenia	Outfit7
Czech Repuplic	avast, KIWI.COM
Lithuania	Vinted

Source: *Dealroom.co*

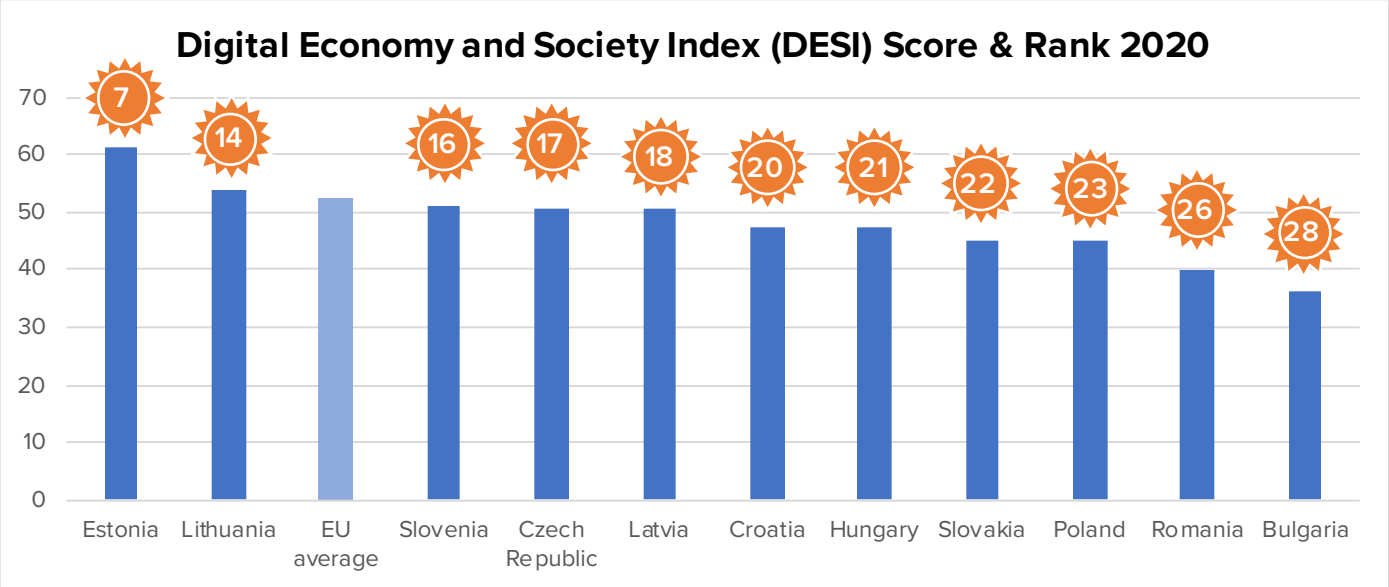
Microsoft, which announced billion-dollar investments to build data centers in Poland.

CHALLENGES FOR CENTRAL AND EASTERN EUROPE

Despite these strong fundamentals and commercial successes, some of the very factors that position CEE for success in the digital transition also hold back the region's potential. For one, CEE countries ***risk getting stuck at the lower end of global value chains***, providing low-cost manufacturing and support services to companies in larger economies. As a result, they may face the risk of the so-called "middle-income trap," unable to move to more knowledge-based and higher-value sectors. This trend is evident in the automobile industry, for example. Slovakia, Romania, the Czech Republic, and Hungary have the highest shares of direct automotive-manufacturing jobs within the EU, followed closely by Poland and Slovenia.[16] The brand of automobile, and much of the value creation, may be German or French, even if much of the labor is provided in Central and Eastern Europe. Knowledge transfers take place within existing value chains and are, thus, hardly transformative. Imitation rather than innovation is the rule.

However, reliance on manufacturing and competitive labor costs alone are likely to become unsustainable for continued growth and development in the CEE region in the medium to long term. Already, skills and labor shortages have been driving up labor costs across the region in recent years. From 2018 to 2019, all eleven CEE countries

16 "The Automobile Industry Pocket Guide 2020-2021," European Automobile Manufacturers Association, July 2020, *https://tinyurl.com/y5cafdop*



The Digital Economy and Society Index is compiled by the European Commission to track to evolution of EU member states in digital competitiveness. Each member state's score and rank is based on a measure of its connectivity, human capital, use of Internet services, integration of digital technology, and digital public services. Source: *https://ec.europa.eu/digital-single-market/en/desi*

saw hourly labor costs rise more than the EU average of 3 percent, with Romania and Bulgaria exceeding 10 percent.[17] In the medium term, accelerated take-up of automation and applications of AI threaten to displace labor and disrupt economic growth in manufacturing, logistics, warehousing, and basic business services—the very sectors Central and Eastern Europe continues to rely on for its existing growth model. If CEE countries are to thrive, they must find ways to proactively address the disruptions and transformations that will likely flow from advanced manufacturing models and adjust their economies and workforces accordingly.

Automation and digital productivity applications threaten to ***exacerbate the urban-rural divide*** in Central and Eastern Europe. Rural areas are likely to rely on a small number of employers, and often have a higher volume of labor-intensive jobs that do not require tertiary education. Once displaced, low-skilled workers will struggle to find new employment. Meanwhile, jobs that are more resilient to automation are primarily located in urban areas and require advanced education.[18] Disparities in digital connectivity will further isolate rural areas. Without digital infrastructure, rural regions could be sidelined as urban economies thrive. This risk is especially prominent in Romania and Bulgaria, where the rural-urban divide on Internet access ranks among the worst in the EU.[19] To avoid such inequalities, CEE countries need to ensure digital infrastructure and connectivity investments bridge existing gaps in urban and rural areas.

The region's lack of access to capital is another challenge for Central and Eastern Europe. CEE capital markets in 2018 reached only one third of the pre-Brexit EU average.[20] Some estimates suggest that the region trails the EU-15 two years in mobile broadband deployment, but an astounding forty-seven years in capital density.[21] Compared to neighboring regions, Central and Eastern Europe has a lower share of capital raised relative to the number of companies pursuing funding.[22] From 2013 to 2020, per-capita investments in Central and Eastern Europe were eight to thirteen times smaller than the "Big 5" (France, Germany, Italy, Spain, and the United Kingdom)

17 "Hourly Labour Costs," EuroStat, accessed September 29, 2020, *https://tinyurl.com/y48glvz6*.

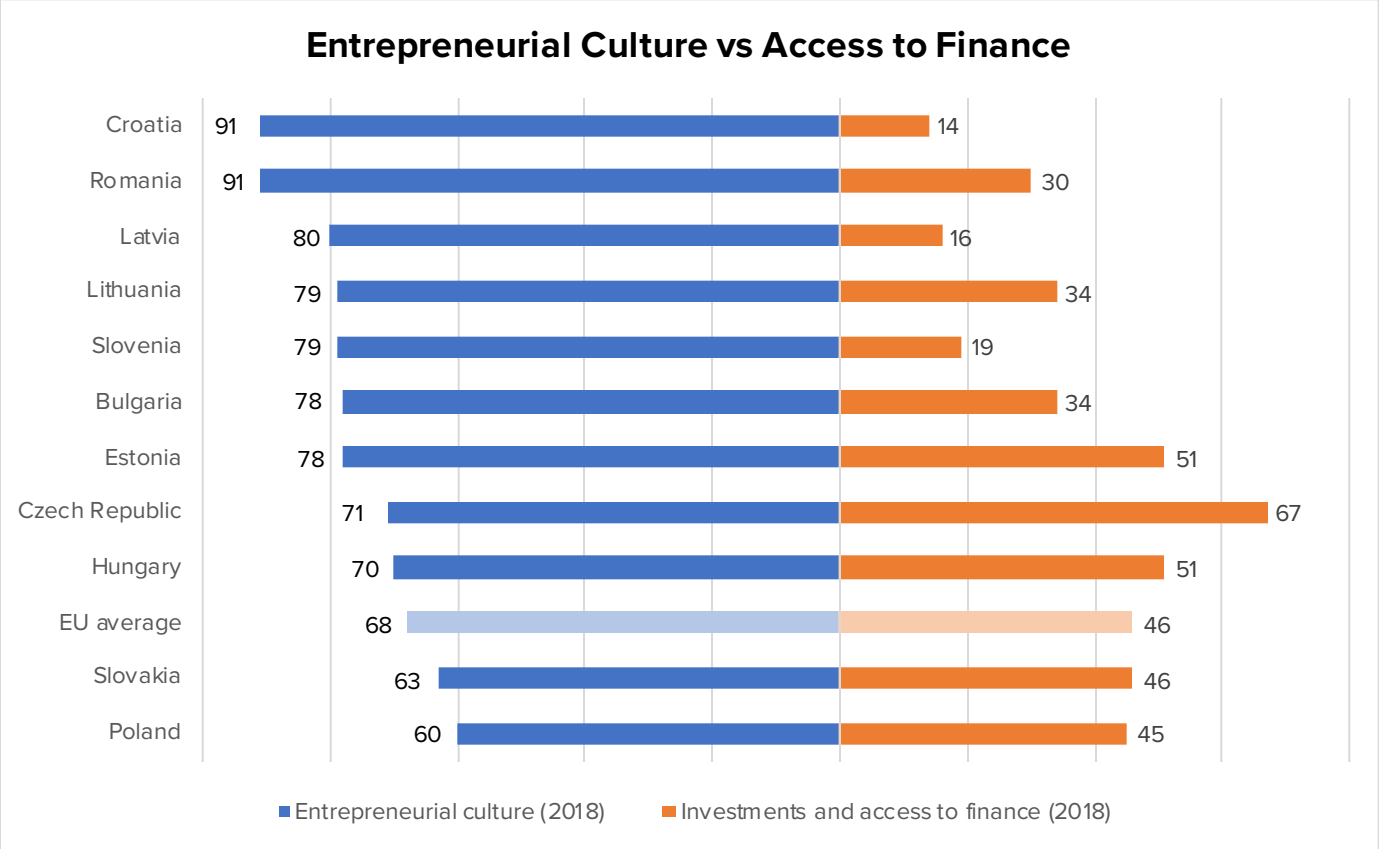
18 "Job Creation and Local Economic Development 2018: Preparing for the Future of Work," Organisation for Economic Co-operation and Development, September 18, 2018, *https://tinyurl.com/y65gdcxk*.

19 "Digital Economy and Society Statistics—Households and Individuals," EuroStat, September 2020, *https://ec.europa.eu/eurostat/statistics-explained/pdfscache/33472.pdf*.

20 Alexander Lehmann, "Emerging Europe and the Capital Markets Union," Bruegel, September 2020, *https://www.bruegel.org/wp-content/uploads/2020/09/PC-17-2020-170920.pdf*.

21 "CEE Region's Fastest Convergence is Happening in Digitalization," Erste Group, June 22, 2017, *https://www.erstegroup.com/en/news-media/news-views/2017/06/22/cee-digitalisation-alias*.

22 "Tech Scaleup Europe 2019," Mind the Bridge, June 2019, *https://tinyurl.com/y6gkaprx*.



Definition: A country's entrepreneural culture is calculated from the Global Entrepreneurship Monitor, which scores total early-stage entrepreneurial activity, self-perceptions: entrepreneurial intentions, and societal values: entrepreneurship as a good career choice. Investment and access to finance is determined on a series of factors including: direct investment, venture capital availability, ease of raising money through local equity markets, and ease of access to loans. Source: European Commission, Digital Transformation Scoreboard 2018

and Digital Frontrunner countries, respectively.[23] As in Europe generally, bank lending remains the dominant type of financing, and public-listed equity plays a much less significant role than in the United States, for example. Meanwhile, only Poland among all CEE countries ranks in the top-thirty countries of the Venture Capital and Private Equity Country Attractiveness Ranking 2018.[24] CEE start-ups are often acutely aware from the get-go of the need to scale globally and get access to financing from outside the region. As a result, they look beyond their smaller, less wealthy home bases from inception, making it harder for the region to retain innovation and talent.

Seeking larger capital and consumer markets, CEE-based startups relocate to Western Europe or the United States. Across Europe, one out of seven startups established headquarters abroad to secure financing and gain traction in the market.[25] The emigration of startups to bigger EU and US markets reduces employment opportunities in Central and Eastern Europe and limits the potential growth of regional economies. Thus, CEE countries should strengthen local startup ecosystems to attract capital investments, encouraging emerging businesses to anchor their operations in the region.

