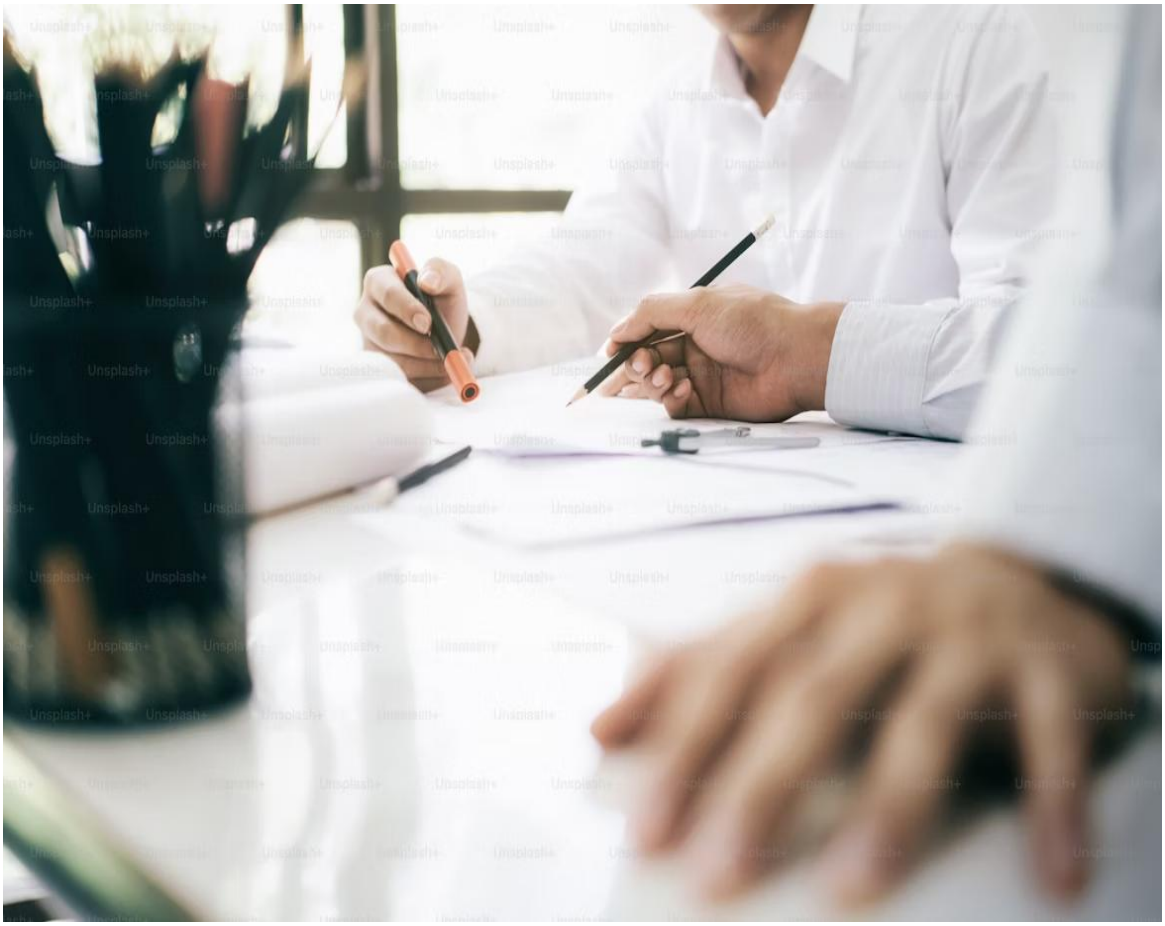
Strategy for Research and Innovation for the Development of the Entrepreneurial Ecosystem in Bosnia and Herzegovina



CPME - Centre for Project Management and Entrepreneurship, Faculty of Economics, University of Banja Luka

Banja Luka, December 2025

WP2. Capacity Building for Research and Innovation in Enlargement Countries T2.3. Setting Research and Innovation Directions in Enlargement Countries, A2.3.1. Formulation of the Research and Innovation Strategy (draft version), D.2.3. Research and Innovation Strategies.

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Based on Article 55 of the Statute of the University of Banja Luka and Article 20 of the Statute of the Faculty of Economics, the Scientific and Teaching Council of the Faculty of Economics, University of Banja Luka, at its 8th session held on 19 May 2025, adopted Decision No. 13/3.576-VIII-8/25 on the appointment of members of the working group for the preparation of the document "Draft Strategy for Research and Innovation of the Faculty of Economics and Action Plan for the Implementation of the Research and Innovation Strategy". Within WP2 – *Capacity Building for Research and Innovation (R&I) in Enlargement Countries,* T2.3 – *Setting Research and Innovation (R&I) Directions in Enlargement Countries,* A2.3.1 – *Formulation of the Research and Innovation Strategy (draft version),* D2.3 – *Research and Innovation (R&I) Strategy*, the working group prepared the draft document "Draft Strategy for Research and Innovation of the Faculty of Economics and Action Plan for the Implementation of the Research and Innovation Strategy" in the following composition:

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12. Milica Marić, MA, Member of the USE IPM Project Team and Member of the Department of Quantitative Analysis and Informatics;

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16. Representative of the Regional Chamber of Commerce Banja Luka.

