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Workshop: Technology-Oriented Research Infrastructures – Opportunities for the Western Balkans

Recognising the transformative potential of Technology-Oriented Research Infrastructures (TORIs) as key drivers of economic growth, industrial competitiveness, and talent retention, the POLICY ANSWERS project is actively promoting their importance for development across the Western Balkans (WB). As part of this strategic mission, a Workshop was held on 13 May 2025 at the Science and Technology Park of Montenegro in Podgorica. The event took place within the framework of the Meeting of the Western Balkans Steering Platform on Research and Innovation, organised by the European Commission.

The Workshop not only raised awareness of the urgent need to advance technology-oriented research infrastructures in the region, but also contributed meaningfully to the European Commission's Call for Evidence—part of the ongoing effort to shape a new European Strategy on Research and Technology Infrastructures. Notably, one of the feedback inputs submitted in response to the Call specifically addressed the need for dedicated measures for the Western Balkans—an outcome directly attributable to the consolidated insights generated during the workshop.

The event brought together stakeholders from across Europe—including government officials, European Commission representatives, researchers, and industry leaders, particularly from innovative companies—to discuss the role of technology infrastructures in driving innovation and regional development. The workshop featured two dynamic sessions with ten distinguished speakers, who presented technologies with real-world impact, innovative policy models, investment opportunities, and strategic approaches tailored to the region's specific needs.

Opening remarks

Opening speeches were delivered by Marash Dukaj, Minister of Public Administration of Montenegro; Bernhard Fabianek, Senior Policy Officer in the Unit for International Cooperation Europe and America at the Directorate-General for Research and Innovation of the European Commission; Yngve Engstroem, Head of Cooperation at the Delegation of the European Union to Montenegro; Ivana Jankovic, Director General for Innovation and Smart Specialisation at the Ministry of Education, Science and Innovation of Montenegro; and Tanja Radusinovic, Director of the Project Department at the Chamber of Economy of Montenegro.

In his address, Minister Dukaj highlighted the need for Montenegro to fully capitalise on its participation in EU programmes. He stressed the value of Smart Specialisation as a tool to focus resources, retain skilled talent, build thriving innovation ecosystems and business centres, and attract investments. He also emphasised the importance of aligning education with market needs. As a concrete example of successful regional cooperation in digital technologies, he cited the 3C WB Regional Capacity Centre for Cyber Security, Cyber Crime, and Cyber Diplomacy—established and co-financed by Montenegro, France, and Slovenia

In his remarks, Bernhard Fabianek, Senior Policy Officer in the Unit for International Cooperation Europe and America at the Directorate-General for Research and Innovation of the European Commission, delivered an inspiring message, reaffirming that the Western Balkans can confidently position themselves within Europe's advanced technology landscape. Reflecting on Montenegro's evolving innovation ecosystem—from the launch of Technopolis in Niksic to the operational Science and Technology Park in Podgorica—he emphasised that such infrastructure is essential for attracting and retaining talents. However, he noted that the real opportunity lies in building a seamless pipeline from education through research and innovation to business development and job creation. He highlighted the pivotal role of Technology-Oriented Research Infrastructures

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(TORIs) as bridges connecting academia and industry, driving knowledge transfer, and helping turn innovation into tangible societal and economic benefits—especially considering the ongoing green and digital transitions.

Yngve Engstroem, Head of Cooperation at the EU Delegation to Montenegro, underscored the strategic importance of investing in research and innovation, calling them the guiding stars of Europe's future. He emphasised that innovation must translate into real societal and economic benefits, which requires strong infrastructure and a thriving business environment. Praising Montenegro's progress with Technopolis and the Science and Technology Park, he noted that such initiatives are essential for connecting academia, research, and industry. He concluded by affirming the EU's commitment to supporting the Western Balkans' integration through the New Growth Plan for the Western Balkans, which places innovation, the green and digital transition, and improved business conditions at its core.

