



**POLICY
ANSWERS**

BOOSTING THE IMPORTANCE OF RESEARCH INFRASTRUCTURES IN THE WESTERN BALKANS

Workshop on Research Infrastructures – Sarajevo, Bosnia and Herzegovina
14 September 2023

Organised by
POLICY ANSWERS and the Regional Cooperation Council (RCC)

Report prepared by
Sanja Damjanovic (GSI)

Supported by
Elke Dall (ZSI)
Ulrike Kunze (DLR)

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Introduction

In its ongoing mission to fortify research and innovation policy making in the Western Balkans, the POLICY ANSWERS project employs a multifaceted approach, focusing also on promoting the importance of Research Infrastructures (RI) for the Western Balkans (WB) as catalysts for economic growth. Therefore, POLICY ANSWERS and the Regional Cooperation Council (RCC) organised jointly a workshop on RI on 14 September 2023 in Sarajevo, Bosnia and Herzegovina.

The workshop consisted of two dynamic sessions, featuring nine distinguished panellists who represented diverse domains of RI such as Agri-Food, Social Science, Health & Biotechnology, Green & Digital, and Environment.



Figure 1: Workshop on Research Infrastructures, 14 September 2023

RI have proven to have a powerful social and economic impact, helping to meet global challenges and to attract the best talents. One of the challenges in the WB is that outgoing mobility is higher than the incoming mobility due to, among other reasons, underdeveloped research infrastructures, lack of first-class research facilities and access to the newest technologies in the Western Balkans, as well as insufficient support for participation of the WBs in existing leading core European Research Infrastructures (ERIC, ESFRI, and other RI with TNA).

In his introductory keynote speech, Sinisa Marcic (RCC) highlighted in particular results from a mapping and bibliometric analysis done related to research infrastructures. It demonstrated a lack of cooperation among the different facilities and difficulties to adequately support economic growth. Role models and innovation infrastructures have been identified, developed often without official support from the governments and limited access to finance. His presentation detailed the match between the available RIs and the Smart Specialisation Strategies (S3) or respective drafts. Those economies currently developing S3s should learn from these. He furthermore highlighted the need for Open Access Policies: the RCC supported 23 RI to get such policies in place, a good practice to be further expanded.

POLICY ANSWERS, for example, with its planned support for young researchers' mobility towards RI, and the RCC are thus well placed to cooperate and further the discussions with the distinguished panellists.

Both organisers highlight their respective online presence: www.balkaninnovation.com and www.westernbalkans-infohub.eu.

First panel: Promoting Research Infrastructures for Societal Challenges: Progress in the Development of Research Infrastructures in the Western Balkans

RIs can help to improve everything from geopolitical tension, brain drain and limp economic growth. The topic of the first panel was how to deliver this vision for the WB, how to raise awareness among policy makers about the benefits of RI and how to improve the potential funding sources. It was moderated by Sanja Damjanovic, who represented POLICY ANSWERS and GSI Darmstadt. The six distinguished speakers at the first panel informed about existing facilities and those under development, highlighting the benefits of involving researchers, organisations, and industries from the WB in leading core European RI. The panellists represented a diverse range of institutions, including RI, international NGOs, national authorities, local authorities, and universities.



Figure 2: First Panel of the Workshop on Research Infrastructures. From left to right: Dejan Mirakovski, Jasmin Ademovic, Teodora Ilic, Nenad Celarevic, Vesna Bengin, Tarik Zaimovic, Sanja Damjanovic

- 1) **Vesna Bengin:** Co-founder of the BioSense Institute in Novi Sad, Serbia, and the coordinator of the Horizon 2020 ANTARES project, the only Teaming project awarded in the WB

Vesna Bengin provided a comprehensive overview of both the direct and indirect benefits arising from the ANTARES project, which invests in science, scientists and RI, and the return of investments for societies. The power of ‘Teaming for Excellence’ calls, which strive to support Centres of Excellence (CoE) as role models to stimulate institutional building, is best illustrated with the ANTARES project worth 30 mio. EUR. The ANTARES project is a CoE for Advanced Technologies in Sustainable Agriculture and Food Security, which helped transforming the BioSense Institute into a market-oriented European CoE. This success story serves as a compelling example of how to efficiently create an ecosystem which attracts the best talents world-wide, stimulate employment and boost collaboration with private sectors. Notably, ANTERES remains the only example in the WB of a successful Teaming project.

