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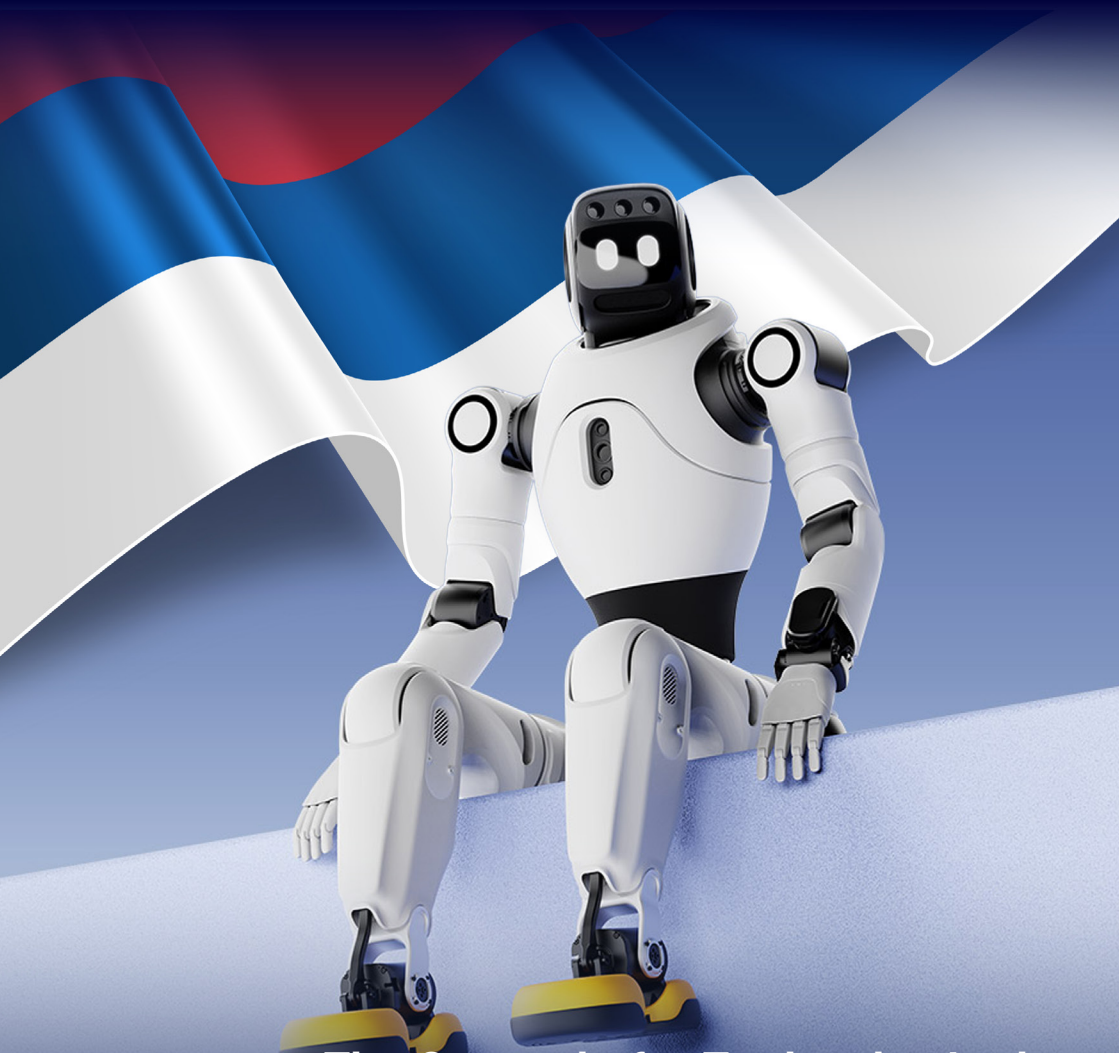

# The Struggle for Technological Sovereignty and Possibility for a Strategic Partnership between Hungary and Serbia in Emerging Advanced Technologies

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# THE STRUGGLE FOR TECHNOLOGICAL SOVEREIGNTY AND POSSIBILITY FOR A STRATEGIC PARTNERSHIP BETWEEN HUNGARY AND SERBIA IN EMERGING ADVANCED TECHNOLOGIES

## THE GEOPOLITICAL RATIONALE FOR TECHNOLOGICAL SOVEREIGNTY

In a rapidly changing world order that carries the aftermath of the "end of history," and which is offering an alternative to the liberal world order as we knew it, for a sovereign country it is of the utmost importance to pursue as little dependence on others, or at least to diversify that dependence as much as possible. The contemporary world relies on technological development to pursue progress and to keep the "system running." Without modern technologies, the stability and efficiency of modern economic and social systems would be difficult to sustain.

In such a world, technology becomes a geopolitical question, and technological reliance could easily be weaponized by providers for their own profit, as was seen with the example of the U.S. tech company Starlink, the services of which have been relied upon by the belligerents on the battlefield in the Russia–Ukraine war.[1] The source of such weaponization can be another sovereign nation or even a private company. And, in the future, those capabilities will not remain reserved solely for companies that maintain close ties to governments—the likes of which SpaceX and its subsidiary Starlink currently enjoy in the United States—but may be within reach of various multinational corporations aiming to achieve their business goals by coercive means. Such exposure and dependence on technology may pose a risk to any sovereign country without diversified technological sources or a degree of technological self-sufficiency. Therefore, the development of critical technologies needs a sovereigntist approach, under which states invest in their own technological development.

1 Paul Adams, "Musk Cuts Starlink Access for Russian Forces – Giving Ukraine an Edge at the Front," *BBC News*, February 19, 2026, https://www.bbc.com/news/articles/c0q3ndj7052o.

In the case of small states, such as Hungary and Serbia, achieving full technological self-sufficiency is neither economically viable nor strategically efficient. However, their cooperation can create a complementary framework that partially mitigates external dependencies. Hungary, as a member of the European Union, offers access to the EU market, regulatory structures, and integration into European industrial value chains. Serbia, on the other hand, as a candidate country, operates with greater flexibility in industrial policy, investment conditions, and external partnerships. This combination creates a hybrid operational space that allows both countries to benefit from EU integration while retaining a degree of strategic maneuverability. Therefore, such joint projects could complement the already existing successes of economic cooperation by strengthening their position within a fragmented technological landscape and, at the same time, potentially reduce their dependency on external actors.

The development of AI-related technologies brings new challenges for the big players, but also opportunities. While the United States and China invest in research and development (R&D) to boost the competitiveness of their AI companies on the global market, the European Union is falling behind by prioritizing regulation over development.[2] Because of this approach, European companies are finding it difficult to adapt in a rapidly evolving and expanding global AI market. This creates an opportunity for widely used, non-European AI engines and language models to collect big data and utilize it for their own development and legally questionable purposes.[3] Meanwhile, regulations in the EU cannot stop the collection and utilization of data, but can only limit it to a certain extent. The EU legislative process is also slow and exhausting, and by the time regulation is put in place, non-European companies have already acquired large amounts of data. In other words, the damage is done quietly and without any possibility of stopping it. In the modern world, those who control data, data infrastructure, and data flows wield considerable social power as well, frequently unbound by state borders. The potential benefits of joint projects between two countries are numerous. Apart from the obvious economic upsides of boosted

2 Leticia Batista Cabanas and Elisabeth Heinz, "The AI Race: Can Europe Catch Up to the US and China?," *Euronews*, January 27, 2026, https://www.euronews.com/my-europe/2026/01/27/the-ai-race-can-europe-catch-up-to-the-us-and-china.