Ivana Jankovic, Director General for Innovation and Smart Specialisation at the Ministry of Education, Science and Innovation of Montenegro, emphasised that Technology-Oriented Research Infrastructures (TORIs) are central to the implementation of the Smart Specialisation Strategy—Montenegro's roadmap for strengthening scientific excellence, fostering a knowledge-based economy, and deepening collaboration between science and business. She highlighted the need to align the Smart Specialisation Strategy with national research infrastructure roadmaps to ensure coherence and impact. Referring to the country's Reform Agenda, she pointed to key targets, including the need to significantly increase private sector investment in research and innovation, alongside enhanced public sector funding, in order to build a more balanced and effective innovation ecosystem.

Tanja Radusinovic, Director of the Project Department at the Chamber of Economy of Montenegro, welcomed participants on behalf of the Chamber, highlighting its century-long tradition in fostering economic development. She stressed that Technology-Oriented Research Infrastructures are key drivers of scientific excellence, industrial growth, talent development, and regional cooperation. Emphasising the need for strong public-private and academia-industry partnerships, she noted the Chamber's active role in EU programmes such as Horizon Europe and Digital Europe. She also underlined ongoing efforts to bridge research and business, especially in digitalisation and the green transition. Radusinovic concluded by highlighting the Chamber's role in the Montenegrin European Digital Innovation Hub, reinforcing its commitment to building a resilient and competitive innovation ecosystem.

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Figure 1: Photos from the event.

Keynote Speaker:

Among the ten distinguished speakers, the keynote address was delivered by Sandro Rossi, Director General of CNAO in Pavia, Italy, the second of only four European hadron cancer therapy clinics. In his presentation, titled 'From the Heart of Atomic to Cancer Care: CNAO at the Frontier of Research and Innovation,' Rossi compellingly illustrated how Technology-Oriented Research Infrastructures can deliver tangible societal benefits and save lives. He presented CNAO's pioneering role in advancing ion therapy, a cutting-edge cancer treatment that offers exceptional precision while sparing healthy tissue. Built with contributions from over 600 companies, CNAO exemplifies the scale, complexity, and collaborative spirit behind successful innovation ecosystems. Rossi also highlighted CNAO's leadership in the EU-funded HITRIplus project, a Horizon 2020 initiative bringing together more than 20 European institutions—including CERN, GSI, and four hadron therapy centres—to develop next-generation medical accelerators. He noted that SEEIIST is envisioned as a future reference user within this strategic research framework, underscoring the relevance of regional collaboration and forward-looking investment in high-impact, health-focused infrastructure.

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Following the keynote, Sessions 1 and 2 featured distinguished speakers from leading European institutions – including both EU and Western Balkans representatives - who are driving real value for European companies across diverse sectors.

Session 1:

The first speaker of the session was Djerdj Horvat, Senior Research Project Manager at the Fraunhofer Institute for Systems and Innovation ISI, who presented 'The Fraunhofer Success Model.' He explained why Fraunhofer is Europe's leading applied research organisation and one of the largest worldwide, with 76 institutes, 30,000 employees, and a 3 billion EUR annual budget. Fraunhofer focuses on demand-driven research aligned with market needs, securing two-thirds of its funding from industry and other sources. Its research spans key enabling technologies such as nanotechnology and digital innovation, with a strong emphasis on bridging fundamental research and practical application through technology transfer and patent licensing. Horvat highlighted Fraunhofer's success in turning research outcomes into high levels of technology readiness, outperforming other German institutes in patent licensing. Crucially, he identified a gap in the Western Balkans—the missing bridge between basic research and implementation—and stressed that strengthening knowledge transfer mechanisms is vital to overcoming this challenge and fostering innovation-driven growth in the region.

The second speaker of the first session was Mirka Gottberg, Manager for International Affairs, Policy and Strategy at VTT Technical Research Centre of Finland Ltd, who presented on 'How Technology Infrastructures Drive Real Value for European Companies'. She underlined the role of VTT in bridging scientific excellence and industrial competitiveness. As one of Europe's leading research and technology organisations, VTT plays a key role in converting breakthrough science into market-ready innovations. With over 80 years of experience, VTT employs more than 2,300 experts and operates with an annual income of 300 million EUR—roughly one-third from public funding, one-third from collaborative research, and one-third from client partnerships. It hosts over 21 R&D infrastructures and pilot facilities across six cities, supporting work in carbon-neutral solutions, digital technologies, and sustainable products and materials. Gottberg highlighted VTT's mission to turn research into real-world applications, with a particular focus on the critical pre-market stages of testing, validation, and demonstration. She emphasised VTT's role in overcoming the 'valley of death' for emerging technologies, operating from Technology Readiness Levels (TRLs) 3 to 8. Importantly, she positioned VTT's model as a blueprint for the Western Balkans, showcasing how technology infrastructures and strong public-private cooperation can drive sustainable innovation and economic growth in smaller markets.

