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Policy Dialogue on Aligning Priorities in the Western Balkans

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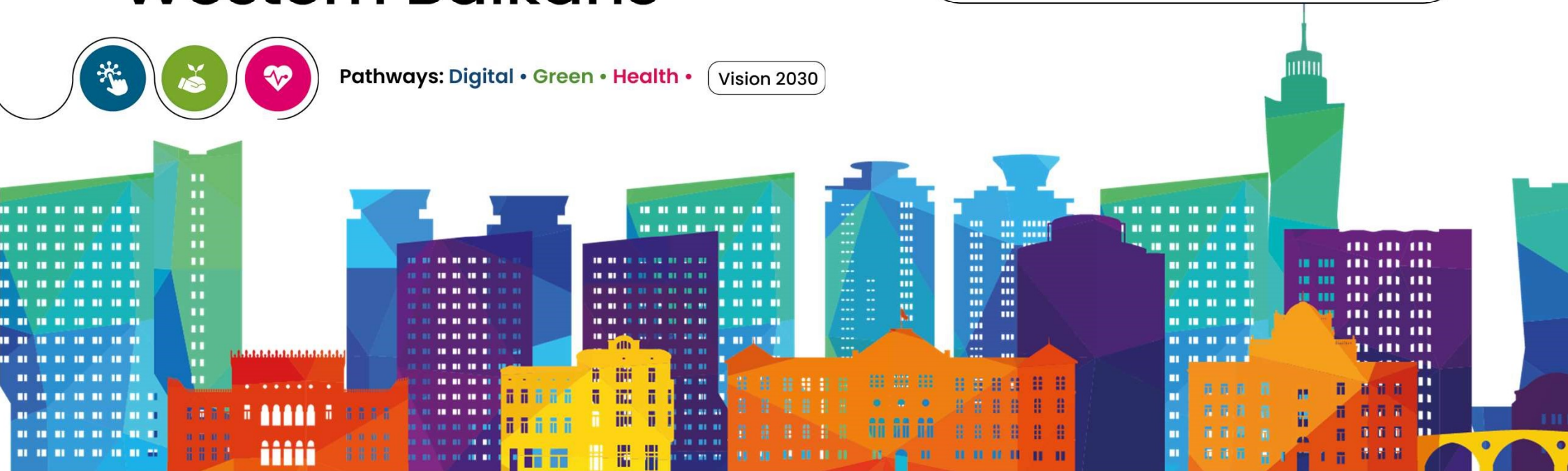
Sarajevo, Bosnia and Herzegovina
14 September 2023

Pathways: Digital • Green • Health • Vision 2030

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

University of Sarajevo High-Performance Computing (HPC) System

University of Sarajevo

- 22 Faculties, 3 Academies and 5 research Institutes

- 1.700 academic and scientific staff

- Organized in six science/arts groups

- With over 400 active study programs

- 200+ academic and science departments

- Around 25.000 enrolled students
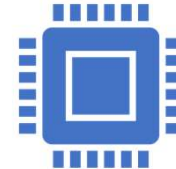
- Budget of 100 mil Euro

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University Research Infrastructure – Strategic Aspect