3 Peder Schaefer, "How Europe Became a Digital Colony – and How It Might Escape," *The Parliament Magazine*, January 26, 2026, https://www.theparliamentmagazine.eu/news/article/how-europe-became-a-digital-colony-and-how-it-might-escape.

output, investing in new technologies such as AI and robotics may have a positive impact on the demographic crisis facing the region in the twenty-first century. It could even render mass immigration and heavy investment in family policies unnecessary for improving domestic economies and addressing labor shortages. New technologies can replace repetitive and simple jobs, which require little or no human input. New technologies such as AI and the development of humanoid robots may also be used in the military industry, which the Serbian president recently outlined as an important consideration for investing in these industries.[4] If properly applied, new technologies could bring about a significant increase of industrial productivity and efficiency, based on which these projects could potentially bring new investors on board. However, for the projects to be carried out properly, human, financial, and spatial resources are necessary to avoid failure even before they have entered the planning phase. The assistance of experienced foreign companies and diverse sources of foreign capital could prove beneficial, provided a state-owned consortium maintains some tools of oversight and control, thus preventing the country from falling into another dependency.

## THE COMPLEMENTARITY OF HUNGARY AND SERBIA'S TECHNOLOGICAL EFFORTS: REGULATORY AND RESOURCE OBSTACLES

Serbia's most formal document on AI, officially titled "The Strategy for the Development of Artificial Intelligence in the Republic of Serbia," was adopted in January 2025. The document announces the government's intention to focus on developing digital skills, infrastructure, and ethical AI governance,[5] but exhibits limited operational detail. In contrast, the "Serbia 2030" plan,[6] publicly presented by Serbian President Aleksandar Vučić on March 7, 2026, remains the only (relatively) clearly articulated undertaking that resembles a national strategy on advanced technologies to date. During his pompous presentation of

4 "Aleksandar Vučić: 'Srbija bi prva u Evropi mogla proizvoditi humanoidne robote za potrebe vojske'" [Aleksandar Vučić: 'Serbia Could Be the First in Europe to Produce Humanoid Robots for Military Use'], *Radio Sarajevo*, February 6, 2026, https://radiosarajevo.ba/vijesti/regija/srbija-prva-u-evropi-humanoidni-roboti-vojska/624589.

5 Government of the Republic of Serbia, "Strategy for the Development of Artificial Intelligence in the Republic of Serbia," January 10, 2025, https://www.srbija.gov.rs/tekst/en/149169/strategy-for-the-development-of-artificial-intelligence-in-the-republic-of-serbia.php.

6 Government of the Republic of Serbia, "Ključni cilj Srbije u narednom periodu – očuvanje mira i stabilnosti" [The Key Objective of Serbia in the Upcoming Period – Preserving Peace and Stability], March 7, 2026, https://www.srbija.gov.rs/vest/955304/kljucni-cilj-srbije-u-narednom-periodu-ocuvanje-mira-i-stabilnosti.php.

the concept, Vučić even used a humanoid robot as a symbolic prop to emphasize Serbia's push for AI-driven manufacturing and technological modernization.

In its essence, the plan depicts AI and robotics as fundamental features of Serbia's economic growth for the future. Additionally, investing in these features is expected to bolster the transformation of public services and contribute to sovereign data storage through the expansion of state-owned data centers—all while relying on foreign partners for actual technology and energy. Meanwhile, Serbia's main economic goal is to use these technologies and establish itself as the first mass-producer of robots in Europe, positioning itself as an indispensable actor in the equation. Another key underlying factor driving the strategy is the demographic situation, as automation is largely seen as a tool to advance manufacturing and at least partially compensate for continued population decline. However, for the time being, the strategy does not appear to have a domestic funding mechanism and is instead forced to rely on capital investments from China, the United Arab Emirates (UAE), and international financial institutions.

On the other hand, attempts at technological modernization in Hungary have been substantially more formal and often enshrined in official government policy and the Hungarian government's Artificial Intelligence Strategy 2020–2030.[7] The strategy itself focuses on the AI value chain as one of its "foundational pillars," which mainly revolves around the data economy, infrastructure, energy, manufacturing, healthcare, and public services. The strategy's 2025 upgrade, the Renewed AI Strategy 2025–2030,[8] centers its attention on six concrete pillars: regulation and security; infrastructure; education and competence development; the data economy; research, development, and innovation; and encouraging and developing AI applications. The strategy is tied to plans relating to new data centers like the ParTec AG facility near the Danube-adjacent town of Paks, with a capacity of 96 megawatts (MW) and requiring an investment of about €3 billion,[9] AI supercomputers "optimized for AI research"[10] such as the one at the University of Szeged, and EU grid integration, predominantly via the

7 Government of Hungary, *Hungarian Artificial Intelligence Strategy 2020–2030* (Ministry for Innovation and Technology, 2020), https://mik.neum.hu/wp-content/uploads/2025/03/2020-hungarian-AI-strategy.pdf.

8 Government of Hungary, *Magyarország Mesterséges Intelligencia Stratégiája (2025-2030)* [Hungary's Artificial Intelligence Strategy (2025–2030)] (Government of Hungary, 2025), https://cdn.kormany.hu/uploads/document/c/c0/c0d/c0dfdbd37cfa520ae37361a168d244c85e7295af.pdf.

9 Doing Business in Hungary, "ParTec AG – Data Center near Paks," July 10, 2025, https://doing-business-in-hungary.com/eng/partec-ag-data-center-near-paks/.

10 Doing Business in Hungary, "AI Supercomputer at the University of Szeged," July 15, 2025, https://doing-business-in-hungary.com/eng/ai-supercomputer-at-the-university-of-szeged/.

EuroHPC AI Factory Antenna program,[11] the aim of which is to allow access to the continental supercomputing network. Naturally, Hungary's position within the European Union compels the country to closely integrate with EU safety rules and regulations, which is why it has also placed testing environments like the ZalaZone at the center of its strategy, the role of which is to serve as testing grounds for AI mobility systems, the automotive industry, and futuristic autonomous vehicles.[12] All of this is a necessary precondition for Hungary's compliance with the EU's legal framework, which has been one of the driving factors shaping the country's technological strategy.

This is precisely the point where Hungary and Serbia differ greatly. Additionally, the two countries face different imperatives, offer different advantages, and prove themselves useful for different outcomes, concurrently complicating collaboration in certain areas and rendering them perfectly complementary in others.