The third speaker of the first session was Domagoj Crnkovic, Senior Education Associate at SIMORA / PISMO Incubator in Novska, Croatia, who presented on 'Center of the Gaming Industry in Your Neighborhood.' Crnkovic shared the remarkable success story of how a town of just 10,000 inhabitants—Novska—transformed itself into Croatia's leading hub for the video game industry. Through the regional development agency SIMORA, the town launched the PISMO business incubator, which now serves as a central innovation and education space for aspiring game developers, artists, and designers. Just a decade ago, there were no IT or gaming companies in the area; today, Novska hosts over 100 IT firms, including 80 in the gaming sector. This transformation was driven by a strong focus on early and continuous education, with tailored programmes for children and young adults introducing them to game design, digital art, and coding. The incubator offers six-month training courses in major game development platforms such as Unity, Unreal Engine, and Blender—free of charge—with participants even receiving financial support during their training. Graduates are encouraged to launch start-ups with backing from local, regional, and national funding schemes, further supported by European cohesion funds. A standout achievement is the recent 60 million EUR investment from European cohesion funds to establish a Gaming Industry Campus in Novska, a project that rivals initiatives in cities many times its size. Crnkovic underscored that video games are not only a powerful creative industry but also a strategic driver of economic development and technological literacy in the region. This is a

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compelling example of how a small town Novska can be transformed into a thriving innovation district.

The fourth speaker of the first session was Nevena Radomirovic, Quality Management Director at ElevenEs in Subotica, Serbia, who presented on 'European Leading Manufacturer of Lithium Iron Phosphate Blade Prismatic Battery Cells.' Radomirovic introduced ElevenEs as the first European manufacturer of lithium iron phosphate (LFP) prismatic battery cells outside of China – a key contribution to the EU's Green Deal and energy security goals. Founded just five years ago, the company has rapidly advanced from an R&D lab to a pilot facility producing up to 100 cells per day, with current plans underway for a Gigafactory with 8 GWh capacity. Backed by the Al Pack Group—with over 30 years of industrial experience—and early-stage investor ENO Energy, ElevenEs is scaling green battery technology with a strong focus on sustainability and European energy security. Their LFP Blade cell technology offers significant advantages over conventional chemistries, including lower costs, improved safety, longer lifecycles, and the use of more abundant raw materials. Radomirovic highlighted their latest innovation, the Edge 574 Blade Cell, which features fast-charging capabilities (from 10% to 80% in 12 minutes) and a lifetime of over 500,000 km. With applications ranging from electric vehicles, industrial machinery, and renewable energy storage systems, ElevenEs stands out as a leading example of smart green-tech scale-up within Europe's evolving battery ecosystem. Recognised as a company of national interest, ElevenEs is part of a broader EU-Serbia initiative to develop a vertically integrated battery and e-mobility value chain. Radomirovic positioned the company as a prime example of how an R&D lab can grow into a large-scale industrial player driving sustainable innovation.

Session 2:

The first speaker of the second session was Sinisa Marcic, Senior Expert on Human Capital Development at the Regional Cooperation Council (RCC), who presented on 'Innovation Enabling Infrastructures in the Western Balkans.' Marcic offered a comprehensive regional overview of key infrastructures that support innovation and entrepreneurship, while also addressing ongoing challenges such as limited access to finance, outdated regulatory frameworks, low R&D investment, and significant brain drain. Despite these barriers, he noted encouraging progress, including improved broadband coverage, advancements in e-government, and a strong base of creative human capital. He highlighted several flagship innovation facilities across the region. Among them: Albania's newly opened Durana Tech Park and upcoming Vlora Tech Hub; Bosnia and Herzegovina's Innovation Center Banja Luka and Intera Tech Park, including upcoming Sarajevo Innovation & Tech Park and Science and Technology Park of Republika Srpska; Kosovo *'s Innovation Centre Kosovo, Prizren Innovation and Training Park, and Prishtina Tech Park; Montenegro's Science and Technology Park, Tehnopolis, and EIT Community Hub; North Macedonia's UKIM Innovation Center, EIT Community Hub, and the Technology Park Skopje (in development); and Serbia's four Science and Technology Parks (Belgrade, Novi Sad, Nis, and Cacak), major R&D institutes like BioSense, Vinca, Mihajlo Pupin, and the upcoming BIO4 Campus. Marcic emphasised that while the region still lags behind EU averages in R&D investment, the foundations for digital transformation—such as internet exchange points, 4G networks, and digital policy frameworks—are in place. He concluded with five key opportunities: Strengthening regional cooperation, Harnessing the creativity of the youth, Aligning with EU digital and innovation policies, Enhancing government focus on connectivity, and Accelerating the development of tech parks and innovation hubs across the region.