Content

Draft Strategy for Research and Innovation (R&I) for the Development of the Entrepreneurial Ecosystem in Bosnia and Herzegovina

Summary

The GDP per capita in Bosnia and Herzegovina (BiH) amounts to slightly more than one-third of the EU average. The country continues to face significant socioeconomic challenges, further exacerbated by external shocks such as the war in Ukraine and rising global inflation, which have increased the cost of living and placed additional pressure on economic stability (UNICEF, 2025). The share of small and medium-sized enterprises (SMEs) in total turnover in BiH is higher than the EU average (17.4% compared to 12.6%), while the share of employment in the manufacturing sector amounts to 19.5%, compared to 15.6% in the EU (European Commission [EC], 2025a).

> However, the country records weaker performance in employment within high- and medium-technology sectors, as well as in knowledge-based services, highlighting the low innovation intensity of its economy. BiH shows a similar level of employment in service activities and value added of foreign-owned enterprises as the EU average. These factors point to an attractive economic and fiscal environment that supports SME growth and contributes to improving the overall ease of doing business (EC, 2025a, p.6).

In response to the stagnation and insufficient economic growth in BiH, the academic community is taking on the role of a crucial actor within the entrepreneurial innovation ecosystem, providing strategic approaches to developing its own research capacities. *The Research and Innovation (R&I) Strategy for the Development of the Entrepreneurial Ecosystem in Bosnia and Herzegovina and the enlargement countries* — Serbia, Albania and North Macedonia — partners in the USE IPM project, focuses on strengthening institutional infrastructure, improving collaboration between science and industry and creating an open, inclusive and sustainable innovation environment. A key role in the implementation of this strategy in BiH is attributed to higher education institutions, particularly the Faculty of Economics, University of Banja Luka (UNIBL) and its development and innovation centers, such as the *Center for Project Management and Entrepreneurship (CPME)* and *eLab*. These centers serve as key mechanisms for strengthening collaboration between academia, the private sector, government and civil society — enabling knowledge transfer and fostering systems of *open and sustainable innovation* in Bosnia and Herzegovina and the region through the Quintuple Helix Model of cooperation (Shkarupeta & Babkin, 2024).

The Strategy is fully aligned with European strategic frameworks, including *Horizon Europe*, the Smart Specialization Strategy (S3), the European Research Area (ERA) and the EU Green Deal. At the national level, it builds upon existing development documents and policies of each partner country, focusing on building a more competitive, digitally capable and innovation-driven entrepreneurial sector. The foundation for developing this Strategy includes a series of four thematic rounds of desk-based needs analysis, Delphi studies, focus groups and quantitative empirical research conducted on a sample of 100 micro, small, medium and large enterprises, implemented within the USE IPM project. It also incorporates insights from five study visits by six

CPME researchers to five EU countries, lasting a total of three months, carried out between December 2023 and October 2025.

The strategic objectives of the Strategy include:

1. *Strengthening the role of the University as a catalyst for social progress* – with a special focus on the role of the Faculty of Economics at UNIBL – as an active actor in the regional innovation system through functional development centers and partnerships with the business sector.
2. *Promoting open innovation* through the interaction of academia, the private sector and public institutions, aiming at jointly creating sustainable solutions for societal and market challenges.
3. *Building capacities for knowledge and technology transfer* by creating collaboration instruments (innovation laboratories, University knowledge transfer office, active cooperation with the Science and Technology Park of Republika Srpska).
4. *Developing human capital* with an emphasis on transversal competencies, digital skills and entrepreneurial mindset, focusing on empowering youth, marginalised groups and women in the innovation process.
5. *Enhancing regional cooperation* to create an interconnected and functional innovation space in the Western Balkans.

It is expected that the implementation of the strategy will contribute to the creation of a stronger entrepreneurial and innovation ecosystem in Bosnia and Herzegovina, connected with the European Research Area. Through the active involvement of institutions such as the Faculty of Economics and other organisational units of UNIBL, the strategy will enable better knowledge flow, the development of new business models, increased self-employment rates among students and graduates, enhanced competitiveness of newly established startups and small and medium-sized enterprises (SMEs), and the strengthening of an innovation culture based on collaboration, sustainability and openness to change.