When Serbia announced its intention to be the first European nation to start producing humanoid robots in February 2026,[13] the news was met with much fanfare and skepticism alike. What is certainly undeniable is that the plan is highly ambitious, given that it entails producing between 1,000 and 2,000 robots and 10,000 "robot dogs" per year and envisions a future in which the country will be home to 50 robotics factories.[14] For the time being, Serbia's plan is to commence the production in the scope of an existing factory in its western town of Loznica, where China's Minth Group has been operating the facility since 2022.[15] This was confirmed by President Vučić, who said that the same factory will be ready to start manufacturing hardware for AGIBOT Innovation, a Shanghai-based robotics firm, by September 2026 at the very latest.[16] While such an undertaking is supposed to help Serbia leapfrog its development shortcomings and increasingly dire labor shortages, achieving this means that

11 Adam Brader, "Hungary Among First to Join Europe's Most Powerful Supercomputer Network," *Hungarian Conservative*, October 14, 2025, https://www.hungarianconservative.com/articles/tech/hungary-supercomputer-europe-network-ai/.

12 Hungary Today, "ZalaZone Set to Emerge as a Hub for NextGeneration Vehicle Testing," January 13, 2026, https://hungarytoday.hu/zalazone-set-to-emerge-as-a-hub-for-next-generation-vehicle-testing/.

13 N1 Info, "Vučić: Serbia Could Be the First in Europe to Produce Humanoid Robots," February 2, 2026, https://n1info.rs/english/news/vucic-serbia-could-be-the-first-in-europe-to-produce-humanoid-robots/.

14 SeeNews, "China's Agibot Plans to Produce Humanoid Robots in Serbia," February 4, 2026, https://seenews.com/news/chinas-agibot-plans-to-produce-humanoid-robots-in-serbia-1289074.

15 Serbian Monitor, "The State Gave over €37 Million to China's Minth Group in Four Years, Plus Free Land," August 8, 2024, https://www.serbianmonitor.com/en/the-state-gave-over-e37-million-to-chinas-minth-group-in-four-years-plus-free-land/.

16 B92, "Čovekoliki roboti u Srbiji: Vučić najavio otvaranje jedinstvene fabrike" [Humanoid Robots in Serbia: Vučić Announced the Opening of a One-of-a-Kind Factory], March 7, 2026, https://www.b92.net/biz/srbija/vesti/213776/covekoliki-roboti-u-srbiji-vucic-najavio-otvaranje-jedinstvene-fabrike/vest.

the country will rely almost entirely on its favorable access to relatively cheap energy resources—most notably Russian and Azerbaijani gas, but also its deep integration with Hungary's energy management system.

The fact that the envisioned technological advancements will rely on Chinese technologies and a Eurasian energy base makes it clear that Serbia's technological sovereignty will not be based on homegrown innovation. In this case, sovereignty refers to strategic positioning, relating predominantly to the infrastructural and jurisdictional ecosystem that the Balkan country will be compelled to build. Advanced robotics on such a large scale invariably implies having a place to store data safely and employ sovereign compute capacities. Regardless of the level of Chinese investment, the accompanying data centers will be built on Serbian soil, while the country's government will still be the one controlling the data and collecting all the taxes.

If closely examined, Serbia's robotics bid is not entirely a marketing scheme, nor will its ultimate application remain completely civilian. In fact, Vučić's announcement itself directly referenced the defense industry and the country's military, with robots envisioned as a vital part of future parades.[17] Meanwhile, Serbia is also planning to engage in joint drone production with the Israeli Elbit Systems,[18] which again reinforces the fact that the robotization of the Serbian military is just a segment of a broader modernization effort. Serbia's greatest advantage when it comes to dual-use robotics lies in its ability to engage in procurement and develop capabilities outside the European Union's regulatory framework. Namely, under Regulation (EU) 2021/821, many robotics-tied or autonomously acting technologies that might be used in a military context are treated as "dual-use," which substantially impacts the ability of EU-based businesses to import, test, or integrate them with their own products.[19] This especially pertains to high-precision sensors and navigation systems—listed in Annex I of the document—both of which can easily be applied in the military context. While there are still ways for EU businesses to legally incorporate such components into finished products, they are required to obtain government licenses, which involves authorities investigating the end user and intended use

17 Defense Mirror, "Humanoid Robots to Feature in Serbia's Next Military Parade," February 3, 2026, https://defensemirror.com/news/41011/Humanoid_Robots_to_Feature_in_Serbia_s_Next_Military_Parade.

18 European Western Balkans, "Serbia Plans to Produce Drones with Israeli Elbit Systems," April 8, 2026, https://europeanwesternbalkans.com/2026/04/08/serbia-plans-to-produce-drones-with-israeli-elbit-systems/.

19 Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 Setting Up a Union Regime for the Control of Exports, Brokering, Technical Assistance, Transit and Transfer of Dual-Use Items, *Official Journal of the European Union* L 206 (June 11, 2021), https://eur-lex.europa.eu/eli/reg/2021/821/oj.

of the technology in question.

In the absence of such constraints, Belgrade enjoys the leeway to fully exploit the potential of third-party technologies and is well-positioned to benefit from advanced Chinese technologies. AGIBOT, as a company that leads the world in the volumes of robots it produces,[20] equally stands to gain by acquiring a foothold on European soil while skillfully avoiding increasing EU barriers around the deployment and use of autonomous systems. Yet this freedom does not come without its costs. As fast as prototyping and manufacturing may be in the China–Serbia dynamic, this form of non-compliance essentially renders access to the European single market much more difficult, if not outright impossible. Luckily enough, Serbia has relied on one geographically adjacent and geopolitically indispensable partner for many of its high-profile foreign policy endeavors: Hungary.

It is clear that Serbia's advantages lie in its ability to manufacture hardware and provide a low-cost environment for the assembly of humanoid robots, yet it lacks integration with the EU's industrial ecosystem, which spans a significant portion of the continent. In stark contrast, Hungary has already enjoyed the benefits of EU membership for 22 years, during which it had ample time to align its manufacturing processes with EU standards. Moreover, its continent-wide exports fully utilize the advantages of the single market and free movement of goods, and Hungarian companies are entitled to various forms of EU funding for innovation and digitalization purposes.

As far as the Hungary–Serbia partnership goes, the two countries have already made strides in digital infrastructure. When Serbia's Office for IT and eGovernment signed a deal with the UAE's e& enterprise in September 2025, the aim of the agreement was to increase the Balkan country's data center capacity to 40 MW[21]—a significant improvement on Serbia's sole high-performance Tier-4 data center in Kragujevac, which has a capacity of 14 MW. More importantly, the agreement is directly tied to a memorandum of understanding that the UAE company had already signed with Hungary's 4iG Group,[22] which aims to

20 Antara News, "Agibot Reaches 10,000 Units as RealWorld Demand for Robots Accelerates," April 8, 2026, https://en.antaranews.com/news/411588/agibot-reaches-10000-units-as-real-world-demand-for-robots-accelerates.