The second speaker of the second session was Vesna Bengin, Co-founder and Scientific Advisor at the BioSense Institute in Novi Sad, Serbia, who presented on 'RI Stands for Real Impact.' Bengin introduced BioSense as a leading research institute focused on digital technologies for agriculture, highlighting its transformation into a European centre of excellence following a 32 million EUR investment through the Horizon 2020 Teaming Call—the largest EU investment in Serbian science to date. Roughly half of the funding came from the EU, with the rest provided by national sources. Of this, 20 million EUR was dedicated to research infrastructure—including a cutting-edge building

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and specialised micro/nanoelectronic equipment—while 12 million EUR was invested in recruiting and developing human talent. Bengin stressed that such balanced investment in both infrastructure and people is crucial for long-term impact. Today, BioSense employs nearly 200 researchers and is internationally recognised for its work in sensor development, AI for agriculture, and smart agri-food systems. She noted that BioSense has helped reverse brain drain by attracting both returning Serbian experts and foreign researchers to Novi Sad. The institute's demand-driven, transdisciplinary research model has not only generated scientific publications and patents, but also reshaped agricultural practices in Serbia and beyond. Bengin emphasised that BioSense plays a unique dual role—not just in producing research, but also in building the broader innovation ecosystem. The institute supports start-ups, advocates for policy reform, and helped create Serbia's national science fund and research funding framework. Inspired by BioSense's success, the Serbian government is supporting the 500 million EUR Bio4Campus in Belgrade. BioSense has established 23 partnerships across the Western Balkans. Bengin concluded by positioning BioSense as a model for how research infrastructures can catalyse sustainable innovation, retain talent, achieve competitiveness on the European scale, and foster regional growth through strategic investment and strong public-private collaboration.

The third speaker of the second session was Lejla Gurbeta Pokvic, CEO of the Verlab Institute in Sarajevo, Bosnia and Herzegovina, who presented on 'Technology and Innovation in Bioengineering: The Verlab Approach.' Pokvic shared the remarkable journey of Verlab, the first private research institute in Bosnia and Herzegovina, which evolved from a clinical engineering company into a fully-fledged innovation hub in just three years. Initially focused on medical device regulation, Verlab expanded its scope through applied research and digital innovation, driven by the belief that technology can enhance human capabilities. The institute now integrates education, transformation, and innovation through its digital innovation hub, supporting SMEs in digital transformation, data literacy, and AI applications. Verlab institute works closely with both local and European partners, contributing to initiatives like EuroCC and EIT Health, and has played a role in developing Bosnia and Herzegovina's high-performance computing (HPC) infrastructure. Pokvic emphasised Verlab's mission to inspire and deliver impact through tailored, need-driven research, with a strong focus on regional cooperation, stakeholder engagement, and building a resilient innovation ecosystem. She highlighted the institute's success in helping ten SMEs implement digital solutions and access EU funding, and unveiled the construction of Verlab's new headquarters, signalling its long-term commitment to science-driven economic development.