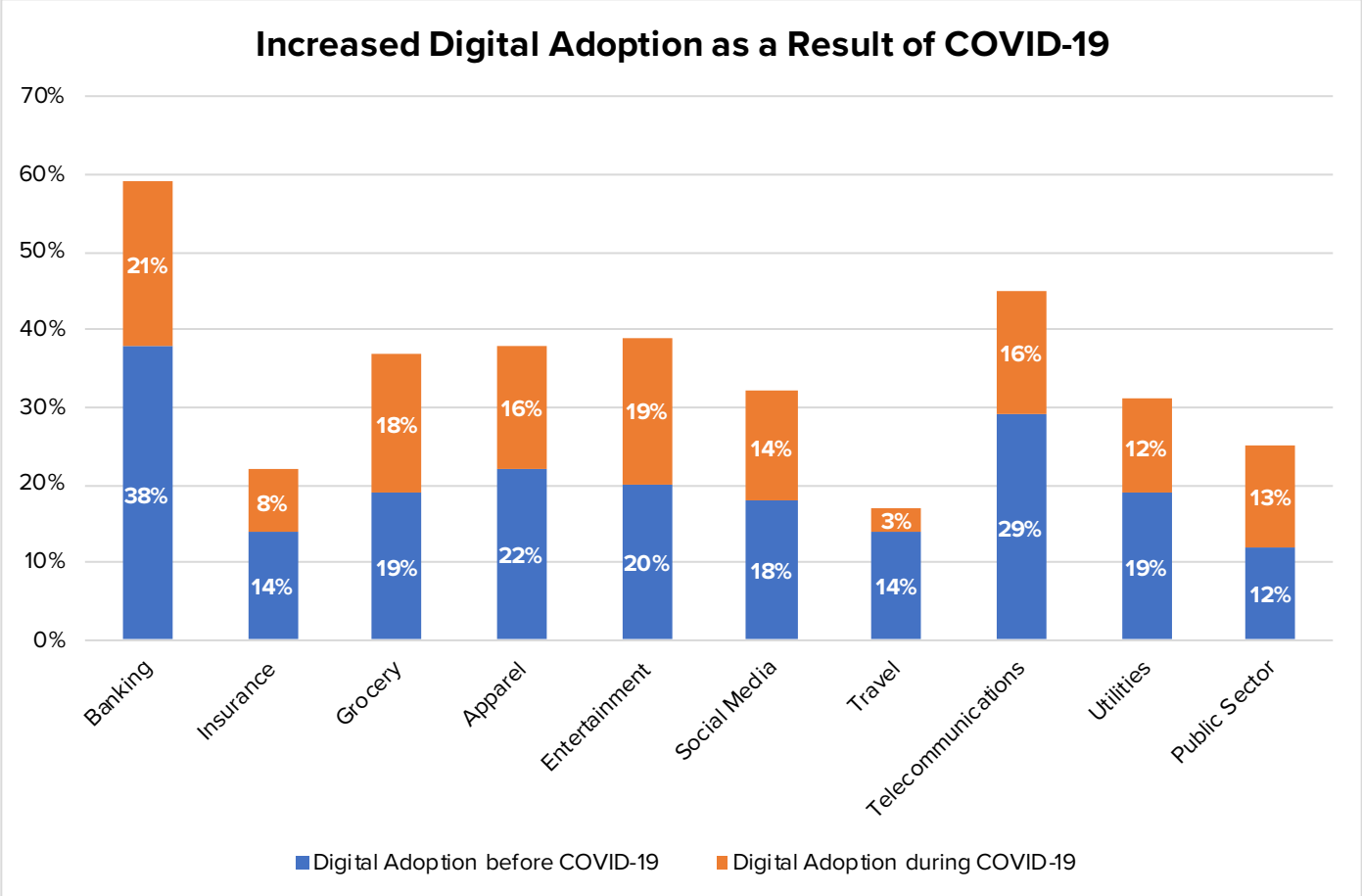
Similarly, ***a gradual but significant brain drain*** undermines the region's economic potential. Talent—equipped with STEM training from Central and Eastern Europe's robust education systems—migrates to Western Europe in search of job opportunities with higher incomes. For example, by some estimates, software developers can earn up to 35 percent more in Western European countries than in CEE countries.[26]

23 Novak et al., "The Rise of Digital Challengers," 9.

24 Alexander Groh, et al., "The Venture Capital and Private Equity Country Attractiveness Index 2018," IESE Business School of University of Navarra, Early Makers, Emlyon Business School, March 6, 2018, 17, *https://blog.iese.edu/vcpeindex/files/2018/02/report2018.pdf*.

25 "European Dual Companies: Scaleup Migration?" Mind the Bridge, June 2017, *https://www.wsgr.com/PDFSearch/european-dual-companies.pdf*.

26 Mariola Krause, "Where Can I Find High Quality Software Developers?" *Medium*, March 28, 2019, *https://medium.com/@talent.io/where-can-i-find-high-quality-software-developers-d0c3178f63f3*.



Source: McKinsey & Company "Digital Challengers in the Next Normal"

Nonetheless, brain drain affects the entire region.[27] According to one tech study, nearly 75 percent of technology specialists in Central and Eastern Europe would consider relocating for job opportunities abroad.[28] High-skilled workers are doing exactly that. Individuals with higher education are enticed by higher-paying jobs and increased opportunities abroad. In Romania, almost 40 percent of its highly educated population has emigrated.[29] CEE countries must address this outflow of skilled workers and identify strategies to retain the region's extensive STEM talent, if they are to succeed in the next phase of digitalization.

Lack of regional cooperation makes it difficult to solve these region-wide problems, making this final challenge the most urgent for Central and Eastern Europe. Uneven levels of digitalization and inevitable competition between CEE countries lead to divergent national interests. Too often, they find themselves in direct competition for projects and investments. As a result, different priorities impede the region's ability to form a consensus on digital projects and policies, with serious consequences for everyone's competitiveness and progress.

One consequence of this lack of cooperation is that, more than a decade after joining the EU, the countries of Central and Eastern Europe still find themselves to be "policy-takers," following the leadership of larger Western European economies. Without an effective regional coalition, CEE countries have little influence on the EU regulatory agenda. However, Central and Eastern Europe's voice is critical to ensuring EU policymaking benefits the region by encouraging entrepreneurship, attracting investors, and enhancing economic growth. This is especially important as the EU pursues legislation that will set the rules for Europe's digital innovators. To shape EU policies, CEE countries must look beyond their differences to focus on regional cooperation.

27 "Migration and Brain Drain: Europe and Central Asia Economic Update (2019)," World Bank, September 10, 2019, *https://openknowledge.worldbank.org/handle/10986/32481*.

28 Sebastian Sala, "Relokacja za Pracą—czy to Się Opłaca? [Relocation for Work—is It Worth It?]," *Antal*, July 2, 2018, *https://antal.pl/wiedza/artykul/relokacja-za-praca-czy-to-sie-oplaca*; Krause, "Where Can I Find High Quality Software Developers?"

29 "Migration and Brain Drain."

TRIAL AND OPPORTUNITY: DIGITALIZATION IN THE CONTEXT OF COVID-19

The COVID-19 pandemic clearly underscores the need for CEE countries to accelerate digitalization. Businesses and governments are relying on digital solutions to manage the crisis, ensure operational continuity, and enable communications and shape relations with citizens, customers, and suppliers. Since the start of the COVID-19 pandemic, Central and Eastern Europe has seen a dramatic increase in digital engagement, with twelve million new online-service users.[30] Rapid digital adoption and adaptation under the current restrictions offer an opportunity for economies already well positioned to exploit digitalization and move more decisively in this direction.

Indeed, a range of sectors saw increased digital activity during COVID-19, including a 21-percent rise in online banking, an 18-percent increase in online grocery shopping, and 13-percent growth in users accessing government services digitally. Online access to government services more than doubled in Central and Eastern Europe, but left consumers unsatisfied, highlighting the importance of investing in e-governance capabilities.[31] Consumers are likely to continue to rely on digital services after the pandemic is resolved, and will have higher expectations for the availability and quality of online options.

However, the pandemic has also tested the fundamental strengths of Central and Eastern Europe and accentuated some weaknesses. As lockdowns forced communities to quickly adapt daily activities to an online platform, the shift exposed some of the digital divides in Central and Eastern Europe. For example, the movement to e-learning revealed inequalities in Internet access between urban and rural areas and highlighted the importance of expansive digital infrastructure. In Estonia, Romania, Lithuania, and Poland, fewer than 80 percent of rural households are covered by fixed broadband.[32] This disparity disadvantages students in rural communities who cannot access remote education, and underscores the need for CEE businesses and governments to address blind spots COVID-19 revealed by accelerating digitalization.

The immediate health crisis and economic consequences of COVID-19 threaten to distract from digitalization and stall long-term growth. The International Monetary Fund (IMF) projects GDP will contract by an average of 6.6 percent across Europe in 2020, as a result of COVID-19 and related economic repercussions.[33] In Central and Eastern Europe, the economic slowdown challenges the region's sustained growth. In the urgency to revive their economies, CEE policymakers may be tempted to shift focus and resources away from long-term digitalization. However, COVID-19 recovery efforts should aim to rebuild economies that are better equipped for the future.

The EU recovery plan provides financial incentives to capitalize on COVID-19 as an opportunity to transform economies and seize the full potential of ongoing digitalization trends. Next Generation EU—the EU's 750-billion COVID-19 recovery package—will integrate member-state recovery funds with transformative investments.[34] Through this recovery plan, the EU aims to advance a green, digital, and resilient Europe. As CEE countries apply for Next Generation EU funds, they should focus on taking advantage of current momentum to prioritize digitalization.

COVID-19 and Next Generation EU recovery funds reframe the context for digitalization. The successful transition to the digital economy was always seen as a boon for the countries of Central and Eastern Europe. In the 2018 "Digital Challengers" study, McKinsey & Company estimated that a concerted effort at digitalization could add up to €200 billion to the region's GDP. Now, it is imperative for Central and Eastern Europe to embrace digitalization in order to meet consumer demands, restore economic growth, and secure its role in the digital future. COVID-19 has demonstrated the absolute necessity of this transition, and the EU recovery funds could offer the means to make it reality.

30 Novak et al., "Digital Challengers in the Next Normal," 3.

31 Ibid, 38.

32 "Digital Economy and Society Index (DESI) 2020," European Commission, accessed September 25, 2020, *https://ec.europa.eu/digital-single-market/en/desi*.

33 "World Economic Outlook: The Great Lockdown," International Monetary Fund, April 2020, *https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020*.

34 "The Pillars of Next Generation EU," European Commission, accessed August 19, 2020, *https://tinyurl.com/y67cgkya*.

Why CEE Regional Cooperation On Digitalization?

As policymakers throughout the region address the immediate economic challenges of the COVID-19 pandemic, their natural place to start is their national economy. At the height of a crisis, few would expect otherwise. But as attention shifts to the long road to a lasting economic recovery and decision-makers seek to capture the opportunities that wider digitalization under crisis conditions has opened up, they should not miss the chances that greater regional cooperation offers for their digital policy ambitions.

Such cooperation could help create a larger, more attractive market for CEE digital players. More formalized fora for greater exchange among public and private sector actors would encourage the sharing of best practices, allowing CEE countries to advance digitalization more effectively and expeditiously. Strengthening cooperation through technology clusters could spur innovation, strengthen overall competitiveness, and raise the attractiveness of the region to its own homegrown IT talent in the face of an enduring tech brain drain. Rather than viewing cooperation as something imposed by EU funding requirements, CEE policymakers should embrace regional cooperation on digitalization as an opportunity to leverage their national economies strengths and overcome their challenges in a global marketplace.

One challenge that has hobbled regional coordination in the past, are the differences—perceived or real—in digital development among Central and Eastern Europe's countries. It is true that there are ***different starting points when it comes to some aspects of digitalization across the region***. The range of digital connectivity across Central and Eastern Europe illustrates this point. In Poland, Lithuania, Romania, and Slovakia, fixed broadband covers less than 90 percent of households, whereas Croatia is among the top-twelve EU member states, with 99 percent of households covered.[35] With respect to mobile broadband, Hungary is an EU leader in 4G coverage and 5G readiness, while Bulgaria and Slovenia rank among the lowest in the EU.[36] These different starting points combine with a patchwork of national strategies and priority plans for digital policy to complicate any regional coordination. Given the realities of democratic politics across countries in the region, these national differences are likely to remain, as politicians must respond to, and make policy for, their national constituencies.

At the same time, the differences among CEE countries should not be overstated to such an extent that they limit regional cooperation and inhibit going after synergies. Important variations exist. Yet, especially when compared to Western Europe, these ***countries share broadly similar strategic outlooks and goals on digitalization***. Across the region, policymakers and business leaders seem increasingly focused on the need to avoid the "middle-income trap" by moving up value chains, embracing technological change, and shifting from foreign imitation to homegrown innovation. The majority of economies rank similarly high on openness and exposure to global markets, as well as support for free-market policies. CEE economies surpass the EU Big 5 in degree of trade openness, with the exception of Romania.[37] Most of the region's countries also rank similarly in global innovation and entrepreneurship indices. Technology adoption, whether at the level of individual use or company applications, shows few outliers among Central and Eastern European countries. The majority of CEE countries rank at the bottom end of the EU Digital Economy and Society Index, with only Estonia and Lithuania surpassing the average EU score.[38] Within this score, the countries of Central and Eastern Europe lag significantly behind fellow EU member states in availability of digital infrastructure and integration of digital technologies, with Lithuania and the Czech Republic as outliers.[39] Against a broader European—or even global—backdrop, differences shrink and greater commonalities take shape.

There is also insufficient focus on how ***greater cooperation can help overcome some of the region's limitations and challenges***. By themselves, eleven different national strategies for digitalization will neither create the right synergies and market size for CEE digital players nor send the crucial signal for them to think big and think global. Combined, these countries represent a substantial market at 23 percent of the EU population and 11 percent of EU GDP, or nearly 1.5 trillion

35 "Digital Economy and Society Index (DESI) 2020."

36 Ibid.

37 "Trade Openness, 2017," Our World in Data, accessed October 9, 2020, *https://tinyurl.com/yxgcepjz*.

38 "Digital Economy and Society Index (DESI) 2020."

39 Laurent Probst, et al., "Digital Transformation Scoreboard 2018: EU Businesses Go Digital: Opportunities, Outcomes and Uptake," European Commission, 2018, *https://tinyurl.com/y66rcfx6*.