In response to the question why policymakers do not seem to clearly see the benefits from investing in RI, even if a significant part of funds (50%) stems from the EU, Vesna Bengin pointed out that the responsibility is not only on the side of policymakers but also on the side of researchers. Researchers need to showcase that their research can create an impact. Both sides policymakers and researchers, should jointly focus on talking about science for demand or science for impact and work on creating impact, instead of focusing on narrow scientific fields or published papers. She believes that success stories are the best way to stimulate policymakers to allocate dedicated budgetary supplements, such as national or IPA funds, and raise awareness of RI’ benefits for economy and society, with a clear return of such investments. She also believes that due to the success of ANTARES and BioSense, the Government of Serbia decided to support Bio4Campus.

Based on her insights, Vesna Bengin emphasised the pressing need for the region to reverse the defragmentation within its research ecosystem in order to maintain competitiveness. She also underlined that, while there are numerous benefits from investing in RI, the primary focus should be on investing in people and their skills, which are the region’s most valuable asset.

- 2) **Nenad Celarevic:** Regional Business Development Coordinator for Helvetas Serbia, renowned for his pivotal role in incorporating the Western Balkans into the European Social Survey (ESS) European Research Infrastructure Consortium (ERIC) map

Nenad Celarevic played a pivotal role in incorporating the WB economies into the ESS ERIC map, which also led to Serbia and Montenegro gaining full memberships. Through this journey in developing a ‘Story of Change’, Nenad Celarevic elaborated on the main challenges he experienced and the key factors that led to the success. He emphasised the important support by Helvetas, which was implementing the Swiss government project focused on strengthening social sciences. This support helped to set a systematic approach to understanding the situation of social sciences in the region. Subsequently, there was a grassroots demand from scientists in the region to join the Research Infrastructures. With additional support from the European Commission and the engagement of policy makers, the process gained momentum and ultimately led to the successful integration of the WBs into the ESS ERIC. This collaborative effort demonstrates the importance of partnerships, grassroots demand and policy engagement in achieving such milestones.

Nenad Celarevic also provided a comprehensive overview of direct and indirect benefits for the Western Balkans from their participation in the ESS ERIC. These benefits include: 1) Strengthening social sciences by opening access to data, resulting in higher-impact and high-quality publications in the fields of social sciences and humanities. The access to data boosted the number of publications and visibility of the region's scholars internationally, 2) Improving trust between state and social sciences as scientists gained access to comparative data, 3) Enhancing education: given that access to data is free and open, allow its use in teaching at higher-education institutions across the region, and 4) Improving evidence-based policy making (which is not quite yet there). Participation in ESS ERIC has laid the foundation for data-driven policy decisions.

In response to the question which strategies and coordination actions could be employed to facilitate policy makers to support the research community to get integrated into leading core European Infrastructures (e.g. the European Strategy Forum on Research Infrastructures (ESFRI) or ERICs), Nenad Celarevic emphasised the need to increase trust in science, and that could only be achieved by including civil society organisations to effectively disseminate information and promote trust in science. This approach will legitimise policymakers to prioritise investments in RIs.

- 3) **Teodora Ilic:** A member of the Minister's office at the Ministry of Science, Technology and Innovation of Serbia, actively involved in actions related to the development of BIO4Campus

Teodora Ilic presented the Bio4Campus, a powerful large-scale RI currently in the design phase, worth more than 350 mio EUR. Notably, this RI was initiated through a top-down approach. Positioned as a pioneering Bioeconomy Hub in Europe, Bio4Campus focuses on four key topics: biomedicine, bioinformatics, biotechnology and biodiversity. The project aims to create an ideal ecosystem for fostering innovation and generating employment opportunities for the best talents. Teodora Ilic presented the concept of Sustainability of the Bio4Campus, emphasising that sustainability encompasses not only funding, but also collaboration. She pointed out that in addition to the Government funding, the project plans to generate income through strong collaboration with national and international industries, and between faculties on an international scale.

In a follow-up question, Teodora Ilic shed light on what metrics have been used to measure the economic, societal, and research impact of the Bio4Campus. She explained the planned communication strategies for conveying these metrics to various stakeholders and potential funders.