21 e&, "e& Enterprise and Serbia's Office for IT and eGovernment Ink Landmark Deal," September 17, 2025, https://www.eand.com/en/news/17-sep-2025-eand-enterprise-and-serbias-office-and-egovernment-ink-landmark-deal.html.

22 4iG, "4iG, e&, and Mubadala Sign Strategic Cooperation Agreement," June 17, 2025, https://www.4ig.hu/sw/static/file/4ig_e_mubadala_presseelease_20250717.pdf.

directly exploit their digital-infrastructure corridor and serve as its expansion across the Hungary–Serbia border. At the same time, UAE firms like e& and Mubadala have been looking at Hungary's data-infrastructure with an interest in jointly developing data-center capacities and enhancing connectivity between Central Europe and the Middle East through the Balkans.[23] Some clear roles have emerged. Compute-intensive work and sovereign government data storage are being handled by Serbia, while the Hungarian side of the equation is serving mostly as a regulatory gateway and provider of high-capacity connectivity oriented towards the needs of EU businesses and customers.

Any digital partnership between Serbia and Hungary would also be firmly reliant upon their expanding energy relationship. In addition to their oil and gas industries collaborating closely,[24] the two countries are also bent on further integrating their power grids. Both countries will be looking for ways to create backup battery systems to store electricity in order to reach an equilibrium between the needs of the data centers and available energy.[25] Naturally, any data center operator will want to take full advantage of the mix, which Serbia's comparatively cheap land and electricity prices and Hungary's EU-integrated financial and legal system can offer when working in concert. Having the hard infrastructure, like data centers, developed in Serbia, at the very edge of an otherwise constrained European power system, will thus pose an enormous advantage.[26] Another expectation is that large EU-based powerhouses will have to deal with grid congestion[27] and creeping water scarcity in the coming years.[28] In contrast, a tight-knit Serbian–Hungarian collaboration that can guarantee power storage and provide predictable response times due to geographic proximity and integrated decision-making will appear increasingly attractive to a host of international AI compute providers.

23 Kelsey Warner, "UAE Expands AI Footprint with Serbia Data Center Deal," *Semafor*, September 19, 2025, https://www.semafor.com/article/09/19/2025/uae-expands-ai-footprint-with-serbia-data-center-deal.

24 Global Banking and Finance Review, "Hungary's MOL Talks NIS Acquisition Ongoing," April 28, 2026, https://www.globalbankingandfinance.com/hungarys-mol-talks-nis-acquisition-ongoing/.

25 Serbia Energy, "Serbia's Convergence Play Expands: Battery Storage Turns Energy, Data Centres, and Optical Networks into a Scalable Infrastructure Platform," April 24, 2026, https://serbia-energy.eu/serbias-convergence-play-expands-battery-storage-turns-energy-data-centres-and-optical-networks-into-a-scalable-infrastructure-platform/.

26 Balancing Energy, "Serbia as a Strategic Data Center Platform on the EU Border," accessed April 26, 2026, https://balancing.energy/serbia-as-a-strategic-data-center-platform-on-the-eu-border.

27 Elisabeth Cremona, "Crossed Wires: Grid Capacity Could Block EU Energy Security," *Ember*, April 1, 2026, https://ember-energy.org/app/uploads/2026/04/Crossed-wires_Grid-capacity-could-block-EU-energy-security.pdf.

28 Nancy Bazilchuk, "Europe's Power Grid Has a Big Drought Problem," *Norwegian SciTech News*, April 14, 2026, https://norwegianscitechnews.com/2026/04/europes-power-grid-has-a-big-drought-problem/.

However, given that the overarching goal of both Hungary and Serbia would be to achieve the highest degree of technological autonomy, it is worth examining to what extent the presence of Chinese capital and technology in Serbia helps or hinders the stated cause. As of 2026, China formally ranks as the leading foreign investor in Serbia, with the total sum of invested capital now surpassing €7 billion.[29] In addition to the well-known steel and copper mines and infrastructure projects like the Budapest–Belgrade railway, Chinese investors can also lay the foundation for Serbia's digitalized economy. In the case of the national data center in Kragujevac, for instance, Chinese tech giant Huawei acts as both a financier of municipal data infrastructure and a crucial enabler of Serbia's efforts to deploy the 5G network.[30] In coordination with Chinese technology companies, Serbian authorities began implementing "safe city" technologies in 2017,[31] which immediately raised concerns about the heightened state of surveillance and questionable data sovereignty. This collaboration between Beijing and Belgrade has since grown to encompass the defense sector, with Serbia's president having confirmed his country to be in possession of Chinese hypersonic missiles in March 2026.[32] In a similar vein, China has positioned itself as a provider of CH-92A and CH-95 unmanned aerial vehicles (UAVs) to the Balkan country,[33] with the two countries jointly participating in the development of the Serbia-produced "Pegaz" drones.[34]

While this certainly provides Serbia with the means to accelerate its digital development and bolster its defensive capabilities, it ties the country more deeply to Chinese technologies, further causing compatibility issues with the rest of the European continent and making it more difficult to adapt to EU regulations. More importantly for the issue at hand, it complicates any

29 Tanjug, "Mesarović: Chinese Investments in Serbia Have Exceeded 7.2 bln Euros," April 21, 2026, https://www.tanjug.rs/english/economy/246382/mesarovic-chinese-investments-in-serbia-have-exceeded-72-bln-euros/vest.

30 Connecting Region, "Serbia's 5G Rollout Set to Begin in 2026, Full Coverage by 2027," August 12, 2024, https://connectingregion.com/news/serbias-5g-rollout-set-to-begin-in-2026-full-coverage-by-2027/.

31 Reid Standish, "In Serbia, Chinese Surveillance Tech Sparks Backlash," *Radio Free Europe/Radio Liberty*, November 22, 2022, https://www.rferl.org/a/serbia-chinese-surveilllance-backlash-standish/32142771.html.

32 South China Morning Post, "Serbian President Confirms His Country Owns Chinese Supersonic Missiles after Photo Leak," March 13, 2026, https://www.scmp.com/news/world/europe/article/3346420/serbian-president-confirms-his-country-owns-chinese-supersonic-missiles-after-photo-leak.

33 Stefan Vladisavljev, "A Quiet Signal: Serbia Deepens Military Ties with China amid Global Distractions," *China Observers in Central and Eastern Europe*, accessed April 27, 2026, https://chinaobservers.eu/a-quiet-signal-serbia-deepens-military-ties-with-china-amid-global-distractions/.

34 Radio Television of Vojvodina, "Utva i kineski ALIT uspostavljaju centar za održavanje bespilotnih letelica" [Utva and China's ALIT Establish a Drone Maintenance Center], November 14, 2024, https://www.rtv.rs/sr_lat/drustvo/utva-i-kineski-alit-uspostavljaju-centar-za-odrzavanje-bespilotnih-letelica_1584152.html.

comprehensive attempt at technological integration with Hungary. On the other hand, Hungary has made considerable efforts to strike a balance between nurturing beneficial commercial ties with China and still meeting its obligations as a member of the EU and NATO.[35] On its digital cooperation with Serbia, the main issue for Budapest will revolve around complementarity. In other words, there simply will not be a way around regulatory alignment on cross-border data and robotics supply chains. Practices and technologies that will take center stage must not violate EU-defined data protection, cybersecurity, or dual-use export regulations.