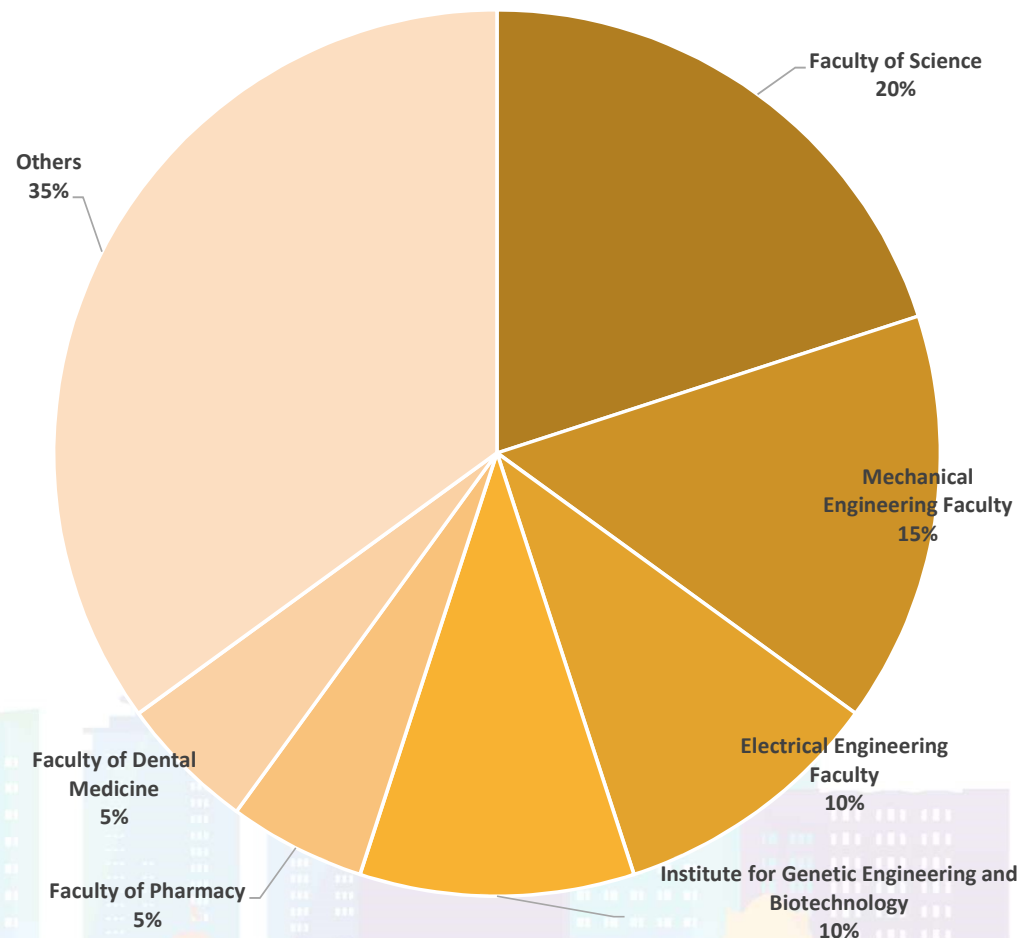| … documents	… participation	… key infrastructure projects
IPR Policy (adopted in 2020) Open Access to RI Policy (adopted in 2021) Rulebook on IP management (adopted in 2022)	Active participation in the Framework for research infrastructure roadmap of BiH DARIAH – Digital Research Infrastructure for the Arts and Humanities (member since 2021, UNSA coordinator 2021-2024) RESILIENCE – Research infrastructure in Religious Studies (H2020/HE projects, part of the ESFRI roadmap for 2021)	Sarajevo ion accelerator (II phase) Open Research Network (open RI, virtual laboratories, TTO, etc.) High-Performance Computing (HPC) System TEM & BioTech 2.0 AI Digital and Molecular Pathology BigData and AI research centers DigiEd 2.0 AAI, etc.

University Research Infrastrukture Investments

- Monetary value: >13 mil. EUR
  - Sarajevo ion accelerator (I phase)
  - Science for Gen Z
  - BioTech
  - eUNSA
  - DigiEd HCI
  - ORI
  - …
- Some examples:
  - Mass spectrometer UPLC MS/MS
  - Genetic analyzer 3500 Series (Applied Biosystems)
  - Single-particle mass spectrometry (SPMS)
  - SEM
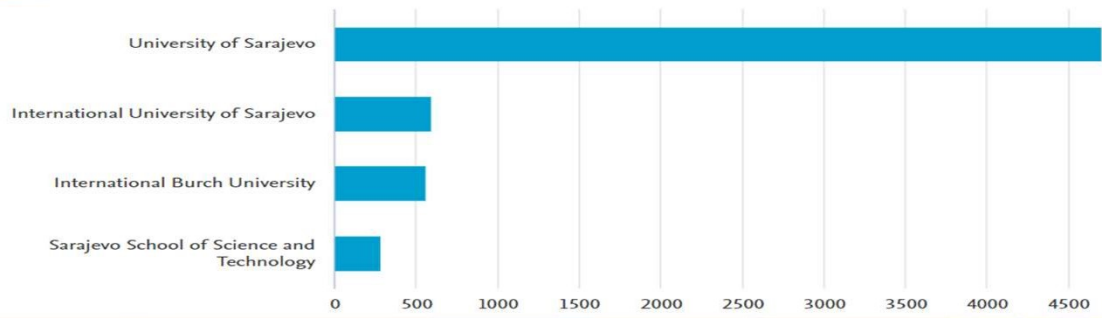 - Spitzenberger Spies PD 2190 GV/GSM
  - Flow cytometer