In response to the question on what the main driver was for policy makers to support development of the Bio4Campus through a top-down approach, Teodora Ilic emphasised that the Bio4Campus' mission reflects Serbia's Smart Specialisation Strategy (S3), and that the adoption of the S3 in Serbia played an important role in the decision to embark on the Bio4Campus initiative. The Bio4Campus is fully in line with the Action Plan 2023-2025 of the Serbian S3.

- 4) **Jasmin Ademovic:** President of the City Council of the City of Sarajevo, contributing to the development of a Tech4Green High Performance Computing Center

Jasmin Ademovic presented yet another RI on the horizon, which is not driven by researchers, but by the local authority: The City of Sarajevo set up a new long-term strategy focused on becoming a leader in the digitalisation process of Bosnia and Herzegovina and in achieving the status of a Smart City. As a significant step towards realising this vision, the City of Sarajevo has

proposed the establishment of the Tech4Green HPC Center and has already allocated an attractive location and a building worth 6-7 mio EUR, covering an area of 2000 m².

In terms of funding, Jasmin Ademovic explained that the modern building is already 95% complete, and that the first phase of the project will be fully supported by government funds, comprising combinations from the city budget and the Ministry of Economy of the regional government, including contributions from various public companies. Looking ahead to the second phase, the plan is to secure European funds through applications to HPC calls and EuroHPC initiatives.

In response to pressing climate resilience challenges, the City of Sarajevo sees the Tech4Green HPC Center as a vital initiative to bridge the gap between cutting-edge technology and sustainability. Its primary objective is to bring the city's digitalisation and smart city initiatives together, focusing on environmental sustainability. This includes addressing issues such as air pollution, supporting renewable energy, optimising resource management, enhancing climate adaptation strategies, and improving waste management practices, while promoting the use of HPC for economic resilience and data driven decision-making processes, working towards a more sustainable urban environment.

Jasmin Ademovic underlined that the scope of Tech4Green is to create a framework for research and innovation investment, fostering collaboration among different actors, including universities, companies, NGOs, scientific institutes, and digital hubs. Together, they will use the infrastructure to address the issues that are important for the cities in the first place. The project is expected to start operations by the end of 2024.

5) **Dejan Mirakovski**: Rector of Goce Delcev University in Stip and co-funder of the AMBICON Lab

Dejan Mirakovski presented the keys for success of the University of Goce Delcev Stip in North Macedonia, being recognised as one of those universities pushing agenda around sustainability, in particular in the context of the environment. He emphasised that the university's success story was primarily rooted in its collaborative efforts with industry partners and its multidisciplinary approach. Furthermore, he emphasised that the industries much faster recognise the advantages of collaborating with researchers.

The relatively young university has experienced significant growth, emerging as one of North Macedonia's most esteemed universities. Dejan Mirakovski presented the AMBICON Lab, which has achieved accreditation for environmental testing sectors and is now recognised as one of the foremost research facilities in North Macedonia, while the accreditation is important for collaboration with industries. Through continuous development and provision of high-quality services, the lab has established long-term collaborations with the largest industrial and service companies across North Macedonia, Serbia, Bulgaria, Kosovo* and Albania, thus building a large scientific and research database. Operated on a non-commercial basis, the lab also collaborates with Government entities, with a primary focus on enhancing the scientific database and providing vital support, particularly in monitoring air quality.

In response to a question why the self-organisation of user communities, which is a key mechanism to boost development of new RI (single-site or distributed), has weakened in the WB region despite its past robustness, Dejan Mirakovski reacted that this decline correlates with the lack of social and political will to establish new infrastructures. He further emphasised the need for increased investments in science and people and their skills through various grants and student fellowships.

* This designation is without prejudice to positions on status and is in line with UNSCR 1244 and the ICJ opinion on the Kosovo declaration of independence.

6) **Tarik Zaimovic:** Vice-Rector of the University of Sarajevo (UNSA), actively engaged in the development of the UNSA High-Performance Computing (HPC) System

Tarik Zaimovic presented the UNSA HPC System, a forthcoming RI which will empower researchers with advanced computing technologies crucial for solving complex problems across various fields. The UNSA HPC System will also serve as a breeding ground for effectively producing skilled deep-tech talents. Tarik Zaimovic highlighted a broader strategic aspect of developing university RI, of which the HPC System is a vital component. This strategy aligns with UNSA's approach to the higher education sector, focusing on implementing a set of changes aiming at developing the next generation of scientists. These changes include designing new academic programmes, including a digital education programme, creating an Open Research Network, virtual laboratories, a Technology Transfer Office, BigData and AI research centres, a digital hub in addition to an HPC System. This has created an investment push in medical science, biotechnology, genetic engineering, and natural science. In a few years, more than 30 mio. EUR were invested in research equipment.