On such a wide-ranging endeavor, the environmental footprint will surpass mere carbon emissions and tap into more fundamental questions like the availability of water and electricity. In 2025, for instance, the total production of electricity in Serbia amounted to 30.556 gigawatt-hours,[36] with more than 60 percent of this production relying on resources like lignite,[37] an exceptionally heavy pollutant. With enormous energy needs envisioned as an integral part of any future robotics and center network, a country of Serbia's size should see it as an imperative to muster all available energy-generating means just to make ends meet. In fact, a single robotics factory, as Vučić has publicly admitted, would necessitate 600 MW of electricity, which is roughly comparable to the energy needs of a medium-sized city.[38] Needless to say, this would require significant additions to existing production capacities, which luckily appear to be on the horizon. Adding to the aforementioned capacity expansions of the national data center, Serbia is fully diving into projects relying on renewable energy sources, such as wind and solar.[39] Yet as promising as these projects may seem over the long term, the near-term energy demands of robotics and data centers will unequivocally demand upticks in coal-based energy production and imports.

35 Carlo Martuscelli, Camille Gijs, and Pieter Haeck, "Hungary's Flirt with China Could Cost It EU Trade and Foreign Direct Investment," *Politico Europe*, June 25, 2024, https://www.politico.eu/article/hungary-flirt-china-cost-eu-trade-foreign-direct-investment/.

36 "Kako je poslovao EPS u 2025. godini: Uvećana zarada, oslanjanje na ugalj i smanjen izvoz" [How EPS Performed in 2025: Increased Earnings, Reliance on Coal, and Reduced Exports], *Nova Ekonomija*, May 9, 2026, https://novaekonomija.rs/vesti-iz-zemlje/kako-je-poslovao-eps-u-2025-godini-uvecana-zarada-oslanjanje-na-ugalj-i-smanjen-izvoz.

37 "Izmene u vlasništvu naftnog sektora i posledice po ugalj i lignit u jugoistočnoj Evropi" [Changes in Oil Sector Ownership and Consequences for Coal and Lignite in Southeast Europe], *Serbia Energy*, January 9, 2026, https://serbia-energy.eu/sr/izmene-u-vlasnistvu-naftnog-sektora-i-posledice-po-ugalj-i-lignit-u-jugoistocnoj-evropi/.

38 MarketScreener, "Serbia in Talks to Host Europe's First Humanoid Robot Plant," February 2, 2026, https://www.marketscreener.com/news/serbia-in-talks-to-host-europea-s-first-humanoid-robot-plant-ce7e5bd2db8ef72d.

39 Tristan Rayner, "Fortis Energy Plans 36 MWh BESS for Serbia's Nocaj 1 Site," *ESS News*, January 28, 2026, https://www.ess-news.com/2026/01/28/fortis-energy-plans-36-mwh-bess-for-serbias-nocaj-1-site/.

Unsurprisingly, this too is in many ways incompatible with Hungary's energy transition commitments.[40]

The discussed issues make up a hypersensitive political area. One of the most pressing challenges that are yet to fully emerge as a global resource constraint is water consumption.[41] Particularly on the issue of data centers, water consumption will reach staggeringly high levels,[42] largely as a result of the evaporative cooling systems being put to a much wider use. According to 2024 World Economic Forum data,[43] just a megawatt of data center consumes 25.5 million liters of water per year. Largely due to a somewhat cooler average climate, water usage effectiveness in Europe is lower, 0.58 liters per kilowatt-hour.[44] A significant expansion of energy and water-consuming facilities automatically implies millions of additional cubic meters expended annually. As a landlocked country whose territory largely lies within the Danube Basin, Serbia's capacities simply appear too modest. Increasingly facing prolonged droughts, which have had an impact on the Balkan country's ability to generate hydropower, Serbia would surely struggle to simultaneously ensure supplies for its irrigation needs, popular demand, and manufacturing requirements. Sitting at the center of the Pannonian Basin as another landlocked actor with only two navigable rivers, Hungary too understands the perils of not living in abundance of readily available fresh water. Therefore, hosting new data centers would have requirements far exceeding the availability of electricity markets and surely require highly innovative solutions that the existing infrastructure and technologies at the disposal of Budapest and Belgrade cannot adequately address. If future-embracing data centers are to be jointly developed by the two states, their respective leaders, investors, and scientific communities will need to ensure these facilities employ closed-loop cooling systems,[45] find ways to redirect

40 Gregor Erbach and Cecilia Meinardi, *Hungary's Climate Action Strategy* (European Parliamentary Research Service, March 2025), https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/769532/EPRS_BRI(2025)769532_EN.pdf.

41 Zachary Skidmore, "Is Water the New Power?," Data Center Dynamics, June 23, 2025, https://www.datacenterdynamics.com/en/opinions/is-water-the-new-power/.

42 Hans Reinders, "Evaporative Cooling Water Consumption," Oxycom, August 7, 2023, https://www.oxycom.com/blog-news/evaporative-cooling-water-consumption.

43 Wesley Spindler, Luna Atamian Hahn-Peterson, and Sadaf Hosseini, "Why Circular Water Solutions Are Key to Sustainable Data Centres," World Economic Forum, November 7, 2024, https://www.weforum.org/stories/2024/11/circular-water-solutions-sustainable-data-centres/.

44 Simon Hinterholzer, "Data Centres in the EU: Facts & Figures," Borderstep Institute, accessed April 27, 2026, https://www.borderstep.org/data-centres-in-the-eu-facts-figures/.

45 Green Revolution Cooling, "GRC Provides Liquid Immersion Cooling Systems for Serbia's First Green Datacenter," *HPCwire*, February 13, 2020, https://www.hpcwire.com/off-the-wire/grc-provides-liquid-immersion-cooling-systems-for-serbias-first-green-datacenter/.

waste heat for popular consumption, and make sure that water consumption stays short of encroaching on the needs of the population and agriculture.

## THE DIVISION OF LABOR: HOW ROBOTICS AND AI COULD CREATE INDUSTRIAL SYNERGY

A key aspect of improving the state of Hungary and Serbia's cooperation on AI, data centers, and robotics will be the division of labor. In other words, one first has to identify the areas in which the two countries excel, what the other one lacks, and whether their advantages and disadvantages are mutually complementary. Once this picture becomes clearer, it is much easier to sketch out a manufacturing and data-handling scheme where each country does a different job and ends up with a joint product that neither could have produced entirely on its own.

The Loznica-based Minth factory is a good starting point. In this case, the manufacturing aspect will largely rely on assembly, as opposed to typical engineering and production. China's AGIBOT will still remain in charge of producing the kits like batteries, motors, and gears, whereas the task of Serbian engineers will be to piece them together and place them on a production line. Serbia's comparative advantage also lies in lower electricity prices for industrial users[46] and the affordability of industrial land.[47] The making of metal parts, insertion of batteries, and endurance testing of parts and assembled products would require cheaper electricity and spacious facilities. This is precisely why Serbia imposes itself as the partner responsible for the heavier and more energy-consuming portion of the workload.