A worker at the Lithuanian mint holds a silver coin, produced to be exchanged for sets of digital currency released by Lithuanian central bank in Vilnius, Lithuania June 1, 2020. Lithuania is about to issue the first central bank-produced digital coin in the euro zone, part of a project to trial state-backed digital currencies and blockchain technology in everyday use. *Picture taken June 1, 2020. REUTERS/Andrius Sytas https://pictures.reuters.com/archive/EU-CRYPTOCURRENCY-LITHUANIA-RC22LH9L02PX.html*

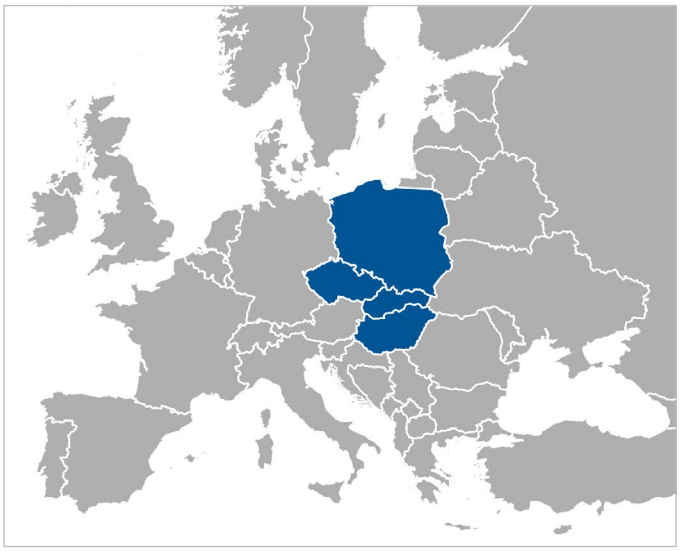
euros. Greater alignment could provide a sizeable launching pad for new companies in the region seeking to take their products to a broader market as they seek opportunities that do not exist within most relatively small CEE national markets. With the right mix of coordinated policies, incentives, and interconnections, a startup-focused ecosystem will have considerable powers of attraction for external investors. Finally, greater cooperation and a more attractive region-wide digital ecosystem could help reduce the brain drain of CEE's digital workforce to Wwestern Europe. By developing key cities into hubs of digital excellence underpinned by encouragement of innovative dynamism, development of an appealing lifestyle, and sufficient financial support, the CEE governments, working with businesses, could help keep digital workers closer to home.

Another serious challenge is the continuing reliance on CEE's existing growth model, centered around lower-cost manufacturing. This leaves the region vulnerable to shifting technology trends and supply chains, the brain drain of skilled workers from the region, and demographic changes. In time, any rising labor cost may lead investors to look elsewhere for cheaper workers, although the impact of post-COVID discussions of "reshoring" is yet unknown. Over the next ten years, advanced automation and AI are likely to cause significant changes and displacement in sectors at the heart of many CEE economies, especially in manufacturing. CEE countries also face challenges more specific to their digital potential: the need for a wider deployment of information and communications technology (ICT)-related solutions, the digitalization of small and medium-sized enterprises, reskilling and upskilling requirements for their workforces, weaker startup ecosystems, and a lack of access to capital.

In overcoming these challenges, ***healthy competition between CEE industries, innovators, entrepreneurs, and policymakers has a vital role to play in creating the right ecosystem for digital excellence and innovation at a regional scale***. Differences in talent, government policies, commercial ties to other EU economies, and digital development have already led to specializations in some areas. Estonia's world-renowned performance in e-governance is one case in point. Through a secure system of digital identification, Estonians can file taxes, check health records, and even vote online—earning Estonia third place globally in the United Nations' e-government survey.[40] Other examples include the cybersecurity sector in Czechia, Slovenia's track record in the development and applications of artificial intelligence and blockchain, and Lithuania's rapidly growing fintech market. If approached from a regional-cooperation lens, these effects of competition, in turn, could potentially

40 "E-Government Survey 2020," United Nations, July 10, 2020, *https://tinyurl.com/y6hh9u6r*.

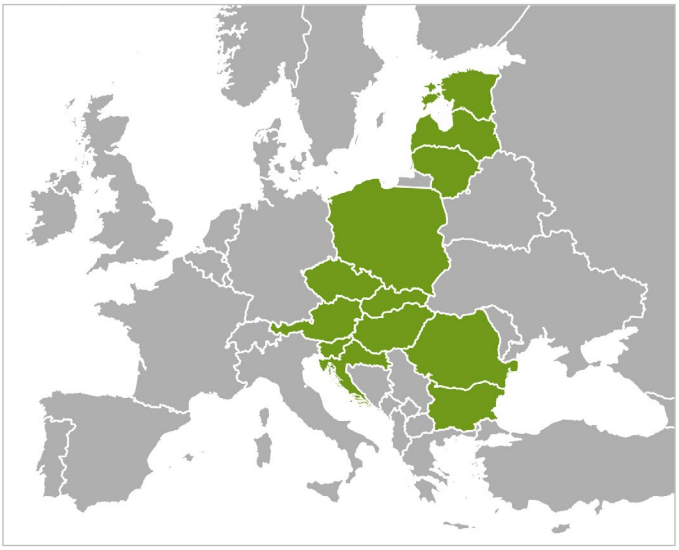
Central European Regional Forums



Visegrad 4

Brdo-Brijuni

Central 5



Three Seas Initiative

benefit CEE countries as a whole through knowledge transfers and collaboration on lessons learned and best practices. CEE neighbors could adopt successful strategies proven elsewhere in the region to catch up in areas of digitalization where they lag behind. Better connections between existing hubs of digital excellence in the region could help fuel innovation, while also enhancing the dynamism, lifestyle appeal, and financial viability of these centers.

Just as importantly, ***the complementarity of specializations, if leveraged to mutual benefit, could help more of the region to succeed as digital innovators together.*** Given the size of individual economies and IT talent pools in the region, CEE countries will not be able to become leaders across all emerging technologies. But it is the combined application of these technologies—in a variety of ways and across sectors—that will transform industries and business models. The complementary of individual CEE countries' specializations, niche technologies, talent pools, and support services—and, most importantly, their combination—could become the winning recipe when competing together on a European or global stage for transformative digital solutions. Imagine, for instance, what a combination of Estonian excellence in digital public services, Slovenian blockchain applications, Lithuanian fintech expertise, and Romanian AI experience could achieve together.

EXISTING REGIONAL COOPERATION INITIATIVES

Whatever the details and areas of focus for regional cooperation, the leadership to start and sustain such specific initiatives will have to come from within the region to succeed. The existence of several regional and subregional initiatives and forums is a testament to the interest in greater cooperation among neighbors and peers in Central and Eastern Europe. These cooperative arrangements range from the more formalized Visegrád 4 (V4) and the Central 5 to the Brdo-Brijuni Process that connects the Western Balkan Six with its EU neighbors, Slovenia and Croatia. The V4 links the Czech Republic, Hungary, Poland, and Slovakia, while the Central 5 convenes Austria, the Czech Republic, Hungary, Slovakia, and Slovenia. The Nordic-Baltic Cooperation (NB8) format brings together the three Baltic countries with Finland, Sweden, Norway, Iceland, and Denmark. These frameworks illustrate the desire to further regional partnerships and offer platforms for discussing the importance of digitalization for regional economic success. However, few of these regional formats—with the exception of the NB8 and its cyber and connectivity workstreams—appear to have dedicated or highly developed tracks for digital cooperation. Nor do they bring together all members of the CEE region in a concentrated effort to strategize digital advancements.

The Three Seas Initiative has, perhaps, gathered the most momentum in recent years and stands out among the other efforts in several regards. For one, the initiative encompasses all eleven countries of Central and Eastern Europe, plus Austria, and has focused on regional infrastructure links in energy, transportation, and telecommunications/digital to advance interconnectivity, especially along the region's north-south axis. It combines that investment and infrastructure rationale with a more subtle, but no less important, geopolitical one. Growing EU and US engagement with the Three Seas Initiative is, in no small part, motivated by the recognition that an economically vibrant and interconnected CEE region is of vital importance for Europe's overall resilience and cohesion in an increasingly competitive geopolitical environment.

Since its launch in 2017, the initiative has built up significant buy-in by national leaders from across the twelve participating countries. After some initial labor pains in reconciling the concept within the framework of the EU, the European Commission and major non-CEE member states such as Germany have become more fully engaged. The 3SI also offers a unique transatlantic link for the region, as the United States government has been directly and deeply engaged since its inception. In February 2020, Secretary of State Michael Pompeo pledged $1 billion for the Three Seas Initiative Investment Fund through the US International Development Finance Corporation. The powerful combination of tangible infrastructure projects, three priority areas of key relevance to the region, engagement from CEE leaders, US involvement, and a designated 3SI investment fund have created momentum and potential for impact for the Three Seas Initiative that is missing from many other regional or subregional efforts.

However, on the digital policy front, the Three Seas Initiative continues to punch below its weight. The digital pillar remains largely underdeveloped when compared to its cousins in energy and transportation. While the latter two now include dozens of projects designated for cooperation and the investment fund, the digital list remains far less populated, and is concentrated on telecommunications projects. There is a noticeable lack of cooperation on either emerging technologies, such as 5G or artificial intelligence, or of emphasis on the digital policy and regulatory dimension. The reasons may be varied. For one, digital infrastructure plays a relatively less visible role in advancing digitalization than physical infrastructure does for energy security or transportation links. Once broadband is securely in place, it is almost out of sight, out of mind—few think of how a successful "digital highway" provides the backbone of continuous innovation in both hardware and software components or enables new online services. A new fiber-optic cable connection also provides much less of a photo opportunity for political decision-makers than a new power plant and remains less tangible to the public than a new highway. Perhaps more importantly, digital infrastructure and technology are seen as the predominant domain of private actors and capital, whereas energy and transportation have traditionally been sectors characterized by much higher degrees of public-sector involvement and investment. And, agreement on large-scale infrastructure projects with tangible benefits for two or more countries is easier to find than consensus or convergence on regulatory policies.

Whatever the exact reasons for a lack of digital policy focus in the past, the Three Seas Initiative continues to hold promise for more formalized collaboration to drive forward digitalization in the CEE region. Estonia, a digital frontrunner, holds the 3SI presidency in 2020. As the agenda setter for the annual 3SI summit, Tallinn has worked to translate its own tech experience and expertise—from e-governance to cybersecurity and digital innovation—into laying the foundations for greater regional cooperation on digital matters. Released at the summit, its vision paper on smart connectivity, for example, lays out how cooperation on digitalizing key infrastructure projects could have a significant impact on the broader ecosystem for economic growth and

innovation.[41] Even beyond 2020, the 3SI format will provide a potential building block for greater cooperation and coordination among CEE countries on a regional digital agenda. Two tracks might be of particular importance here.

First is a better linkage between the more developed energy and transportation pillars on the one hand, and the digital pillar on the other. Through support from the 3SI investment fund, hybrid solutions in the former two areas could help the region leapfrog ahead. As aging energy infrastructure across Central and Eastern Europe comes due for significant renewal in the coming years—and as transportation links, especially in the bigger CEE countries, need further expansion—hybrid infrastructure elements that combine physical and digital elements could make the region a leader in this area. Such improved interlinkages in energy and transport projects with digitalization could also offer tech firms in the region opportunities to develop new solutions at scale and for wider application.

Second, a greater focus in the Three Seas Initiative on policy coordination and joint standard setting among CEE countries could be a major step ahead for the region's digital ambitions. As suggested below, enhanced coordination and stocktaking of digital policies and progress among 3SI governments could help better represent the region at a European level.