Pie chart:
- Faculty of Science 20%
- Mechanical Engineering Faculty 15%
- Electrical Engineering Faculty 10%
- Institute for Genetic Engineering and Biotechnology 10%
- Faculty of Pharmacy 5%
- Faculty of Dental Medicine 5%
- Others 35%

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Result ...
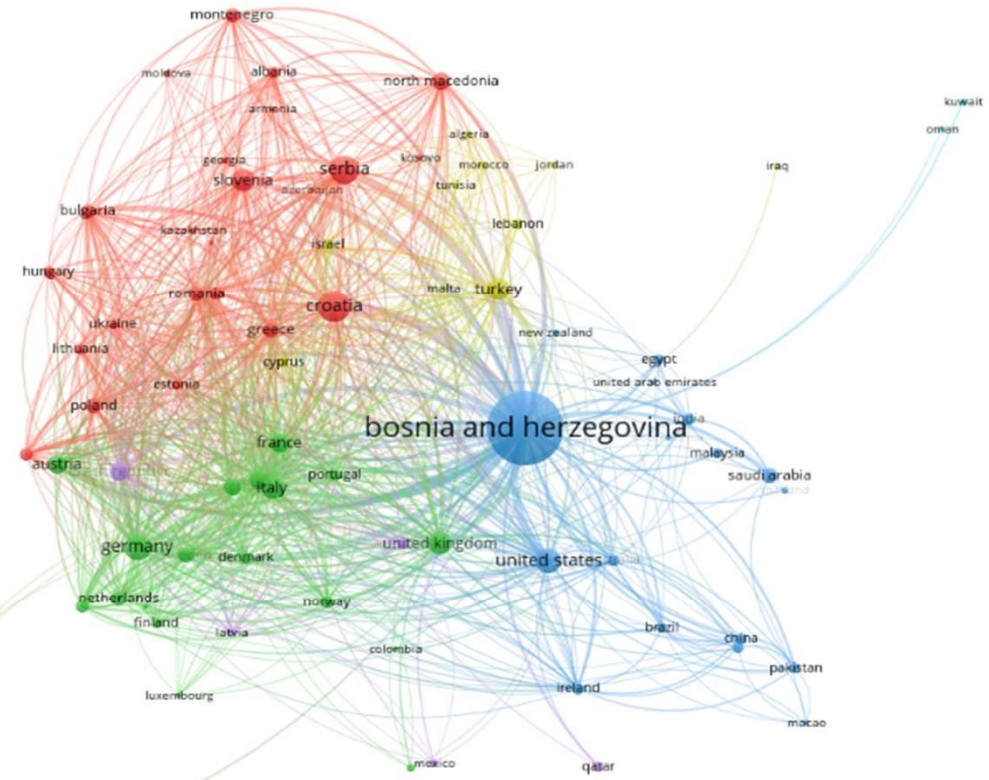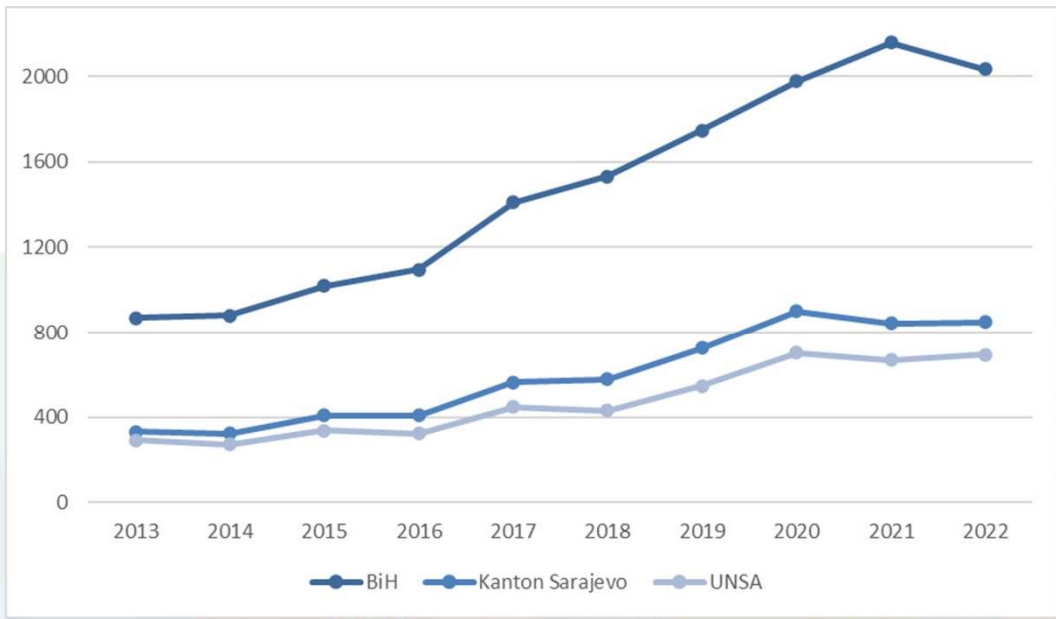
About High-Performance Computing (HPC) System