Nevertheless, from a customer's point of view, all this is still far from a finished product. To access the vast EU market, goods manufactured in Serbia would need additional software overrides and emergency stop systems in order to be deployed to what will predominantly remain human-populated working environments over the short-to-medium term.[48] Quite conveniently, Hungary already enjoys a formidable network of specialized testing laboratories and industrial integrators,[49] which have played a vital role in its automotive industry.

46 eKapija, "Eurostat: Serbia among Countries with Relatively Cheap Electrical Energy," May 13, 2025, https://www.ekapija.com/en/news/5166649/eurostat-serbia-among-countries-with-relatively-cheap-electrical-energy.

47 Stefan Pekic, "Investing in Serbia: A Practical Guide," International Comparative Legal Guides, December 19, 2024, https://iclg.com/briefing/22079-investing-in-serbia-a-practical-guide.

48 "What Are the Types of EStop Devices in Robotics?," posted on December 10, 2025, by Everything About Robotics Explained, YouTube, 4 min., 22 sec., https://www.youtube.com/watch?v=kNCiBl0GvZ8.

49 IC Auto Design, "Who Leads the Factory Automation Market in Hungary?," September 22, 2025, https://www.icautodesign.com/news/news/who-leads-the-factory-automation-market-in-hungary.

Following these baseline advantages, one can imagine a scenario in which robots assembled in Serbia are transported north across the border for further refinement and EU-aligned standardization. Subsequently, once in Hungary, the robots can obtain their certified safety sensors to prevent accidents and injuries in close contact with human operators. Similarly, this would be where standardized communication interfaces[50] would be installed so that the robot settings are compatible with a variety of factory systems.[51] The same would be true of electromagnetic compatibility testing, noise level reduction, and all other forms of certification with the purpose of labeling the end product with CE marking,[52] which would enable its sale across the EU single market. Attempting such an operation exclusively in Serbia would merit a complete overhaul of the Balkan country's entire certification bureaucracy, while excessive hardware production in Hungary could significantly reduce profit margins due to unnecessary expenditures on energy and poor labor arbitrage. A joint project, however, would allow both countries to make the most of their comparative advantages, while the intended markets receive a superiorly competitive product, combining cutting-edge technologies with affordable prices.

The same logic can be applied to the realm of artificial intelligence, where instead of physical assembly and certification, it all becomes about large-scale compute capacity. Modern AI models are usually trained by being fed streams of data, typically over weeks of number-crunching through specialized chips. Given that this activity devours electricity without requiring user responses in real time, the clear choice to plant a data center for this purpose would be Serbia—again largely thanks to the country's competitive pricing of electricity. Working in concert with Chinese AI experts, Serbian researchers could train models on an unprecedented scale for the Balkan region—something that Serbia's Kragujevac data center already allows[53] and that emerging facilities are likely to support as well.[54] Such data centers can process enormous amounts of data, conduct

50 Milvus, "How Do Robots Communicate with Each Other and with Humans?," accessed April 26, 2026, https://milvus.io/ai-quick-reference/how-do-robots-communicate-with-each-other-and-with-humans.

51 Patsnap Eureka, "How to Ensure Compatibility in RobotIntegrated Systems," April 2, 2026, https://eureka.patsnap.com/report-how-to-ensure-compatibility-in-robot-integrated-systems.

52 European Commission, "CE Marking," accessed April 26, 2026, https://single-market-economy.ec.europa.eu/single-market/goods/ce-marking_en.

53 Intermark Relocation, "Serbia to Become a Regional AI Hub, Driving Foreign Talent Relocation," January 15, 2026, https://intermarkrelocation.com/news/immigration/serbia-to-become-a-regional-ai-hub-driving-foreign-talent-relocation/.

54 NS Reporter, "Digitalna tvrđava Srbija: Niš i Novi Sad dobijaju data centre, Kragujevac postaje centar sajber bezbednosti" [Digital Fortress Serbia: Niš and Novi Sad to Get Data Centers, Kragujevac Becomes Cybersecurity Hub], March 7, 2026, https://nsreporter.rs/2026/03/digitalna-tvrdjava-srbija-nis-i-novi-sad-dobijaju-data-centre-kragujevac-postaje-centar-sajber-bezbednosti/.

wide-ranging experiments with training algorithms, and do so under fewer constraints than they would have faced in an EU member state. Serbia's existing laws are designed to follow and mirror the General Data Protection Regulation (GDPR), which the EU strictly adheres to. In practice, however, enforcement remains weak,[55] and there is no supranational authority that could impose sufficient costs on Belgrade for non-compliance. This enables companies to harvest massive amounts of user data for AI training with no prior notice and minimal transparency.[56] By contrast, EU-based providers are compelled by the EU AI Act to prepare and publicly release detailed summaries of the content they gather from users,[57] as well as to regularly comply with EU copyright law.[58] The fact that none of this applies to Serbia enables it to serve as an experimental AI lab—a role the country will be more than willing to play going forward.

As both an EU-adjacent and an EU-candidate state, Serbia is already an integral part of the existing European energy and logistics infrastructure. Politically centralized as it has been for the better part of the twenty-first century, Serbia also offers a favorable environment for rapid legislative adoption. Areas undergoing depopulation and devoid of critical natural reserves also present fewer environmental obstacles data center development. Additionally, as the largest country by landmass in the EU-adjacent Western Balkan region, Serbia possesses clear advantages relative to its neighbors, especially when it comes to attracting foreign investment. This stands in stark contrast to Bosnia and Herzegovina, for instance, which remains in a state of hopeless internal division on matters ranging from investment to foreign policy, notwithstanding its lack of critical infrastructure, underdeveloped energy grid and largely single-source supply route, as well as topographically unforgiving terrain. The distances from the EU's core in incomparably smaller markets like North Macedonia or Montenegro disqualify them as critical suppliers for Central Europe, a region that requires both scale and proximity of cheap products—something in

55 Marija Veljković, "Bridging the Gap Between Serbian Regulations and the GDPR: Serbia's Data Protection Strategy Unveiled," Schoenherr Attorneys at Law, September 27, 2023, https://www.schoenherr.eu/content/bridging-the-gap-between-serbian-regulations-and-the-gdpr-serbia-s-data-protection-strategy-unveiled/.

56 Business and Human Rights Resource Centre, "Meta Allegedly Trains AI on Balkan User Data without Consent," October 6, 2024, https://www.business-humanrights.org/en/latest-news/meta-allegedly-trains-ai-on-balkan-user-data-without-consent/.

57 European Parliament, "EU AI Act: First Regulation on Artificial Intelligence," June 8, 2023, https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence.