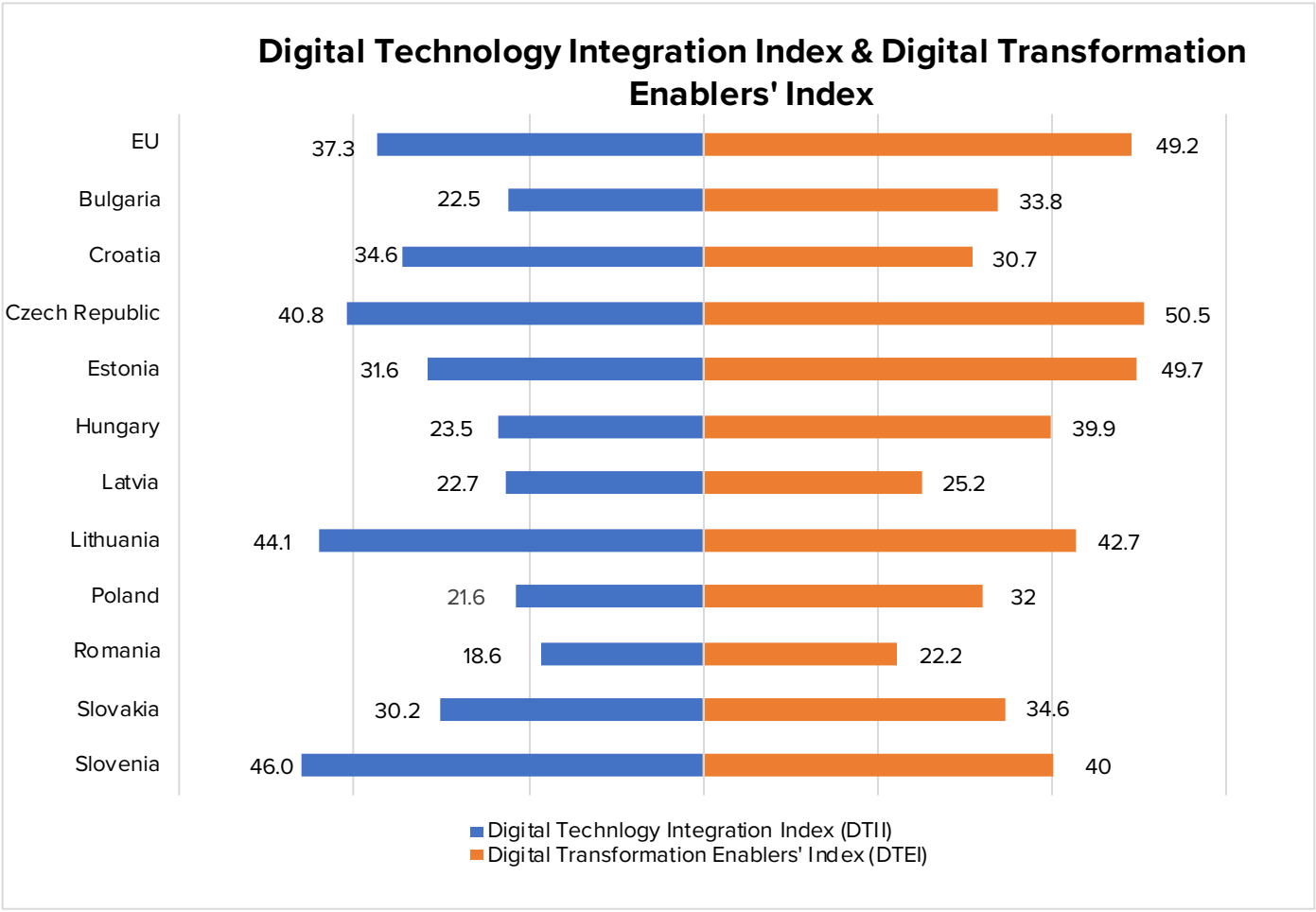
41 "Smart Connectivity," Ministry of Economic Affairs and Communications of the Republic of Estonia and DAI, October 2020, https://3*seas.eu/event/smart-connectivity*.

Principles For Driving CEE's Digital Transformation

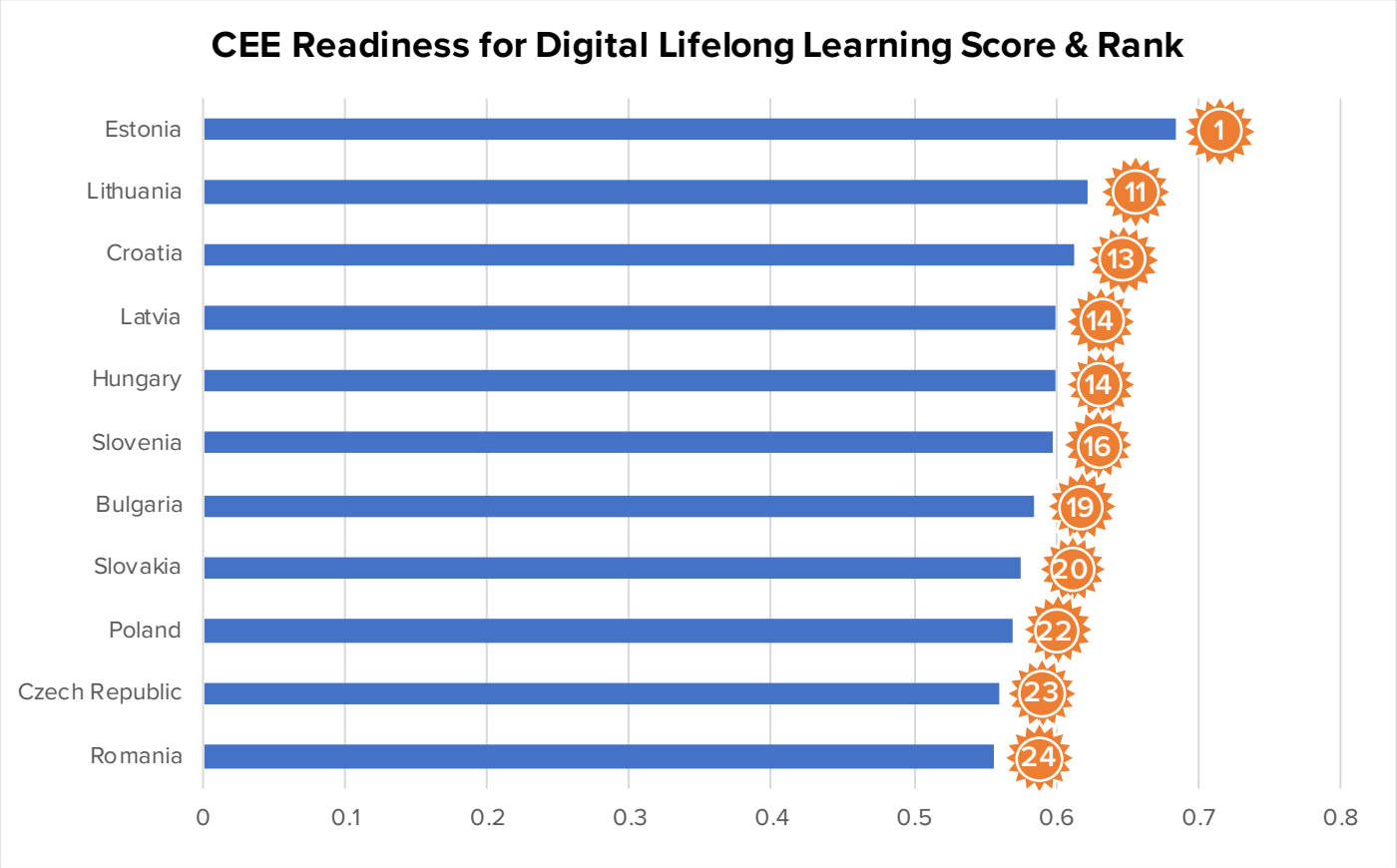
As Central and Eastern Europe assesses how best to move forward on digitalization, it must develop a set of principles and priorities that can help guide and galvanize regional policy action. In doing so, governments should both address the region's most pressing challenges and decide how to best leverage existing strengths to build greater cooperation on technologies and policies. A shared set of guiding principles would help governments across Central and Eastern Europe multiply the effects of public-sector action and strengthen an overall ecosystem conducive to deeper digitalization, value creation, and innovation. Concerted CEE regional action would also signal to the policymakers, business leaders, and investors in the rest of Europe, in the United States, and elsewhere that Central and Eastern Europe is serious about the digital transformation of its economies. The following principles should guide digital policy action and regional cooperation:

KEEP THE BIG PICTURE (AND ECOSYSTEMS) IN MIND

Government decision-makers should keep a holistic perspective of digitalization. As they approach digital transformations and related policy decisions, they should resist focusing only on the latest emerging technology, whether AI, quantum computing, or robotics. Instead, policymakers should consider what combination of emerging



Definition: The DTII is based on EU DESI scores for the integration of digital technology. The DTEI scores EU member states on their enabling conditions and enabling environment including infrastructure, access to finance, demand and supply of relevant skills, and entrepreneurial culture.
Source: European Commission, Digital Transformation Scoreboard 2018



The 27 EU member states were scored on learning participations and outcomes, institutions and policies for digital learning, and availability of digital learning. Source: Centre for European Policy Studies, Index of Readiness for Digital Lifelong Learning, *https://tinyurl.com/y365d6bs*

technologies can best be leveraged to transforming their country's existing industries. They should also assess where an "entrepreneurial state" can make a real difference in shaping the wider ecosystem of digitalization as a whole by focusing on key enablers of digital transformation.[42] To the extent possible, such efforts should factor in the horizontal impact of digital technologies across sectors and applications. Policymakers should also avoid trying to pick winners among still-emerging and evolving technologies—or, in other words, remain technology neutral.

Almost all of the emerging technologies, digital-infrastructure elements, new processes, novel applications, and big data in the focus of today's digital debates are highly interdependent and developing in some combination. 5G, robotics, AI, the IoT, blockchain, and big data, by themselves, are each powerful innovations—and sometimes deceiving distractions on their own. Almost all play some role in each other's development. It is really when combined that they are expected to have transformational effects on a wide range of sectors, from advanced manufacturing and autonomous vehicles to logistics and financial services. Similarly, high-performance computing delivers its full potential as it converges with cloud-based services and leverages big data, with far-reaching implications for innovation and research and development (R&D) across sectors. Combine all of that with the study of new demands on government policy, regulations, and human capital, and the need for a holistic approach to digital transformation emerges.[43]

In this context, it may make more sense to ***approach emerging technologies through their applications in specific sectors.*** Given the importance of manufacturing for growth and employment for countries throughout the region, CEE governments and stakeholders could, for instance, bring together expertise on Industry 4.0 rather than focus on 5G, robotics, or AI in a vacuum. Understanding how these trends and technologies of a Fourth Industrial

42 Nagy Hanna, "A Role for the State in the Digital Age," *Journal of Innovation and Entrepreneurship* 7, July 16, 2018, *https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-018-0086-3*.

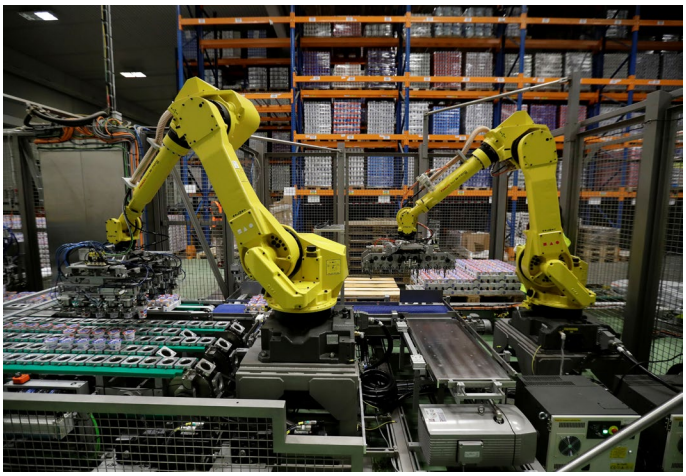
43 Ibid.

Revolution—driven by the Internet of Things, AI and machine learning, robotics, and machine-to-machine (M2M) communications—will transform manufacturing, and even business services, will be essential to any economy. But that is especially true for Central and Eastern Europe, with its heavy reliance on some of these most vulnerable sectors. There are already national efforts under way, for example with the Future Industry Platform in Poland, on which a regional effort could build.

As CEE governments assess their digitalization strategies and cooperation with their neighbors, they should keep in mind the importance of dynamic ecosystems for digital advances, innovation, and competitiveness. Shaping the right environment will require both long-term commitment and flexible strategies to adjust to rapidly changing technology trends and their unforeseen knock-on effects. While governments cannot themselves create the right ecosystem, they have a role to play in influencing some key factors. The policy and regulatory environments come to mind first. But the public sector has also been an important player in instigating and funding the basic research that has led to pillars of the first phases of digitalization, starting with the Internet. Policies and financial incentives that advance broadly based access to digital infrastructure can help drive both innovation and digital inclusion. E-government initiatives in digital-frontrunner countries have also helped promote the diffusion of important technologies and applications among small and medium-sized enterprises for instance.

BUILD A WORKFORCE FOR AN INNOVATION ECONOMY

The societal impact of digitalization trends on the future of work, reskilling and upskilling requirements, and other aspects of human capital are all part of the digital ecosystem, and should figure in such a comprehensive approach as well. While far from unique to the CEE region, disruption and displacement as a result of automation and the application of AI, automation, and other emerging technologies could hit Central and Eastern European workforces especially hard over the next few decades. Skillsets required of workers will change dramatically, and even newly acquired skills may become obsolete more quickly. For example, the McKinsey Global Institute estimates that demand for technology skills will double by 2030 in terms of hours worked and compared against manual, basic cognitive, or social skills. Around 9.9 million jobs in CEE are estimated to be at risk due to COVID-19 and about 36 percent of these jobs could also be displaced by automation by 2030. COVID-19 may be accelerating changes that will lead to even faster automation. At the same time, CEE education systems



Robotic arms sort and load yogurts onto pallets at a distribution centre near Prague, Czech Republic, February 17, 2020. Picture taken February 17, 2020. *REUTERS/David W Cerny https://pictures.reuters.com/archive/EASTEUROPE-AUTOMATION--RC29GF93GWJK.html*

appear to underperform in those very skills categories that are expected to see higher demand, especially advanced IT skills and programming.[44] While many of the region's countries have elite IT specialists among the best in the world, large parts of the general population show below-average digital skills and usage.

Meeting this challenge will require both a continuous assessment and learning process of which sectors, careers, and skills are likely to be most impacted, and a nimble education system to respond with limited lag time and appropriate skills programs. CEE countries will have to build the institutions and capacities for both. Closer cooperation of policymakers, industry, and the education sector will be key to the success of managing such continuous changes. The region could turn to digital frontrunners and pioneers in reskilling from Denmark to Estonia among its own ranks to establish, examine, and adapt best practices for its own needs. ***The digital transformation may require a parallel transformation of educational institutions***—especially the publicly funded university that continues to be the backbone of STEM education in Central and Eastern Europe, and which may have to shift its business model toward more continuous learning. A greater focus on applied research and stronger collaboration with industry could help link university education and ever-changing demands on skills.