- High-Performance Computing (HPC) systems are computer clusters designed to process complex and large-scale scientific, engineering, and business problems characterized by their high processing power, fast I/O systems, large memory capacity, and parallel processing capabilities, as well as high capacity, reliable connection to outside users.

- High-Performance Computing (HPC) systems are essential tool for high-volume data-driven scientific research, engineering and advanced data analytics, enabling processing of large-scale datasets, simulation of complex physical phenomena and solving optimization problems.

- LUMI – mid 2022. 144,5 mil €, 375/550
- LEONARDO – 2022. 240 mil €, 249,47/323,40
- MareNostrum5 – 2022. 151 mil €, 205/314
- VEGA - 2021. €17.2 mil € 6,92/10,05
- MELUXINA - 2021. 30.4 mil €, 12,81/18,29
- KAROLINA – 2021. 15 mil €, 9.59/15.69
- DISCOVERER – 2021. 11,5 mil €, 4,51/5,94
- DEUCALION – 2023. 20 mil €, 7,22/10

University HPC - objectives

- To provide a **highly scalable and flexible computing platform to support the growing professional and research demands** of the University, and wider scientific and professional/IT community in the Canton.

- **To support demanding applications** that require large amounts of computing power and storage.

- To **improve the speed and efficiency** of data processing and analysis.

- To increase the accuracy of simulations and modelling.

- **To facilitate collaboration and knowledge sharing among researchers and scientists, but also the entire scientific and professional/IT community in the Canton.**

- To reduce the time to results for time-critical projects.

- To contribute to BiH's digital transformation goals and aligning with the specific priorities of the Digital Europe Programme, and become recognised as national focal point for communication, coordination, and collaboration within the EU Digital Europe Programme and EuroHPC JU initiative.

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University HPC - application ...

in the fields of:

- Fundamental scientific research
- Weather forecasting
- Computational biology
- Fluid dynamics
- Energy exploration
- Materials research
- Medical research
- Financial modelling
- Machine learning and artificial intelligence
- Creative Industry

for ...

- Training deep neural networks
- Machine learning
- Large-scale data processing
- Parallel processing
- Optimization algorithms
- Real-time processing
- Learning

University HPC - benefits for …

University:

- Increased Research Capabilities
- Improved Student Training
- Increased Collaboration Potential
- Reduced Time and Cost
- further enhancement of digital transformation

wider scientific and professional community:

- Access to Powerful Computational Resources
- Research Collaboration
- Collaboration with Academic Experts
- Accelerated Research and Development
- Validation of Proof of Concept
- Skill Development and Collaboration
- Algorithm Optimization and Testing
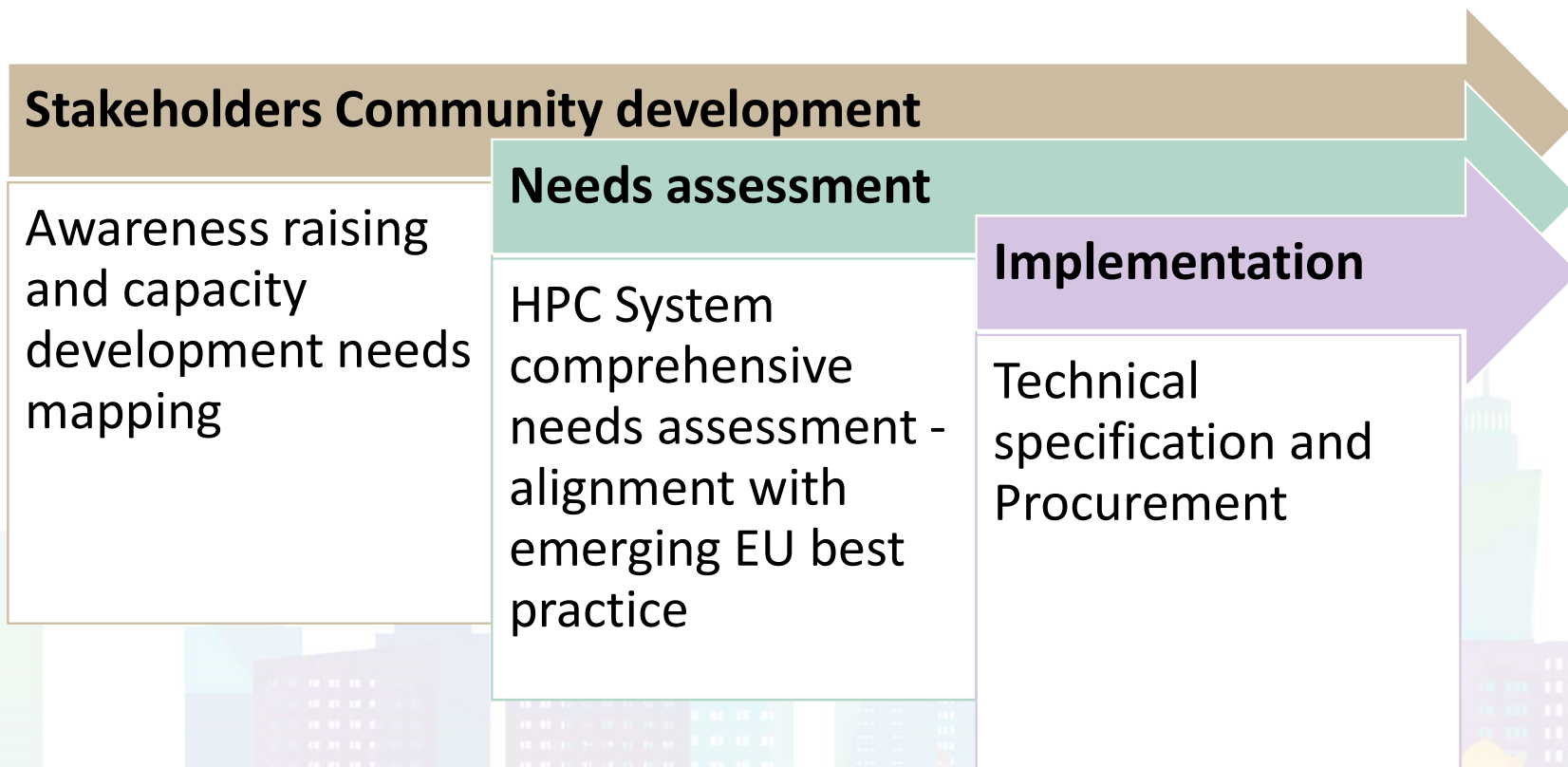- Talent Recruitment and Collaboration

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University HPC – approach …

Stakeholders Community development

Awareness raising and capacity development needs mapping

Needs assessment

HPC System comprehensive needs assessment - alignment with emerging EU best practice

Implementation

Technical specification and Procurement

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