58 European Commission, "Copyright Legislation," accessed April 26, 2026, https://digital-strategy.ec.europa.eu/en/policies/copyright-legislation.

which Serbia excels. Finally, Serbia is the only country in the Western Balkans with a sufficient industrial capacity to support large data centers, whereas its geopolitical positioning as both China and Hungary's regional go-to partner ensures that the country maintains significant capital investment, market access, and critical infrastructure. Such a directly neighboring market presents an enormous opportunity to all EU partners looking to test new technologies, ideas, or products before aligning with EU regulations.

Still, if the goal is to gain access to the European market, there still are some cases in which the issue with Serbian-trained models will be the distance of most planned and existing data centers in the country. Robots working on an Audi assembly line in Győr or an AI assistant in a Budapest-based store will require AI signals traveling back and forth in tiny fractions of a second—for this, data centers located in the middle of Serbia would not be a time-efficient solution.[59] This is why Hungary will need data centers in the proximity of end users and plugged into Central European internet hubs to host the so-called "edge" AI servers.[60] Additionally, if Hungarian professionals could fine-tune Serbian models for specific EU factories or end users, after which they would be deployed as a package that meets EU regulation on data protection and cybersecurity, this would overcome much of the initial hurdles. The Hungarian end of the bargain would also be to ensure that personal data—like video or audio recordings of input provided by customers—remains compliant with the GDPR, which, as previously stated, is not yet fully enforced in Serbia.

If geographic distance is to be overcome as an obstacle to the Serbian–Hungarian technological partnership, the two countries will need a whole host of interconnected data centers.[61] Instead of having them work in silos, Hungary and Serbia should strive for a system that will essentially resemble a single facility, divided only by the border between the two states. Here, the countries should not aim to copy one another, especially since they already have useful ecosystems of their own. Hungary's modern data centers developed by prominent international enterprises such as the 4iG Group in partnership

59 Jack Backes, "AI and Latency: Why Milliseconds Decide Winners and Losers in the Data Center Race," *Data Center Knowledge*, December 19, 2025, https://www.datacenterknowledge.com/infrastructure/ai-and-latency-why-milliseconds-decide-winners-and-losers-in-the-data-center-race.

60 Nicol Turner Lee and Darrell M. West, "The Future of Data Centers," Brookings Institution, November 5, 2025, https://www.brookings.edu/articles/the-future-of-data-centers.

61 Chris Malayter, "InterSite and InterMarket Networking: The Advantages of Data Center Interconnection," CoreSite, https://www.coresite.com/blog/inter-site-and-inter-market-networking-the-advantages-of-data-center-interconnection.

with Emirati investors[62] will be connected by fiber-optic cables,[63] some of which will stretch from underneath the Danubian Plain and through existing heavy-traffic border crossings like Röszke or Serbia's Horgoš. These connections should make sure that servers across borders can communicate within a span of a few milliseconds and allow, once again, for a clear division of labor. The task of the Serbian side should be to transfer data-heavy but non-urgent AI model training, video rendering, or backup storage for the institutions of both countries. With electricity being a significantly cheaper commodity on the Serbian side, the task seems well-suited for the southern neighbor. When it comes to issues requiring instant responses or data that legally must be kept within the EU, the task falls squarely on Hungary. The country can deal with a host of tasks ranging from robot control and citizen e-government services to banking transactions and GDPR-protected data.

One often overlooked feature of the partnership lies in the additional layer of resilience it provides. For instance, if data centers are properly connected, power outages or cooling failures in Serbia could quickly trigger the Hungarian data centers' takeover of critical tasks within a span of just a few minutes.[64] The same goes if disaster strikes in the other direction as well. While such forms of cross-border resilience would typically require exorbitant expenses, these capacity-sharing practices hold promise of cutting it down to a fraction of the originally envisioned cost.

Every possibility examined in this paper begs another pertinent question. If distance, regulation, and resources all pose connectivity problems, why shouldn't the two countries build joint data centers? The reality simply involves fundamentally different requirements that Serbia and Hungary have when it comes to the speed of transferring data. Additionally, they adhere to entirely different legal regimes, which is why placing compute in only one place seems impossible. The two countries also face infrastructural asymmetry due to their diverging grid stability. Furthermore, hosting national data on the territory of another country—even the most reliable ally—is both a major sovereignty concern and a security breach and would face a series of insurmountable legal

62 4iG Group, "4iG Group Signed MoUs with Leading Entities from the United Arab Emirates," July 17, 2025, https://www.4ig.hu/4ig-group-signed-mous-with-leading-entities-from-the-united-arab-emirates.

63 4iG Group, "Optical Network Development to Start in New Regions with Gigabit Hungary Support," December 17, 2025, https://www.4ig.hu/optical-network-development-gigabit-hungary-support.

64 Brandon Devier, "Cooling Failure in the Data Center: The Hidden Uptime Risk," Fluke Corporation, accessed May 25, 2026, https://www.fluke.com/en-us/learn/blog/vibration/cooling-failure-data-center-hidden-uptime-risk.

obstacles. An unclear ownership structure would only add another layer of complication, let alone the insurance scheme that would be nearly impossible to design effectively for such a large-scale cross-border facility. Then comes the issue of risk-sharing, which, as previously noted, would involve power outages and cyberattacks. All these would inevitably result in legal liability disputes that would be notoriously difficult to settle—in addition to compromising joint facilities and the data stored within them. It is precisely for these reasons that the only available solution is to work toward a network of facilities communicating with each other while remaining physically separated in two different sovereign territories.

An adequate division of tasks between the countries can also pay dividends on the use of energy and water. Serbia's most modern data center now uses closed-loop cooling, which could play a role in reducing water consumption. This further becomes manageable if data centers are constructed in the proximity of large rivers that allow them to make proper use of their modern water-recycling systems. The element of complementarity again lies in the fact that the Hungarian partner in this venture already has experience in converting waste heat into public utilities, as geothermal projects in Budapest and Szeged have demonstrated.[65] If the two countries decided to approach such a project together, many duplication efforts can be avoided, water scarcity averted, and resource security increased thanks to a more thoughtful geographic distribution.

## RISKS, CONSTRAINTS, AND POLITICAL REALITIES

The obvious and most serious constraint to this project would be the political will of both countries to delve into such an endeavor. Since government change is a new reality in Hungary after the April 12 parliamentary elections, the question of whether political preconditions will remain favorable to maximizing cross-border cooperation arises. The bilateral relationship between Budapest and Belgrade seems to have had its peak during the Orbán–Vučić era due to the well-developed personal relationship between the two leaders.[66] During this period, bilateral trade, joint projects, and even political cooperation under the international and

65 Hungary Today, "Szeged Has the Largest Geothermal System in the EU," April 16, 2024, https://hungarytoday.hu/szeged-has-the-largest-geothermal-system-in-the-eu/.