Strategies from previous skills shifts and technological transformations may also be instructive. As a region, Central and Eastern Europe could, for instance, look at the land-grant university system in the United States as inspiration. Since the 1860s, this publicly funded system was instituted at existing universities through government grants, and then continuously updated to advanced higher learning

44 Novak et al., "The Rise of Digital Challengers," 30–32; Novak et al., "Digital Challengers in the Next Normal," 6-7.

and skills dissemination in agricultural and mechanical arts. This has since expanded to other technical and scientific fields, but three functional pillars remain the backbone of land-grant institutions—teaching, research, and extension. The emphasis is on the practical application of research and bringing research findings to practitioners through a network of field offices. As part of this so-called "extension" element, experts work directly with those who can put research to practice. Today, the system is widely considered a foundation of US advanced agriculture.[45]

While the pace and scale of change in today's digital sectors may be different, establishing departments at a number of existing universities and vocational schools across the region—dedicated to the study of digital transformations across major sectors and the practical implications for the workforce, skills, and training—could be a game changer. If linked up throughout the region and connected with industry, such a network of educational and skills institutions could more rapidly identify trends, build a body of best practices for both skills and training, and deliver these to individual workers or sectors. CEE countries could develop common criteria for these schools, develop common standards for research, training, and professional certification, and promote exchanges.

With their focus on skills development and dissemination, these universities could also be embedded in technology clusters discussed below and be linked to the European Digital Innovation Hubs (EDIHs) in the region. This, in turn, could help to improve collaboration between industry and the education sector to strengthen applied research, foster commercial spin-offs of university projects, advance technology adoption by startups and small and medium enterprises (SMEs), and give these smaller actors greater access to some of the talent and assets of universities. Over time, such institutions and the networks in which they become embedded could become anchors of a more dynamic and attractive ecosystem that would help retain talent and begin to roll back the tech brain drain plaguing the region. With a broad educational mission and linkages into communities, this network of universities could also become champions of greater digital inclusion among the broader population.

THINK CEE AND DESIGN FOR REGIONAL IMPACT

In developing and mobilizing regional cooperation on such cross-cutting issues, decision-makers should also ensure ***projects and initiatives are of the region, not merely in the region.*** In other words, as Central and Eastern European policymakers think about how to advance regional vehicles for collaboration, they should focus scarce resources and political capital on initiatives and projects with clear gains for CEE cooperation, knowledge transfers, connectivity, standard setting, or thought leadership on digital policy matters.

With the benefits of healthy competition in mind, cooperation should not be taken to mean that all CEE countries ought to act uniformly, or at once, on digital policy or abandon national initiatives. Greater regional cooperation should also not require full consensus or come at the expense of policy initiative and innovation. In fact, ***coalitions of the willing and clusters of cooperation around certain technologies and their applications, rather than a consensus approach, may hold the biggest potential for kick-starting and advancing regional cooperation.***

Where groups of CEE countries have a comparative advantage, existing expertise, or complementary specializations, and see the benefits of working together, they could move ahead to form technology or innovation clusters. Not dissimilar to NATO's Framework Nations Concept from the realm of defense policy, such an approach could combine "flexible participation and structured cooperation that finely balances concurrent, and sometimes competing, requirements to protect and promote sovereignty, autonomy, cooperation, competitive advantage, [and] division-of-labor."[46] It could allow a degree of flexibility to accommodate existing—and necessary—competition among governments and commercial actors across the region, while harnessing the benefits of innovation, interconnectedness, and knowledge or technology transfer for the parties involved. As discussed above, a more concerted approach at linking actors with distinct but complementary specializations could enhance the competitiveness of sectors across the region—not vis-à-vis each other, but with a view to other competitors at the European and global levels.

These clusters could serve as platforms to convene very operationally focused groups of countries—where possible, with both public- and private-sector participation—to develop tailor-made solutions, share lessons learned and best practices, develop common standards in emerging technology areas, promote exchanges among experts and innovators, provide seed funding, or otherwise advance digital transformations in a given field. These groups could also establish informal or formal linkages to public- and private-sector partners in other non-CEE EU countries and

45 Genevieve Croft, "The US Land-Grant University System: An Overview," Congressional Research Service, R45897, August 29, 2019, *https://fas.org/sgp/crs/misc/R45897.pdf*.

46 Diego Ruiz-Palmer, "The Framework Nations' Concept and NATO: Game-Changer for a New Strategic Era or Missed Opportunity?" NATO, July 20, 2016, *http://www.ndc.nato.int/news/news.php?icode=965#*.

the United States to improve access to wider expertise, capital, and potential customers. Indeed, depending on existing specializations and supply-chain integration, some CEE countries might find it more productive to include major non-CEE partners in relevant technology clusters. The Central European Five, for instance, may want to bring German participation into a cluster on advanced manufacturing and automation, given existing value-chain linkages to their western neighbor. The Baltic countries have an interest in including Swedish and Finnish partners, given close links on the expansion of 5G with the creation of the Nordic-Baltic 5G initiative.

The Three Seas Initiative, through its digital pillar or another regional format, could kickstart a more concerted, comprehensive approach to such a cluster model and help jumpstart this to form regional coalitions of the willing. For example, the country holding the rotating 3SI chair could initiate a call on all of its CEE members to submit their top-three digital policy strengths and priorities. From the submissions, a matrix would emerge that could help structure cooperation along technology fields and/or digital policy priorities. Where top priorities overlap, the 3SI would then provide a framework for the relevant countries to convene as operationally focused working groups, from e-government to the application of AI to the energy sector. This matrix would, thus, identify regional overlaps and projects that are ripe for collaboration. From this database, technology clusters and coalitions could naturally emerge.

To mirror these "technology clusters", the public sector should also develop new models of policymaker cooperation and stakeholder engagement. As the pace of technological change accelerates, the interplay of different emerging technologies grows more complex, and their interaction with policy and regulatory issues becomes hard to anticipate, policymakers will face increasing challenges. To overcome this complexity and information lags, they will have to draw more regularly on both best practices from peers and external experts from a wide range of industries, disciplines, and other interested groups.

The EU has already tested a pilot project, "DigitaliseSME," that matched SMEs with digital experts from across Europe for a limited term to help digitalize a range of businesses.[47] This exchange enhanced digitalization in a variety of industries, including textiles, wholesale, tourism, agriculture, and more. Applying this model, CEE countries with the help of EU support could turn this into a more permanent program. This would facilitate interchange between experts to advance digital transformation through consultations on issues including, industry 4.0, e-governance, smart cities, and e-health. A knowledge repository would allow the examination and distribution of best practices that emerge from such an exchange or other regional initiatives. This repository could be held by the Three Seas Initiative or a university hub, and should be accessible for all stakeholders—governments, businesses, and researchers—to enhance learning and regional exchange. Governments can also use the repository to identify practices that are worth converting into domestic legislation or policy initiatives. Together, these two elements—the exchange program and the knowledge repository—could also be linked to the European Digital Innovation Hubs in the region, as promoted by the European Commission.

A regional approach to both technology clusters and corresponding stakeholder-policymaker dialogues could become mutually reinforcing. Given the different strengths and specializations of CEE countries across digital disciplines, regional dialogues would also help to foster best practices and knowledge transfers for public-sector decision-makers in Central and Eastern Europe. A good starting point could be a regional council of chief information officers and chief technology officers of key digital-sector companies, governments, and public authorities. This forum should include the CIO/CTOs of large regional players in infrastructure, including energy and transportation. This would not only help to inform the digitalization of these sectors, but also help address important opportunities and "pain points" for the region (see below). It could also strengthen the linkages among the 3SI pillars. Such a format for regular public-private sector dialogue should focus on follow-through from regional policy initiatives, cooperation projects, and coordination efforts at EU level.

INVEST IN INFRASTRUCTURE

Investment in digital infrastructure as the foundation of connectivity has the potential for significant gains and long-term effects for the economy as a whole. This does not relegate the importance of physical infrastructure. Indeed, some CEE countries continue to struggle with outdated, underdeveloped, or nonexistent infrastructure, and must dedicate massive resources to construct roads and bridges. But digital and physical infrastructure are not mutually exclusive. Investment in digital infrastructure supports broader economic and productivity growth. One study of US multinationals, for instance, suggests that for every doubling of IT capital, these companies increased their productivity by 5 percent.[48] In another study, researchers estimated that

47 "DigitaliseSME: Enabling the Digital Transformation of European SMEs," DigitaliseSME, February 2020, *https://tinyurl.com/y2g4kc4e*.

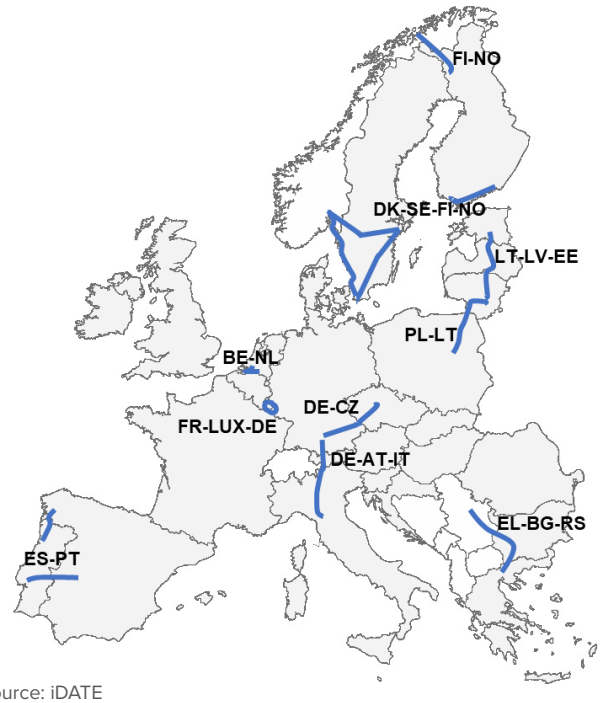
48 Caleb Foote and Robert D. Atkinson, "Does Investment in Physical Infrastructure Really Drive Growth," Information Technology & Innovation Foundation, April 20, 2020, *https://tinyurl.com/y5oddpcc*.

the European Union could add $315 billion to its GDP if it built up its digital infrastructure to the level achieved by Norway in 2011.[49] And, the COVID-19 pandemic has highlighted the critical importance of digital connectivity—and, by obvious extension, that of digital infrastructure—for business continuity and economic resilience.[50]

Just as importantly, ***digital infrastructure plays a crucial role as a key enabler of digitalization and innovation.*** Both designated digital infrastructure (which is by its very nature digital, such as broadband, 5G, fiber-optic cables, data centers or server farms) and hybrid infrastructure (which combines more traditional infrastructure with IoT, AI, and other digital components, such as smart electricity grids, smart cities, or the EU's "digital cross-border corridor" highways) form important parts of the broader digital ecosystem. In order to stay competitive in the digital economy, Central and Eastern Europe should focus on upgrading its digital infrastructure, bringing greater connectivity to rural areas, and increasing the capacity of its networks. 5G with its potential impact on the speed, capacity, performance, and application of other technologies is one example, but hardly the only one. Equally important for future connectivity are unlicensed millimeter-wave bands such as 60 GHz that offer telecommunications operators to bring gigabit connectivity almost anywhere at low cost. Ultimately, all wireless technologies also rely on a fiber backbone. Bureaucracy, high prices for right-of-way permits, and obsolete building codes can interfere with the quick buildup of fiber. Governments should focus their regulatory efforts to ease deployment of fiber-optics networks and also promote initiatives such as open-access networks to incentivize sharing and reduce high costs associated with trenching.

In its narrower, "hardware-centric" definition above, digital infrastructure is also interwoven with a variety of cloud-based applications and processes. "Everything-as-a-service" ranges from the most commonly used "Software-as-a-Service" (SaaS) applications—think customer-relationship management software for instance—to Platform-as-a-Service (Paas) and Infrastructure-as-a-Service (Iaas).[51] In this context, data centers required to host these services play a crucial role and are another area where in which CEE countries should attract further investment to enhance the region's digital infrastructure. The location of data centers enables higher bandwidth and lower latency, enhancing user experience. Speed of data processing is crucial for existing industries in the region and the development of future technologies, from advanced manufacturing to autonomous cars. Milliseconds

5G Route Map



Source: iDATE

will be decisive when smart vehicles process data to optimize traffic flow and avoid collisions. Thus, the strategic placement of data centers in Central Europe will improve the transmission of data and impact economies across Europe and neighboring regions, such as the Middle East. Recent announcements by Google and Microsoft of investments in data centers in the region signal that important players in the digital economy seem to recognize the opportunities Central and Eastern Europe offers in this regard.

High-performance computing (HPC) is another essential element of digital infrastructure with potentially transformative implications for businesses, research, and public-sector strategies in the region. As an emerging all-purpose technology often used in combination with big data, cloud-computing solutions, and AI, "supercomputers" deliver higher-performance computations—currently at up to one quadrillion calculations per second—to solve large and complex problems in science, engineering, or business.[52] HPC is widely expected to become an increasingly important driver of innovation and competitiveness for small and large businesses, and their adoption of digital technologies. However, a European Investment Bank (EIB) study found

49 Ibid.

50 "ICT Spending Growth in Central and Eastern Europe in 2020 Expected to Fall Short of Previous Year," International Data Corporation (IDC), February 4, 2020, *https://tinyurl.com/y5lwhggt*.