Since the University of Sarajevo is the primary driver of the HPC System, Tarik Zaimovic outlined the main strategic research domains which will benefit, including fundamental scientific research, weather forecasting, computational biology, energy exploration, financial modelling, machine learning and AI, and creative industries, among others. He also highlighted the key objectives of the UNSA HPC System, emphasising its role as a highly scalable and flexible computing platform which will support the growing professional and research demands of the University, and wider scientific and professional/IT community in the Canton. Additionally, it will facilitate collaboration and knowledge sharing among these groups. Another important objective is to contribute to Bosnia and Herzegovina's digital transformation goals, aligning with the specific priorities of the Digital Europe Programme and becoming a recognised National Focal Point for communication, coordination, and collaboration within the EU Digital Europe Programme and the EuroHPC Joint Undertaking initiative.

Tarik Zaimovic also presented the concept of the sustainability and the strategic approaches to the development of the UNSA HPC System. He emphasised the importance of the first phase, which focuses on Stakeholder community development to ensure 80% utilisation of capacity. This phase requires a strong network of researchers, companies from Bosnia and Herzegovina, as well as a broader region. The second phase involves a comprehensive assessment of the needs for the HPC System, following emerging EU best practices. In a few years, the UNSA will be ready to start the implementation phase. It is evident that the HPC system within the university will play a pivotal role in remodelling the higher education sector, elevating the quality of research, and driving research-related jobs.

Second panel: GEANT for the Western Balkans & InfraBooster Initiative opportunity of the Western Balkans

The second panel was dedicated to the presentations by three distinguished speakers concentrating on GEANT, the collaboration of European National Research and Education Networks, and highlighting the benefits of GEANT for the WB region, but also presenting the new EIT initiative InfraBooster as a great opportunity for the WB. This session with three speakers was moderated by Monika Petrova (RCC).