66 Joakim Scheffer, "Serbian President Aleksandar Vučić Receives Prestigious Grand Cross of the Order of Merit of Hungary," *Hungarian Conservative*, August 23, 2024,.https://www.hungarianconservative.com/articles/current/alkesandar-vucic-merit-of-order-hungary-serbia-cooperation-budapest-belgrade-railway-migration-energy/.

regional framework flourished, delivering tangible results on a frequent basis. With the change of government in Budapest in May 2026, questions arise as to whether such cooperation will continue as it did in the recent past . However, given the fact that Hungary and Serbia are two neighboring countries that have succeeded in developing strong bonds over the previous decade, this can serve as a solid foundation for the continued provision of political support for joint development projects.

Another major obstacle could be the availability of the resources necessary to start the project. These include financial and human capital, for instance. Data centers can offer data storage for all state-owned institutions and potentially profit by offering services to commercial companies. The services may include either providing controlled facilities for storing commercial data centers or even offering cloud storage services for commercial purposes. In fact, such hybrid approaches would likely be necessary from a cost optimization standpoint. The heavy burden of constructing data centers only makes up a fraction of the cost of such a project, which is soon compounded by maintenance and energy consumption expenditures, often leaving investors with insufficient revenue to maintain the whole system. To avoid placing additional financial stress on the state budget, data center facilities within joint projects need to offer services for commercial purposes to receive the funding necessary to cover operational costs. The perfect case study of such approach is the aforementioned data center in Serbia, Kragujevac, which was built and has been operational since 2020, offering services of the highest, Tier-4 standard in Europe.[67] The data center in Kragujevac is 100 percent state-owned, but it was built with the assistance of top-notch experts and companies from the European Union, United States, United Kingdom, and China.[68] In the case of a lack of financial resources, private investors could also be involved in the construction of the new data center infrastructure. Either way, majority ownership still needs to be in government's hands, to avoid potential sovereignty constraints caused by private capital.

Uncertainty about the energy market and rising prices may also play a crucial role in the implementation of this project. In the emerging global order,

67 Data Cloud Technology, "Data Center," accessed April 23, 2026, https://www.dct.rs/en/data-center.html.

68 Marko Crnjanski, "Ekskluzivno: Posetili smo Državni data centar u Kragujevcu od 14.000m² – jedan od najmodernijih u ovom delu Evrope" [Exclusive: We Visited the 14,000m² State Data Center in Kragujevac – One of the Most Modern in This Part of Europe], *Netokracija*, February 4, 2021, https://www.netokracija.rs/data-centar-kragujevac-180295.

where international law is becoming seemingly irrelevant in hindering great powers from acting as they see fit, we are witnessing an increasing reliance on military power by these states to achieve their strategic objectives. In such cases, global supply chains may become interrupted, which will consequently lead to a rise in the prices of commodities. For example, the Russo-Ukrainian war and the escalating conflict between the United States and Israel on one side and Iran on the other led to massive rises in energy costs. Both events triggered disruptions in the energy market and had a negative impact on European economies.[69] When gas and oil supply is disrupted, the whole economy struggles, which can have an impact on projects like building data centers or investing in AI research and robotics. Nevertheless, electricity production is well diversified in Hungary, but 25 percent of production is still reliant on gas power plants. In Serbia, dependency on coal remains high, with almost two-thirds of electricity production originating from coal/lignite power plants. Conversely, the country's reliance on natural gas is very low. Another constraint could be regulatory alignment or misalignment between the two countries. As the law is not universal, cross-border cooperation might seem difficult. However, with the political will, laws could be adapted to capital projects and, therefore, ensure the successful implementation and operational maintenance of such projects. However, as Hungary is an EU member state and Serbia an EU candidate, regulations have certain discrepancies which not only are subject to the national lawmaking but also depend on supranational level decision-making in Brussels and Strasbourg. Therefore, regulatory alignment must be examined in the planning phase of the project to avoid possible deadlocks or delays like in the case of Budapest–Belgrade railway.[70]

A final constraining factor would be the environmental issues that the construction and operational phase of data centers may cause. Although electricity and water consumption has already been addressed, it is worth mentioning that Serbia has shown a tendency to oppose projects that could bring economic benefits but pose serious environmental risks. Such a case was the 2021 protests against the mining company Rio Tinto, which was involved in the Jadar project in Western Serbia, aiming to extract high-demand minerals like

69 Tobias Adrian et al., "How the War in the Middle East Is Affecting Energy, Trade, and Finance," International Monetary Fund, March 30, 2026, https://www.imf.org/en/blogs/articles/2026/03/30/how-the-war-in-the-middle-east-is-affecting-energy-trade-and-finance.

70 "Problematic Start for the Budapest–Belgrade Railway," *Railway Pro*, March 2, 2022 https://www.railwaypro.com/wp/problematic-start-for-the-budapest-belgrade-railway/.

lithium. Citizens successfully stopped the project with monthly mass protests.[71] The failure of other projects that pose a risk to the environment cannot be ruled out.

## TECHNOLOGICAL SOVEREIGNTY AS THE END GOAL

Even with all the challenges presented in this paper, technological sovereignty remains a legitimate and worthy objective. Investments in the new technologies are essential to keep economic development continuous and avoid dependence on manufacturing cheap goods or providing low-value services in small countries such as Hungary and Serbia. Smart approaches leveraging the complementarity of the two countries can increase the chances of initial project success and, slowly but surely, move them in the direction of reducing dependence on the technologically most advanced global players. Even just reducing dependence on U.S.-dominated companies providing technological services could be a small step toward success, although the replacement of those companies with other major players from China would be a repetition of the same mistake. The solution lies in a slight diversification of the origins of major technological providers, substantial investment in domestic R&D in new technologies, and the development of technological infrastructure capable of supporting such domestic innovation under a sovereigntist umbrella.

On a more practical level, for Serbia and Hungary, the path to technological sovereignty is based on cooperation with a clear division of labor. In robotics, the role of Serbia could be to assemble humanoid robots, taking advantage of cheap electricity, labor, and industrial land. Hungary's role could be to certify and standardize those same robots for the EU market through its network of testing laboratories. The end product would carry the CE marking, easily reaching customers across the single market. In the AI sector, Serbia could serve as a large-scale training ground for AI models, possibly collecting and processing vast amounts of data without strong regulatory constraints. At the same time, Hungary could host "edge" AI servers closer to end users, further develop specific models with demand in the EU market, and, by doing so, ensure that the final product complies with EU regulations. Investments in data storage infrastructure, which would represent the foundation of a joint project between

71 Guy De Launey, "Serbia Revokes Rio Tinto Lithium Mine Permits Following Protests," *BBC News*, January 21, 2022, https://www.bbc.com/news/world-europe-60081853.

the two countries, could take the form of a network of state-owned data centers connected by fiber-optic cables across the border, designed to communicate in milliseconds and provide backup resilience when necessary. If this kind of complementarity is achieved, Hungary and Serbia could strengthen their positions in the regional and global AI and robotics supply chain. Furthermore, they would demonstrate the ability of small countries to pursue technological advancement while retaining their sovereignty. The stakes are high, though, because if joint cooperation fails, Serbia could increase its dependence on Chinese technology, which could eventually lead to a point where meaningful integration with Hungary—and possibly the broader EU ecosystem—becomes strategically unfeasible.

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