51 Stephen Watts and Muhammad Raza, "SaaS vs PaaS vs IaaS: What's The Difference and How To Choose," *BMCblogs*, June 15, 2019, *https://tinyurl.com/yblxg8bg*.

52 G. Sravanthi, B. Grace, and V. Kamakshamma, "A Review of High Performance Computing," *IOSR Journal of Computer Engineering*, 16, 1, February 2014, quoted in *https://tinyurl.com/y4nvgr2y*.

that while demand for HPC is growing, Europe as a whole is lagging behind and faces significant financing challenges.[53] Central and Eastern Europe is currently home to only two of the top five hundred supercomputers globally.[54] There are EU initiatives under way to address shortcomings in HPC and accelerate the development of the next generation of this technology. But, further CEE cooperation in this area, especially in securing joint funding, could help ensure the region's researchers and innovators will have access to this critical piece of digital infrastructure and transformation.

As discussed above, Central and Eastern Europe shows both strengths and weaknesses when it comes to important elements of digital infrastructure. Broadband connectivity in many CEE countries, for instance, is catching up with other EU members even though important gaps remain. According to 2020 DESI report, for instance Poland, Bulgaria, and the Baltic countries rank above the EU average in mobile broadband penetration. An EIB study also found that few companies view digital infrastructure as a barrier to investment in individual CEE countries.[55]

In order to address existing weaknesses in these areas and ensure the region is ready to take digital development to the next level, CEE governments should address some of the most fundamental questions for digital infrastructure: who pays, what incentives can governments provide, and in which areas can the public sector and its financial incentives make the biggest impact? Rural connectivity seems an obvious choice. The eventual rollout of 5G networks might create additional demands.

The challenge of mitigating the involvement of high-risk vendors in key digital-infrastructure components such as 5G-network equipment could offer another opportunity for Central and Eastern Europe to not only play to existing strengths, but also sharpen its policy profile. A number of countries have already aligned with an initiative from the US government to exclude such vendors from their 5G expansion, or are moving in that direction.[56] The European Commission's January 2020 toolbox for secure network infrastructure provides further guidance, but consensus among member states has yet to form.

CEE countries could leverage their historical credibility from their transitions to democracy at the end of the Cold War, their subsequent political leadership in countering foreign interference from Ukraine to Belarus, and their serious cybersecurity capabilities to chart a way forward for regional, EU, and transatlantic convergence on secure networks. The region could take the lead and start with a working group to develop practical solutions and policy agreement for some of the most protracted issues, such as coordination in implementing the EU cybersecurity toolbox for 5G networks, defining what level of security is required for which parts of 5G infrastructure, and developing shared criteria and processes for assessing vendors. The grouping could work on regional or EU proposals to help wireless operators overcome externalities from having to move away from high-risk vendors and toward more secure, but also more expensive, alternatives. By investing political capital and expertise in this issue area, CEE actors could not only prove that the region has important policy know-how to contribute to EU debates, but also strengthen EU and transatlantic cooperation on a central issue in geopolitical competition.

INVEST IN INNOVATION, NOT IMITATION

As discussed above, a key strategy that has underpinned Central and Eastern Europe's current growth model, and has served the region well since the 1990s, has been to focus on integration in existing manufacturing supply chains and providing back-office, logistics, and other support services (business process outsourcing) for Western European economies. This largely follows the growth strategies and beaten paths of developed Asian economies from South Korea to Taiwan. However, digitally fueled technological transformations are fast changing the rules of the game and levelling playing fields in entire industries, putting knowledge-intensive, innovation-centric strategies front and center. In the short to medium term, Central and Eastern Europe, much like many other players in the global economy, will have to shift gears in a variety of ways to sustain growth and development.

Against this backdrop, one of the guiding principles for the region should be to identify and prioritize opportunities where the region can ***benefit from higher value creation***. Currently, Central and Eastern Europe is more of an outsourcing destination rather than an added-value destination, and remains vulnerable to the success or failure of industries elsewhere in Europe. Even before the COVID-19 pandemic, the slowdown in Germany's economy in 2019 had some analysts worried about growth in those CEE countries most deeply integrated into German supply chains.

53 Björn-Sören Gigler, Alberto Casorati, and Arnold Verbeek, "Financing the Future of Supercomputing: How to Increase Investment in High Performance Computing in Europe," European Investment Bank, 2018, *https://www.eib.org/attachments/pj/financing_the_future_of_supercomputing_en.pdf*.

54 "Top500 List—June 2020," Top500, accessed October 9, 2020, *https://www.top500.org/lists/top500/2020/06/*.

55 "European Investment Bank Investment Report 2019/2020: Accelerating Europe's Transformation," European Investment Bank (EIB), 2019, *https://www.eib.org/attachments/efs/economic_investment_report_2019_en.pdf*.

56 Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia, and Slovakia have signed 5G agreements with the United States. For further details see US Department of State, 5G, *https://www.state.gov/subjects/5g/*.

Rather than focusing merely on attracting more manufacturing as part of an anticipated reshoring or near-shoring of global supply chains in the wake of COVID-19 or as part of broader realignments, CEE countries should focus on building clusters and specializations that align with CEE digital strengths and can create higher value in the region. The same applies to efforts at recreating existing digital success stories with a regional or European flavor. Such a focus on adding value may include incentivizing CEE industries that have not traditionally been digital or tech oriented to adopt new digital technologies and processes.

Similarly, the region should identify areas where its specialization or technology leadership can create ***strategic market demand through innovation from its own tech entrepreneurs.*** Generating such demand for a product or service drives innovation and value creation. Unless there is a market for Central and Eastern Europe's niche capabilities, such companies, sectors, and specializations are not commercially viable. For example, if CEE governments were to identify the energy sector as an area where innovative applications of AI have the potential to increase efficiencies and lower the cost of energy bills, this could provide much-needed certainty and incentives to entrepreneurs and investors. This would allow CEE companies to develop new applications of digital technologies in that sector and assume a leadership position in a new market segment. It would also trigger demand beyond any one country—and even the CEE region itself—and, thus, allow companies to scale up. The region's energy sector, where the need for infrastructure replacement and renewal is well known and predictable, might be a prime candidate for such an approach, but requires cooperation across countries to create scale.

Much like these first two areas, a focus on ***"leapfrogging" forward through digitalization*** could make a strategic difference for the region. Driven by big data, AI, 5G, and advanced manufacturing, the next phase of digital transformation will have horizontal effects across sectors and industries, and is becoming a leveler of playing fields. Central and Eastern Europe currently has a four-year lag in Internet access, and a two-year lag in mobile broadband, compared to the EU-15.[57] At first glance, this seems reasonable and surmountable, until one considers that within a four-year period from 2003 to 2007, tech giants from Facebook and Twitter to YouTube emerged and revolutionized the Internet and business models. The digital landscape transforms so quickly that even a few years of lag in basic digital capacities could be a serious detriment to Central and Eastern Europe's longer-term competitiveness. Instead of simply striving to catch up, the region must double down on innovation to skip steps and developmental stages to leapfrog ahead.

CAPITALIZE ON FORCE MULTIPLIERS

As much as CEE policymakers and stakeholders must focus on leveraging existing strengths to drive growth and innovation they should also target strategic areas with existing inefficiencies, or other challenges where advances through digitalization could create transformative effects and spillover effects for the economy as a whole.

One of the most promising areas is that of digital public services. Digitalizing citizen and business interactions with government services can raise public-sector productivity and bring cost savings. As the COVID-19 pandemic has shown, it is also a key factor in ensuring business continuity for public authorities and their clients. In addition, ***advanced digital public services can contribute to innovation and help diffuse technologies and applications from public authorities to business clients***—especially small and medium-sized businesses.

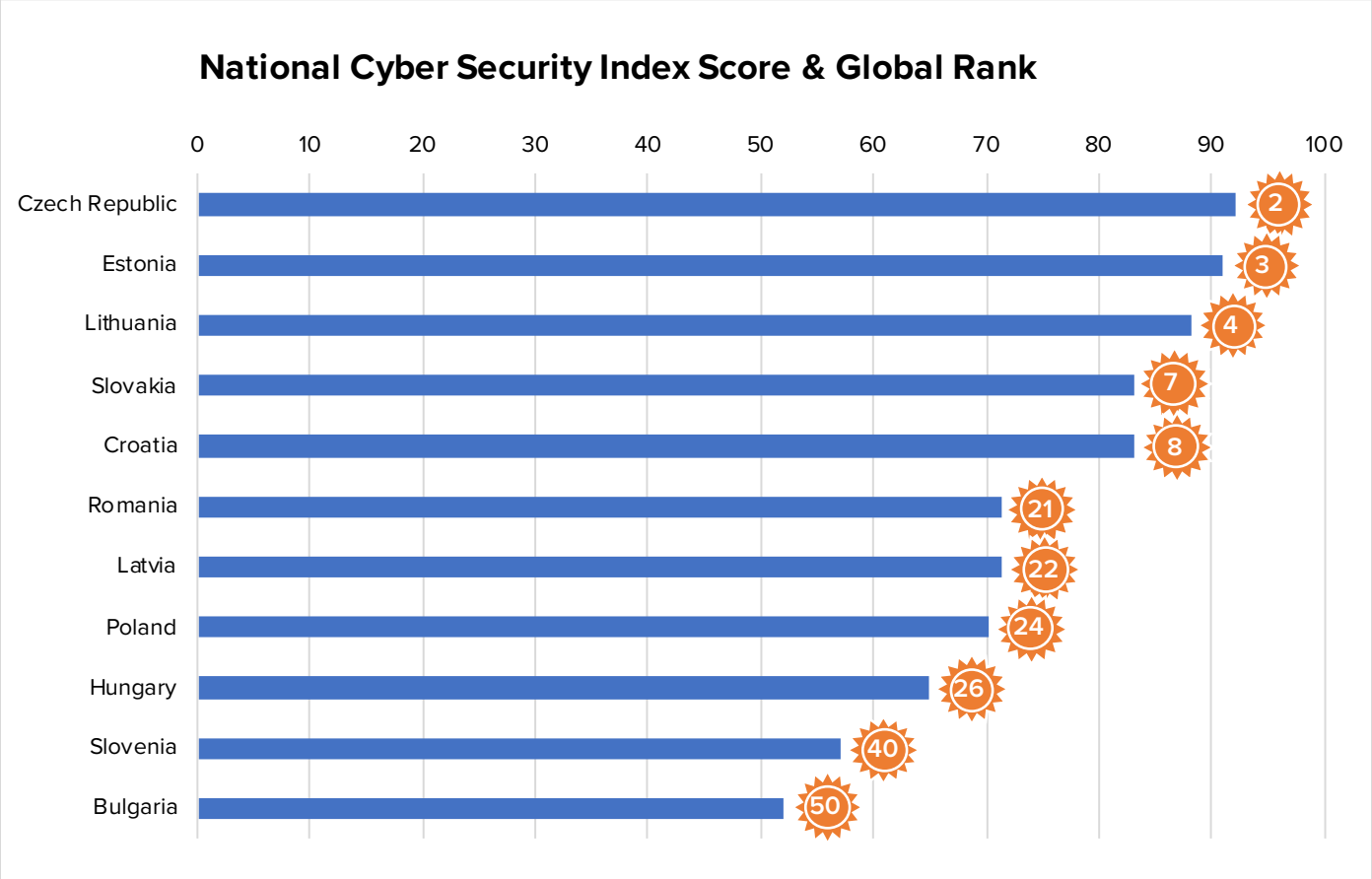
Beyond the mere accessibility of government services, or e-government, the OECD's more advanced data-driven public-sector (DDPS) model entails a deeper integration of emerging technologies and data-centric solutions across government. This approach "recognizes data as an asset, integral to policy making, service delivery, organizational management and innovation." Such whole-of-government transformation could lead to greater foresight capabilities, improved evidence-led policymaking and monitoring, data-backed service design, and greater public transparency and trust.[58]

In the area of digital public services, Central and Eastern Europe continues to lag behind. Clearly, the Baltic powerhouses, led by Estonia, are the exception, and even take leading roles in developing digital public services. But, the region as a whole comes in 10 percent below the EU average of the European Commission's eGovernment Benchmark 2019 study across four top-level indicators.[59] As CEE countries grapple with the challenging tasks of effective public-sector digitalization, such as a secure digital ID and interoperability across agencies at local, national, and sometimes EU levels, they should work with each other and their respective tech sectors. A one-size-fits-all approach

57 "CEE Region's Fastest Convergence is Happening in Digitalization."

58 Charlotte van Ooijen, Barbara Ubaldi, and Benjamin Welby, "A Data-Driven Public Sector: Enabling the Strategic Use of Data for Productive, Inclusive and Trustworthy Governance," Organisation for Economic Co-operation and Development, 2019, 5, *https://tinyurl.com/y2vdzgtr*.

59 "eGovernment Benchmark 2019: Trust in Government is Increasingly Important for People," European Commission, October 18, 2019, *https://tinyurl.com/y4wyfshk*; "Citizens at the Centre: Building Digital Public Services in CEE," PricewaterhouseCoopers, 2020, *https://tinyurl.com/yytauwld*.