The fourth speaker of the second session was Arben Merkoci, ICREA Professor and Group Leader at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) in Barcelona, Spain, and Director of NanoBalkan at the Academy of Science of Albania. He presented on 'NANOBALKAN Centre: Pioneering the Next Frontier in Nanotechnology Innovation.' Merkoci introduced the NANOBalkan initiative as a regional centre of excellence inspired by ICN2—one of the world's leading nanotechnology institutes, known for its interdisciplinary research, strong focus on technology transfer, and integration within broader innovation ecosystems. NANOBalkan aims to replicate this model in Albania and progressively across the Western Balkans, bringing together research groups from Albania, Kosovo, North Macedonia, and associated partners from Greece, Italy, Israel, Serbia, and Spain. The centre will focus on strategic domains including health, agriculture, environment, and advanced materials, while fostering cross-border collaboration, talent retention, and international partnerships. A five-floor facility has already been allocated by the Albanian government at the University of Tirana, with plans to accommodate 150 full-time staff across specialised labs and shared infrastructure. Merkoci emphasised the importance of political consensus, institutional support, and EU funding to ensure long-term sustainability. While the centre currently exists in a virtual form, efforts are underway to secure the necessary resources to establish a permanent, world-class nanotechnology hub for the region.

The fifth and final speaker of the second session was Lisa Cowey, Director of the Technology Transfer Interface in Oxford, UK, and Key Expert at the RCC for the Western Balkan Knowledge Transfer Toolkit Initiative. In her presentation, 'Making RI Projects Investable – Addressing the External Investment Challenge,' Cowey drew on 15 years of experience in EU-funded initiatives

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across the region. She reflected on efforts to map research infrastructure and help universities make better use of it, noting that definitions of 'research infrastructure' vary widely—ranging from microscopes to billion-euro facilities like the Very Large Telescopes. Cowey emphasised that while large-scale research infrastructures benefit from established cost-benefit frameworks, smaller, technology-based ecosystems—like BioSense, PISMO, CosyLab, and Verlab—are harder to evaluate and fund using traditional models. These ecosystems don't simply serve big RIs; they grow independently, drive innovation, and build local ecosystems. Successful examples are marked by core competencies, international scalability, interdisciplinary activity, and their ability to foster second-level investment and start-ups. However, Cowey noted that existing funding tools often don't match the needs of such initiatives, forcing them to adapt to rigid frameworks rather than being supported for what they are. She stressed that returns from these investments come later and in less linear ways, complicating public funding decisions. The biggest barrier, she argued, is not methodology but a gap in understanding—between those managing public funds and those seeing emerging opportunities. Cowey concluded by advocating for new funding models that combine public and private investors who are willing to engage with higher-risk, innovation-driven ventures.

Open Discussion and Concluding by Example

The open discussion was moderated by Sanja Damjanovic from the GSI Helmholtz Centre for Heavy Ion Research in Darmstadt, Germany, who co-organised the event on behalf of POLICY ANSWERS. The discussion focused on how to better align national and EU-level funding, stimulate meaningful public-private partnerships, and design forward-looking investment strategies that ensure technology-oriented projects are truly implementation-ready. Although time constraints limited the formal exchange of views, the conversation continued informally during the vibrant networking cocktail that followed—offering participants ample opportunity for dialogue, connection-building, and idea-sharing in a more relaxed setting.

The Workshop concluded 'By example' with a spotlight on the current status of another Technology-Oriented Research Infrastructure: the SEEIIST project. This initiative demonstrates how life-saving research can drive economic growth in South East Europe. Echoing the Workshop's opening theme—Beating Cancer with Cutting-Edge Technology—Sanja Damjanovic emphasised that SEEIIST is now ready to enter its preparatory phase for construction. This milestone follows the successful completion of its second development phase: a comprehensive Design Study made possible through 6 million EUR in financial support from the European Commission and robust backing from an international consortium comprising over 20 leading research centers, clinics, and companies across 14 European countries. The HITRIplus Horizon Europe Project, after four years of collaborative effort, has enabled SEEIIST to reach this stage. Damjanovic reminded participants that SEEIIST is a pan-European, Accelerator-based Research Infrastructure for Cancer Therapy and Biomedical Research with Ion Beams. It is a unique initiative combining dual missions—as both a multidisciplinary research center and an ion-beam cancer therapy clinic. With a projected investment of only 250 million EUR, SEEIIST has the potential to become a flagship project for EU Enlargement, fully aligned with the New Growth Plan for the Western Balkans.

The Workshop concluded with a dynamic Networking Cocktail, providing a valuable platform for participants to exchange ideas and lay the groundwork for future collaborations.

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