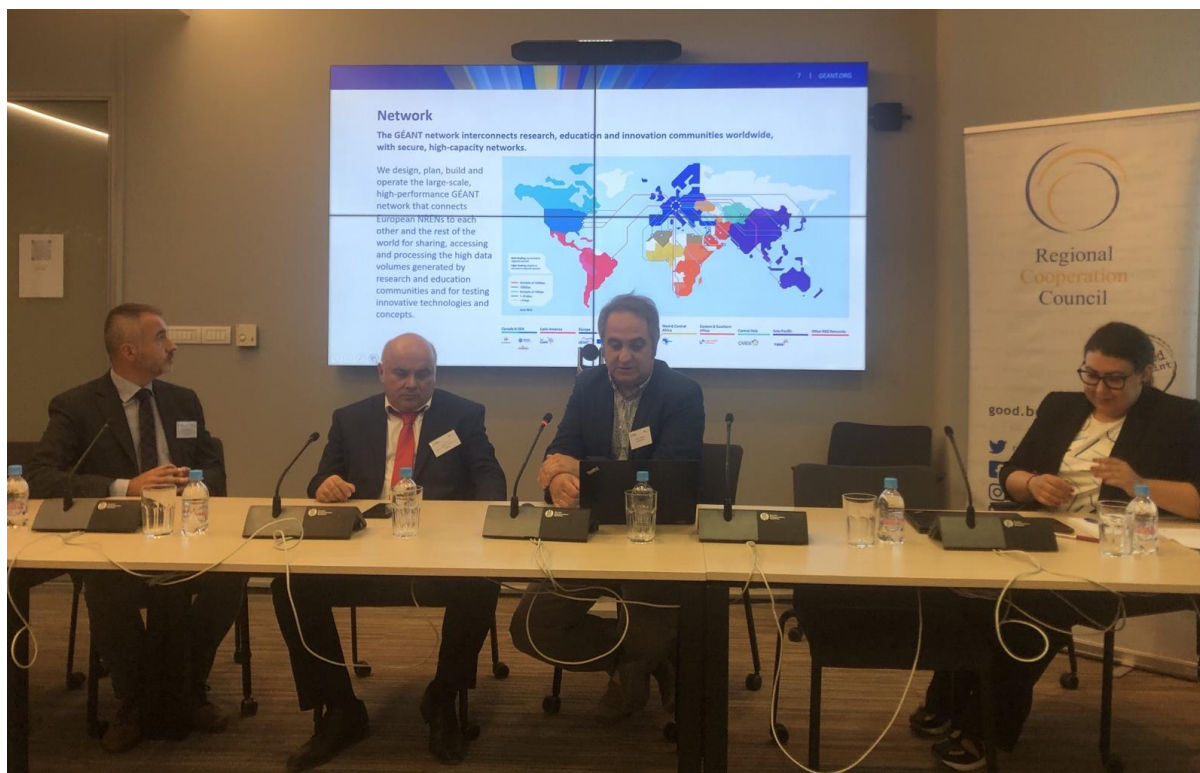


Figure 3: Second Panel of the Workshop on Research Infrastructures. From left to right: Krzysztof Kliniewicz, Arjan Xhelaj, Anastas Mishev, Monika Petrova

1) Anastas Mishev: GEANT South-Eastern Europe Directors Forum Chair and Coordinator

Anastas Mishev gave a comprehensive overview of GEANT services relevant to researchers and research and innovation organisations in the WB. GEANT offers substantial opportunities which require additional promotion around the region: it is one of the biggest pan-European e-Infrastructure, serving a wide range of essential services with a unified force to bring together all European research and education networks. The initiative encompasses a multiple of projects, including those aligned with the Horizon Europe Programme. In the WB, five out of six economies are connected to GEANT, with Bosnia and Herzegovina being the exception.

One of GEANT's standout achievements is operating the largest pan-European research and education network interconnecting research, education and innovation communities worldwide,

with secure, high-capacity networks. This network enables robust daily data transfers in the terabytes, offering flexibility, ample capacity, and significant upgrade potential. Notably, it provides high-speed IT connectivity. GEANT's flagship service, eduroam, spans over 100 territories globally, allowing researchers to access resources with their home institute credentials. Additional services include the eduVPN solution, eduGAIN, eduTEAMS designed to help scientists in accessing resources and others. GEANT also supports InAcademia, facilitating student validation through databases and offers cloud services to scientists across various scientific domains.

GEANT plays a pivotal role in bridging the digital gap in the region, notably contributing to initiatives such as the European Open Science Cloud (EOSC). By promoting open science practices and advocating for shared data and research infrastructures, GEANT aims at enhancing the scientific landscape. GEANT is actively targeting Bosnia and Herzegovina as a focal point for collaboration. The benefits extend to research societies and can have a significant impact, potentially benefiting policymakers and even the country as a whole.

2) **Arjan Xhelaj:** Director General and Chairman of the General Assembly of RASH - the Academic Network of Albania

Arjan Xhelaj presented RASH - the Academic Network of Albania - as National Research and Education Network (NREN) and a highlight of the successful implementation of GEANT and the clear benefits of this pan-European e-Infrastructure for the digital revolution in higher education and science research. Over the past decade, from no network in universities in Albania and without any political support, Arjan Xhelaj managed to establish the RASH e-Infrastructure, which today manages the Academic Network Backbone and Campus Networks, providing crucial network infrastructure for scientific excellence, research, education and innovation through its interconnections with the GEANT Network and its 38 NREN partners.

Arjan Xhelaj shared the remarkable story that this entire complex infrastructure was built by young people. Instead of relying on external tenders, Arjan Xhelaj chose to mentor and develop young professionals, selecting students from schools and universities and cultivating their skills in-house. This approach has led to the creation of a community of highly skilled developers and engineers, contributing significantly to the success of RASH and fostering growth of young professionals in the field.