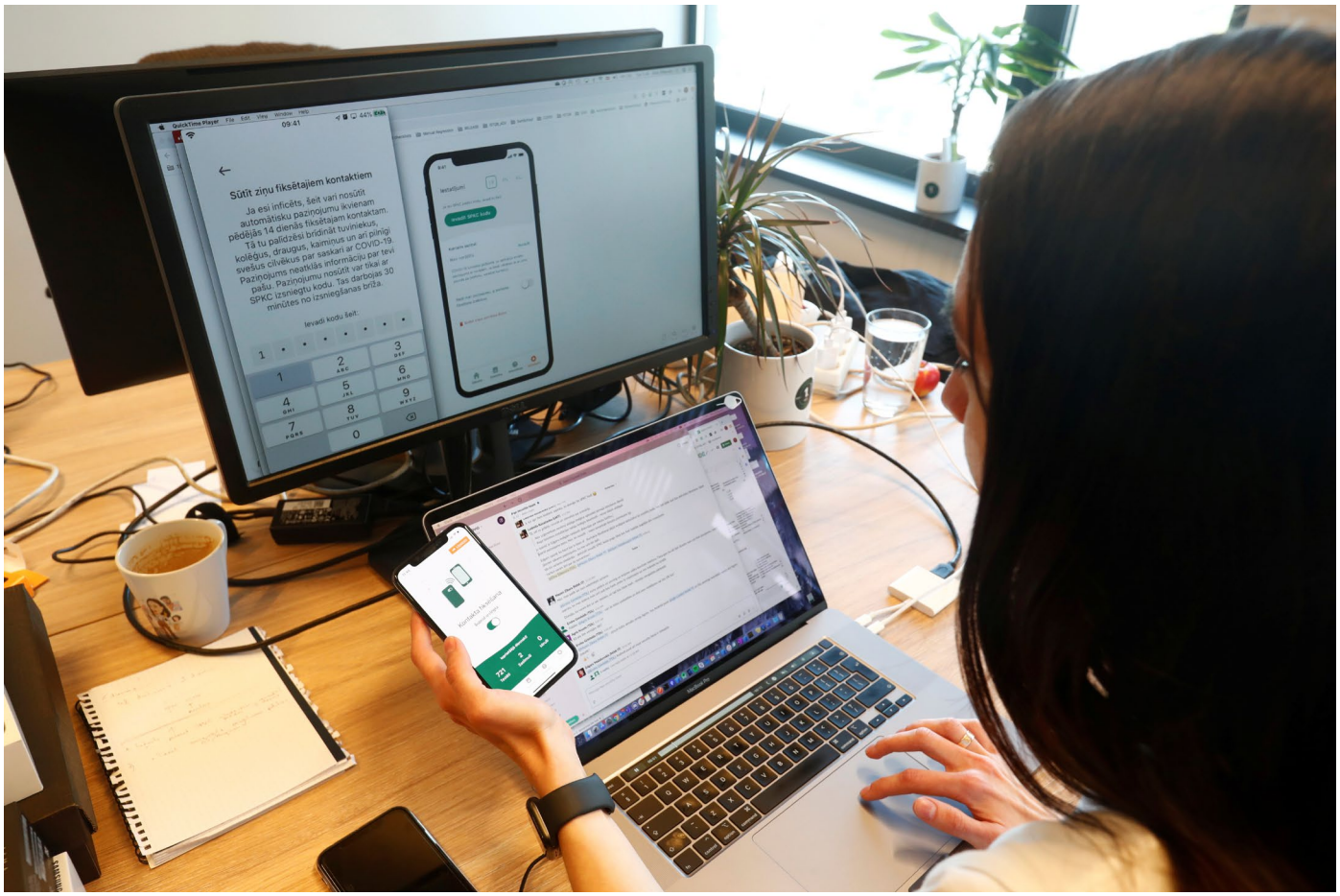


Source: National Cyber Security Index, *https://ncsi.ega.ee/ncsi-index/*

seems to be a misfit, as the experience of Estonian models offered to other countries in the region and beyond seem to show. Especially where sensitive national data are concerned, governments may want some degree of control through national tech partners. Ultimately, few public sectors in the region are of a size that would allow tech partners to scale up solutions they develop. Again, clusters of countries and cooperation on the basis of complementarity may offer a way forward here, where part of the architecture can be developed jointly while some solutions will rely on local partners. Such cooperation could also serve to expand on and advance common EU standards in this area.

Cross-border public services are another area with potential for Central and Eastern Europe to drive real transformation and regionally sourced solutions. Directly related is the need to adapt existing public-procurement procedures to the realities of the digital age. CEE countries could lead the way in reviewing their own rules within the framework of European legislation and see what changes and new standards could promote competition and transparency, while also accommodating greater degrees of agility and flexibility that characterize the development of software and digital services, for instance. In logistics, freight documents continue to be largely processed in paper format across Europe. Only twelve EU member states have thus far acceded to the e-CMR treaty requiring digitization of freight documents, and implementation lags behind. The NB8 have a specific e-CMR initiative, and this could be extended to other interested CEE countries to drive deployment and new standards. In its vision paper on smart connectivity, the Estonian Three Seas Initiative presidency also identified cooperation on fully digitalized and automated cross-border procedures in the region and at a European level as one of the most promising ideas for smart mobility.[60] Secure e-ID with EU, or at least region-wide, certification could be another area of cooperation. All of these fields could have very real benefits, especially for small and medium-sized businesses seeking to operate across the region. They would also allow CEE countries to create economy-wide spillover effects and assume leadership in Europe-wide standard setting. The proposed CEE digital ministerial could further identify heavily analog or paper-based processes in public services where digitalization and common standards could drive productivity gains, cost savings, and technology leadership.

60 "Smart Connectivity," 16-17.



Tester Elina Siskevica tests Apturi Covid (Stop Covid) application amid the spread of the coronavirus disease (COVID-19) in Riga, Latvia May 26, 2020. Picture taken May 26, 2020. *REUTERS/Ints Kalnins https://pictures.reuters.com/archive/HEALTH-CORONAVIRUS-TECH-LATVIA-RC2DYG9AF16J.html*

The COVID-19 pandemic has, furthermore, highlighted ***the potential of digital technologies in the health sector*** and in addressing public health challenges. Several governments and their technology partners in the region have developed contact-tracing apps for the public. Data-aggregation services from online media have assisted in large-scale surveillance of pandemic developments, while Internet of things applications in hospitals assist with treatments and case management. Online medical consultations and diagnostics are helping to keep medical staff safe while maintaining non-pandemic medical services. Supercomputing, big data, and AI are being applied by the pharmaceutical industry to better understand the virus and develop treatments and vaccines.

While there are significant differences in healthcare systems across the region, and healthcare remains the remit of national governments, Central and Eastern Europe could still identify areas for cooperation. Amid the initial phase of the pandemic, important opportunities were missed. Several countries developed their own national contract-tracing apps, for instance. But as the pandemic enters the next stage, CEE countries could lead the way in data sharing and analysis. As one initial assessment of the application of digital technologies in the fight against COVID-19 in *Nature* notes, "big-data and artificial intelligence approaches are only as good as the empirical datasets that are put into them."[61] Countries in the region could, for instance, work with a coalition of technology partners to develop ethical and privacy-protecting standards for public and private data sharing for research purposes. Open data have been an aspiration of EU digital initiatives but have been hampered by the seemingly daunting challenge of reconciling this with ambitious data-protection requirements. Driven by the necessities of the crisis, the region could perhaps help overcome those hurdles and move the ball forward in this field.

61 Jobie Budd et al., "Digital Technologies in the Public-Health Response to Covid-19," *Nature*, August 7, 2020, *https://www.nature.com/articles/s41591-020-1011-4*.

Central and Eastern Europe has been described as the region where "high dependence on energy imports meets low energy efficiency."[62] Energy continues to play a major role, not just in the economic development of the CEE countries, but also in their geopolitical situation. Reliance on direct supplies of Russian gas is only changing slowly in a number of countries. Energy conservation and the deployment of renewable technologies is lagging behind as fossil fuels continue to be an outsized factor in production, employment, and, thus, politics. However, the power and utilities sector is increasingly aware of the impending and inevitable changes that will come as a result of aging energy infrastructure, new technologies, and climate targets at the EU level. The current lag behind other EU countries in the energy transition also offers the region opportunities by applying the latest innovations and upgrades. These are often driven by the application of emerging digital technologies in energy conservation and production, electricity transmission and distribution networks, and smart cities. AI applications and IoT sensors, for example, allow utilities to better predict consumer behavior, monitor efficiency and environmental compliance, and manage supply and demand. AI is also helping to enhance cybersecurity as more elements of the energy infrastructure are becoming digitized. And "Blockchain-as-a-Service solutions are transforming transactions, contracting, monitoring, and reporting in the energy sector.

Given that the sector faces significant investment needs across many CEE countries, ***a combined focus on infrastructure funding, and digital innovation in energy projects*** could be another avenue for regional cooperation. As energy is perhaps the most vibrant pillar of the Three Seas initiative and its investment fund, integrating digitalization requirements and innovation challenges into the fund's activities could be another opportunity for Central and Eastern Europeans to develop technology leadership in an area impacting their overall competitiveness. At the same time, digital upgrades in the energy sector could help the region meet EU climate goals and advance the green agenda through conservation and efficiency gains.

"VISION WITHOUT RESOURCES IS HALLUCINATION." [63]

If digitalization is a strategic priority for Central and Eastern Europe, the region will have to raise and allocate the necessary funding to make it a reality. This applies across all efforts to drive forward digital progress in the areas discussed in this report—whether they are national or regional, public or private, cross-sectoral or at company level, or technology or policy focused.

Nationally, ***CEE countries will have to dedicate sufficient funding in their budgets to support and scale key initiatives*** such as digitizing education, reskilling and upskilling programs, promoting digital technology adoption by SMEs, and public-private partnerships to advance cooperation on emerging technologies. As public finances come under pressure from the economic and fiscal fallout of the crisis and stimulus packages, policymakers will have to defend budgetary allocations for digitalization as crucial investments in the future of their societies and economies.

Both at national and regional levels, governments will have to assess what role public funding can play in empowering digital transformation, and where public incentives can have the biggest impact. This will likely come through leveraging smart public-finance instruments in order to empower private investments in digital infrastructure and other initiatives. The private sector is widely accepted as the main protagonist when it comes to developing digital infrastructure, funding technology deployment, driving innovation through R&D spending, or raising capital for startups. But, public funding and public-private cooperation mechanisms have always played—and continue to play—important roles in innovation and technology adoption, even more so in Europe given continent- and CEE-wide deficits in capital markets and access to private finance. As some have pointed out, many of the key components that have made smartphones so smart, and revolutionary, were—at least in part—government funded: the Internet, the Global Positioning System (GPS), the touchscreen display, and voice-activated personal assistants, to name a few.[64] Public-sector funding and incentives remain essential in developing broadband, especially in rural areas, also advancing economic development and digital-inclusion goals. Member-state and EU funding, often in combination, will also be critical across strategic sectors, as will mobilizing private capital through public-private partnerships. Examples include existing HPC and AI initiatives at EU level.

As members of the EU, CEE countries will also have access to the funding designated to digitalization in the union's new Multiannual Financial Framework (MFF) and its COVID-19 recovery package Next Generation EU. Despite much-lamented cuts to the proposed levels of digital and innovation funds in the acrimonious negotiations at the July 2020 European Council, the combined MFF and Next Generation EU allocations still provide significant resources. Horizon Europe, the EU's flagship research-and-innovation

62 Jurgen Rigterink, "Nine Recommendations for the Central and Eastern European Countries," European Bank for Reconstruction and Development, January 14, 2020, *https://tinyurl.com/y44yb4np*.

63 This quote is attributed to Thomas Friedman, an author, reporter, and columnist for the *New York Times*.

64 Mariana Mazzucato, *The Entrepreneurial State*, chapter 5 (London: Anthem Press, 2013), quoted in Hanna, "A Role for the State in the Digital Age."

program, will get €80.9 billion in total (€75.9 billion from the MFF, plus €5 billion from the recovery fund), or €16.2 billion more than the previous budgeting period. The Digital Europe program to fund high-performance computing, artificial intelligence, and cybersecurity initiatives will receive €6.8 billion, and €1.8 billion have been allocated for digital infrastructure.[65] Even if these allocations over a seven-year period from 2021–2027 will not have the transformational effects that cohesion and structural funds have had for CEE physical infrastructure and growth over the last fifteen years, this funding, if targeted right, can still offer important opportunities for the CEE region. Recipient governments in Central and Eastern Europe could, for instance, earmark a small percentage of their EU funds to support regional initiatives, technology clusters, and startup incubators, as discussed above. Such a move would clearly signal the commitment of CEE countries to greater regional cooperation, while providing such initiatives and formats for CEE collaboration some of the resources necessary to take off.

The newly launched Three Seas Initiative Investment Fund should also play a role in any regional approach. The fund will invest in transport, energy, and digital-infrastructure projects in the Three Seas countries with the aim of leveraging €3-5 billion in public contributions to raise capital from private investors. Poland, Romania, Latvia, Hungary, Bulgaria, and Estonia have, thus far, contributed to the fund or agreed to do so in the near future. Most importantly, the fund should focus on regional or cross-border digital-infrastructure projects. Given the Cinderella status of the digital pillar in the Three Seas Initiative in the past, an early and ambitious announcement in this area by the fund could provide important messaging to governments and investors alike about the importance of digital infrastructure. By combining digital-technology applications with energy or transportation projects from an early phase, the fund could also help promote CEE innovation and industry leadership in these areas. Similar to the above discussion of EU financing, government contributors to the 3SI investment vehicle could also set aside a small percentage of public funding to support clusters on hybrid infrastructure within the 3SI framework and further promote innovative solutions made in CEE.