RASH has developed various software services for ministries, universities, and research institutes, and the platform is centralised for the whole country. These include U-Albania (university portal connecting 38 universities and serving 130 000 applicants in seven years), U-Library (digital library), Teaching for Albania (online application for teachers), Training portal (for professional research), V.UNI (Virtual University), Pitagora (online student secretary), U-Finance (university finances & HR management), U-CRIS (university current research information system), U-Doc (documents archiving), and more. RASH also enables many services built by the pan-European GEANT Network, for universities and scientific research institution, including eduroam, eduGAIN, eduMEET, file sender, eduVPN, GEANT Point-to-Point, TCS-GEANT IP, and more. While RASH received substantial support from Italy and the European Commission, many new platforms and infrastructures are currently under development through international projects (EOSC, WBCnet & HPC Centre, ANIX). RASH is also part of the project NI4OSEU (National Initiative for Open Science in Europe).

RASH serves as a compelling success story in the WB, highlighting the significant potential and clear value derived from investing in e-Infrastructures. It stands as a shining example that should inspire policymakers to allocate dedicated budgetary supplements for the development of new e-Infrastructures in the region.

3) Krzysztof Klincewicz: Professor at the University of Warsaw, Poland and EIT Food

Krzysztof Klincewicz presented the InfraBooster programme and its potential to support the further development of RI in the WB. This programme, organised by the European Institute for Innovation and Technologies (EIT) and funded under Horizon Europe, is specifically designed to assist scientific institutions in the WB in maximising the utilisation of existing and underused research equipment and RI. The primary objective of the InfraBooster initiative is to unlock the hidden value of RI by identifying research equipment and RI which are underused and are costly to maintain, but could be used much more effectively.

InfraBooster offers modular training for scientific institutions with own research equipment and RI. It is meant for scientists, technicians, people from university or RI administration, with a focus on empowering individuals within these institutions. While the programme is specifically targeting the WB, it is based on a methodology developed at the University of Warsaw over the last two years. The success has led to its expansion to the WB, but also to other EU countries.

Krzysztof Klincewicz pointed out the traditional knowledge transfer pathway and explained the unique aspect of the InfraBooster programme. Unlike the conventional approach where scientists wait until they have a patent, InfraBooster focusses on facilitating connections between scientists and potential external partners. This approach leverages the use of existing resources and opens the opportunities for commercialisation and the promotion of excellence in research. The InfraBooster team assists scientists in identifying specific potential industrial partners through the use of intelligent databases, company profiles, and organises specific matching events between research teams and the business sector. All these training programmes are provided free of charge for representatives of scientific organisations in the WB which own research equipment or RI.

The InfraBooster programme for the WB offers the chance to engage in industrial collaboration, gain international exposure, and the ability to work with large industrial players as well as the opportunity to maximise the utilisation of existing research equipment and RI for science-industry collaboration.

The upcoming event 2023 InfraBooster Government Executive Academy is designed for public sector representatives from across Europe, including national and regional governments. WB representatives are invited to participate in this executive-level training programme. The application deadline for this event is 16 October 2023; more information can be found at the following link: <https://www.eitfood.eu/projects/infrabooster/gea> .

Concluding remarks

The closing remarks were delivered by Sinisa Marcic (RCC) and Sanja Damjanovic (POLICY ANSWERS and GSI).

Sinisa Marcic emphasised that the Workshop shed light on some very interesting success stories from the region at the level of individual institutions and universities. He pointed out the importance of a digital platform which interconnects Open Access RI. In this regard, the currently ongoing development of such a platform in Serbia could potentially be scaled regionally, or the region could consider joining the EERIS platform in Romania (Engage in the European Research Infrastructures System). He also underlined the need for more efficient utilisation of the existing RI, and the InfraBooster initiative could help build capacities for better management of running RI.



Sanja Damjanovic emphasised the need for more RI in the WB, to slow down or even to revert the brain drain which is a significant challenge in the region. She also pointed out that there is often doubt about whether the WB have the user capacity for RI. She underlined that any RI based on new technologies would immediately attract many high skilled professionals from the WB who have left the region. While human capacity is undoubtedly present, a strategic coordination process is required to improve and optimise access to all potential funding sources for RI, including the IPA funds. There is a potential to synergise with the recently published EC guidelines that aim at putting synergies between Horizon Europe and the EU Cohesion Policy Funds (ERDF), and align their objectives with the Instrument for Pre-accession Assistance (IPA) funds. The strategic and coordination process should also include cohesive and joint efforts to ensure that instruments of facilitating access to world-class RI (ESFRI, ERIC, or TNA infrastructures) become an integral component of the Widening Programme under the upcoming EU Framework Programme (FP10).