FINDING A STRONGER VOICE IN BRUSSELS

The countries of Central and Eastern Europe should not focus solely on digital technology and infrastructure. Policy creation and regulatory development are key factors of any ecosystem and help determine the direction, scale, and shape of digitalization and innovation. As members of the European Union, CEE countries are not only economic beneficiaries of access to its massive Single Market and funding for cohesion, research, and digital initiatives but also vital policy actors with a role in shaping the union's future, including on digitalization. If the region is to succeed in building a new digitally driven economic model for the next three decades of miracle growth, it must step up its ambitions, find its voice, and exert its influence in determining the EU's digital priorities and legislation. ***Central and Eastern Europe should move from its current "rule-taker" position and seek to play a much more proactive role when it comes to shaping the EU's digital future.*** Again, greater regional coordination and prioritization will be the key to success in this field.

Central and Eastern Europe must move quickly if it is to take on more of a leadership role, as the debate over the EU's future digital strategy is in full swing. Potential EU rules on e-commerce, platform liability, taxation of digitally derived revenue, cybersecurity standards, AI, research support, capital markets for innovation, and many other related issues will have large and lasting impacts on CEE governments and businesses. By March 2020, the European Commission had initiated work toward legislative proposals on AI development, 5G networks, and data management with the intention of strengthening EU competitiveness in the digital space. Along with boosting EU technology and innovation, these policies illustrate the EU's aim to curb the influence of US and Chinese digital companies in the European market.

CEE countries have in common a number of characteristics that could form the basis for a broadly shared outlook on key issues in the EU digital debate. As discussed above, most countries rank similarly high in terms of the relative openness to, and reliance on, trade. Their economies show similarly high degrees of regulatory freedom, when it comes to product and services regulation and the ease of doing business. They tend to be well integrated into existing value chains, but also find themselves in direct competition in key sectors with other similarly developed regions and countries outside of the European Union. These factors combine to give CEE countries a stronger interest in less interventionist policies and regulations that promote entrepreneurial freedom, private-sector innovation, and an attractive climate for outside investors.[66] Striking the appropriate balance between open markets and regulation is

65 Laura Greenhalgh and Lili Bayer, "POLITICO's Guide to the EU Budget Deal," *POLITICO*, July 26, 2020, *https://www.politico.eu/article/politico-guide-to-the-eu-budget-deal-mff-2021-2027/*.

66 Fredrik Erixon, et al., "New Coalitions for Europe's Digital Future -Building Capacity, Improving Performance," ECIPE, October 2017, *https://ecipe.org/publications/new-coalitions-for-europes-digital-future/*.

During the 2020 Three Seas Summit, hosted by Estonia, high-level leaders from the 3SI countries, the EU, and the United States convened virtually. President Rumen Radev of Bulgaria, President Kersti Kaljulaid of Estonia, and President Andrzej Duda of Poland were present in Tallinn. October 19, 2020. *Credit: Three Seas / Arno Mikkor, https://www.flickr.com/photos/187379675@N08/50504663338/in/album-72157716527242123/*

critical for the European Union as it navigates a changing geopolitical landscape. Central and Eastern Europe can bring a lot to that conversation.

To make its voice heard, CEE regional cooperation will be essential. The region cannot simply play defense and react to avert or reshape policy proposals it wants to avoid. In order maximize influence, CEE countries will have to ***develop the vision and thought leadership for a pro-growth, pro-innovation digital agenda*** that plays to the region's strengths and can attract allies among other EU member states. Determining the building blocks of such a positive agenda of what digital policy approaches and objectives Central and Eastern Europe wants to see will be a crucial first step. Here, the region should focus on both its strengths and some of its "pain points."

A priority push on completing the Single Market, and the Digital Single Market package of initiatives more specifically, would help CEE entrepreneurs and companies transcend the limitations of their smaller home markets. Regional cooperation on tech clusters, common standards, and joint efforts on education and skills development can allow local firms to achieve scale in Central and Eastern Europe. But, a truly integrated European internal market will be a real game changer for CEE entrepreneurs, innovators, and investors, and should figure at the top of Central and Eastern Europe's EU policy agenda. A close second should be concerted efforts to put in place key elements of the Capital Markets Union. Deeper capital markets and more diverse financing instruments would go a long way toward alleviating one of the biggest structural challenges facing the European digital sector, and the digitalization of small and medium-sized enterprises in particular.

Good ideas, consensus on strategic goals, and detailed priorities for action in Brussels cannot, and will not, emerge from thin air or chance encounters. Current crisis management, and even day-to-day policymaking in more normal times, consumes much attention and political capital. CEE countries will have to ***develop the frameworks and forums at ministerial and working levels necessary to underpin such a process of prioritization and policy development.*** This should include a CEE working group with representatives from the relevant digital-affairs ministries and agencies to identify key files and initiatives, develop common positions where possible, and coordinate outreach to potential allies in other member states. An annual digital ministerial on the sidelines of the 3SI summit could foster shared assessments of key digital issues at the EU level and provide strategic direction for such a working group. A forum for stakeholder engagement, aligned with both the ministerial and working-group meetings, could help

ensure a high degree of up-to-date input from commercial and civil-society actors. Business associations from the CEE countries should also find a more prominent role in the European umbrella organizations for business representation, and digital issues more specifically. This would serve to highlight Central and Eastern Europe's unique perspectives on the opportunities of digitalization, and support government initiatives to achieve real progress at the European level.

STRENGTHENING TRANSATLANTIC DIGITAL TIES

Since the end of communism, the countries of Central and Eastern Europe have maintained close relations with the United States. These ties have generally been dominated by the region's security and defense relationship with Washington through NATO, as Central and Eastern Europeans have remained acutely aware of the geopolitical challenges from its immediate neighbor to the east.

If the region can take its digital game to the next level, both in terms of unleashing a new digital dynamism in its economies and finding its policy voice, this could significantly broaden the relationship with the United States. US firms already have a large footprint of investment and affiliate activity in the region, including well-known US technology giants. If CEE countries were to move ahead with the cluster approach suggested above, partnerships with US companies and educational institutions could help provide further knowledge and skills diffusion, while also enhancing the appeal of such clusters to local IT specialists. Given the limits on financing in the region, closer links to US tech players, and especially investors, could address one of the major challenges that innovators in Central and Eastern Europe face.

As Central and Eastern Europe strengthens its cooperation on digital policy matters at the EU level, ***the region can also play an important role in mitigating some of the digital policy differences and divergences that have plagued US-EU relations in recent years.*** If CEE countries can become digital innovators and build the coalitions to support that position through policy coordination, they will also secure larger influence in both Brussels and Washington. With a shared interest in greater openness and innovation-friendly policies, the region could become an appealing partner both for digital frontrunners within the EU and for policymakers across the Atlantic. From such a position of transatlantic credibility on digital policy and firm integration into the EU, Central and Eastern Europe could help foster greater consensus on divisive issues between the United States and Europe.

Recommendations

Building a Supportive Ecosystem for Emerging Technologies:

- **Map CEE digital strengths and priorities across countries, and convene clusters focused on specific technologies and applications.** Not all regional cooperation needs to involve every country; smaller clusters could focus on development of particular technologies and their applications, for example, artificial intelligence (AI) and the Internet of Things (IoT) in energy systems or e-government in procurement. They could extend to countries outside of Central and Eastern in specific sectors. The 3SI could provide a forum for an annual review of progress and convene private-sector representatives by cluster.
- **Launch a "Secure CEE 5G" cluster among interested CEE countries.** The cluster would bring together private- and public-sector experts to advance common implementation of the EU cybersecurity toolbox for fourth-generation/fifth-generation (4G/5G) network infrastructure, define security requirements, and develop common assessment criteria for vendors with the aim of establishing a global standard. It should invite EU and US partners to collaborate. This model could be replicated for clusters on data management in healthcare; blockchain applications in finance; and many other areas.
- **Launch a "CEE Digital University" network.** Starting with at least one per CEE country, these programs at existing universities would focus on the practical study of digital technology trends, the impact on the future of work and skills, and working with industry to develop and disseminate skills programs. These programs should also spearhead efforts to innovate within the education sector to make learning available on more flexible terms to a constantly "upskilling" workforce.
- **Establish regional innovation hubs, each focused on a specific technology.** These hubs would bring together key research institutions, private-sector technologies and startup entrepreneurs, as well as government researchers and relevant officials. By focusing on a specific technology (blockchain in Slovenia, data management in Bulgaria, etc.), each hub could become the regional locus of that particular effort, drawing in people and companies from across the region. Governments should also foster the development of cities where the hubs are based so that CEE information-technology (IT) specialists will be less tempted to migrate west in search of lifestyle and resources.
- **Launch a 3SI Digital Public Services Initiative to establish common solutions and standards.** Focusing on digital public services, and especially cross-border services and interoperability, the initiative would bring together 3SI digital agencies and private-sector stakeholders to advance common solutions and standards in five areas—digital-ID, e-procurement, e-invoicing, e-CMR, and digital notary services. The grouping should also assess other paper-heavy processes as additional priority projects. It should report on progress annually to the 3SI digital ministerial suggested below.

Building the Infrastructure for CEE Regional Cooperation:

- **Create a 3SI Digital Council based on a twice yearly regional ministerial on digital issues and a network of digital ministries or agencies.** This council could be inaugurated at the 3SI summit, and meetings could also be held at the sub-ministerial level. This effort would demonstrate government commitment to regional cooperation in digitalization, and allow ministers and other government officials to more effectively share priorities and best practices.
- **Create a CEE CIO/CTO council with the mandate to produce an annual report on regional cooperation and recommendations to the 3SI summit.** The group should include private- and public-sector chief information officers (CIOs) and chief technology officers (CTOs), and produce an annual policy memo identifying critical obstacles and bottlenecks to digitalization. It should also develop policy recommendations to advance the adoption of digital technologies across sectors. The report could serve as input to 3SI Summit and the Digital Council.
- **Link up CEE digital trade associations.** Compared to many Western European business communities, much of the CEE region lacks strong industry representation (with a few exceptions). By either linking arms among existing interest groups or shaping a region-wide umbrella organization, the digital sector across the region could better communicate needs to policymakers, and more effectively give impulses on regional or EU-level initiatives from Central and Eastern Europe.

- **Establish a CEE digitalization knowledge repository and exchange program.** Such a central database would make information on case studies, initiatives, lessons learned, and other developments related to digitalization in CEE available to policymakers and stakeholders throughout the region to turbo-charge their dissemination and best practices adoption. The repository could be combined with a CEE exchange program in which industry experts, digital policymakers, startup representatives, and other experts travel across the region to help advance expertise and build connections.

Finding the Resources:

- **CEE governments should compare—and, where possible, coordinate—plans for spending the 20 percent of the EU COVID-19 recovery fund allocated to digital transformation.** Although it will be difficult to organize major cross-border projects funded by the EU recovery fund, given the priority usually assigned to national projects, a cluster or two of countries should find it possible to collaborate in designing their national plans so that part of their EU funds can be used on a shared project—perhaps to support a priority such as high-performance computing.
- **CEE governments should allocate 1 percent of the funds intended for digital transformation to fund regional cooperation.** This would not include funding on actual projects, but, rather, funding for network creation and participation in joint task forces and government-to-government collaboration. Such funding is often essential to create the opportunities and incentives for collaboration.
- **The Three Seas Investment fund should allocate monies to support key cross-border digital projects.** These projects could be proposed and determined by the digital ministerial council, perhaps on the recommendations of the CIO/CTO council. The current list of projects must be significantly expanded in the digital arena.

Finding a Stronger Voice in Brussels—and in Washington:

- **A key focus of the 3SI Digital Council should be to define and drive a CEE digital agenda within the EU.** Whether through the 3SI process or separately, the CEE governments should engage both ministers for digital affairs and for European affairs to identify where the countries share interests. Especially as the EU begins to work through its ambitious digital agenda for the next few years, it is vital that CEE countries consult and plan in advance, and be ready to offer alternatives when suitable.
- **Support efforts to expand the EU's Digital Single Market project.** Because few of the CEE countries provide enough of a market for any startup to scale up, the availability of the entire EU market is essential. The continual removal of internal barriers within the Digital Single Market should be a priority.
- **Establish working groups on EU-level priority projects.** These working groups should include CEE government leads on key priorities, including the Digital Single Market, but also the Capital Markets Union, e-identity, and cybersecurity. Through the ministerial council, the CEE countries should identify priority issues, coordinate coalition building, and collaborate on reaching out in Brussels and key member-state capitals.
- **Establish relationships with digital frontrunners.** The CEE working groups above should build relationships with likeminded member states outside of Central and Eastern Europe. Here, the so-called digital frontrunners, the Nordic-Baltic Eight, and groupings like the Digital Nine (D9) might be of most interest. These relationships should seek to explore concrete proposals on priority files, and build best-practices exchanges.
- **Push for greater cooperation between the United States and the EU on digital policies, especially in establishing standards.** Such rules will be more effective and attractive globally if supported by the two most mature digital markets, and such cooperation will make it easier for US and EU companies to operate across the Atlantic. CEE countries can be an important voice in Brussels and key capitals, making clear the importance of shared transatlantic values in the digital space.

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