1. INTRODUCTION

1.1. Overview of the Entrepreneurial Ecosystem in Bosnia and Herzegovina[1]

Entrepreneurial ecosystems are defined as *a set of interdependent actors and factors coordinated in such a way as to enable productive entrepreneurship within a given territory* (Stam & Spigel, 2016). In addition to placing entrepreneurs – rather than existing firms – at the centre of attention (Stam, 2015), the entrepreneurial ecosystem approach considers the broader entrepreneurial context in which entrepreneurship takes place (Brown & Mason, 2014) and examines wide-ranging socio-economic, technological and cultural dimensions and influences (Audretsch et al., 2019). This perspective supports Baumol's (2010) theory, which makes a key distinction between ***"routine/systematic innovation"*** and ***"entrepreneurial innovation"***. Baumol (2010) argued that routine/systematic innovation is predominantly the domain of large multinational corporations, such as IBM, Novartis, GE and Intel, which possess substantial, traditional research laboratories and facilities. In contrast, he considered small entrepreneurial firms – including many originating from universities – as the primary sources of radical or revolutionary breakthrough innovations. Some notable examples of entrepreneurial innovations developed by small firms

[1] The overview of the entrepreneurial ecosystem in Bosnia and Herzegovina, with the author's permission, has been adapted from Petković, S. (2025). *Entrepreneurial Management of Innovative Start-ups*. Banja Luka: University of Banja Luka, Faculty of Economics.
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include the electronic calculator, alternating current, sound film, turbojet engine, biotechnology, the personal computer and internet search engines (Guerrero & Siegel, 2024).

Nascent or potential entrepreneurs require "a tailwind" in the form of strong and modern educational institutions, role models, alternative sources of early-stage start-up financing, supportive fiscal policies, efficient legislative, judicial, and executive authorities, mentoring networks and other entrepreneurial infrastructure institutions. In the entrepreneurial ecosystem of Bosnia and Herzegovina, there is a lack of venture capitalists, angel investors, crowdfunding platforms, science and technology parks, free economic zones, business accelerators and mentoring services for aspiring entrepreneurs (although mentoring services are beginning to appear, primarily on a project basis). Furthermore, there is an insufficient number of role models – globally recognised successful entrepreneurs – universities have not been transformed into entrepreneurial ecosystems, and generally, "other values" prevail in which initiative, proactivity, creativity and the willingness to take reasonable risks are not particularly desirable traits. Entrepreneurial ecosystems are defined as *a set of interdependent actors and factors coordinated to enable productive entrepreneurship within a given territory* (Stam & Spigel, 2016). In addition to focusing on entrepreneurs rather than existing firms (Stam, 2015), the entrepreneurial ecosystem approach examines the broader context in which entrepreneurship occurs (Brown & Mason, 2014) and investigates socio-economic, technological and cultural dimensions and impacts (Audretsch et al., 2018; 2019). This perspective supports Baumol's (2010) theory, which distinguishes between ***"routine/systematic innovation"*** and ***"entrepreneurial innovation".*** Routine/systematic innovation is primarily the domain of large multinational corporations such as IBM, Novartis, GE and Intel, which have substantial traditional research laboratories and facilities. Small entrepreneurial firms – including many university spin-offs – are considered the key sources of radical or breakthrough innovations. Notable examples of entrepreneurial innovations developed by small firms include the electronic calculator, alternating current, sound film, turbojet engine, biotechnology, the personal computer and internet search engines (Guerrero & Siegel, 2024).

In most cities and municipalities in Bosnia and Herzegovina, except for areas where large publicly owned companies were not significantly present, a policy of "dependence" prevails rather than a policy of "independence" that encourages individuality, creativity and innovativeness – all essential predispositions for entrepreneurial activity. In certain smaller local communities in Bosnia and Herzegovina, one can observe a so-called entrepreneurial subculture, typically in towns that either lacked strong industrial facilities during socialist Yugoslavia or had a separately developed entrepreneurial culture, which was more of an exception than the rule (e.g. Kotor Varoš, Tešanj, Laktaši, Gračanica, Široki Brijeg). Therefore, one of the key factors for the development of entrepreneurship in small developing economies – which is clearly missing – is an entrepreneurial culture. *Entrepreneurial culture is fostered from an early age, beginning even in the preschool years* (Petković & Kisić, 2019). A limiting factor for the development of entrepreneurial culture in Bosnia and Herzegovina has been the long period of the so-called socialist self-managed socio-economic system, as well as the extended post-war recovery period and the continuation of the ongoing transition.

Vidović (2022) investigated the level of development of the entrepreneurial ecosystem in Bosnia and Herzegovina using the GEM NES study (National Experts Study). The application of the GEM NES study enables the calculation of the overall NECI score – the National Entrepreneurship Context Index – according to the GEM methodology, derived from the GEM NES study (GEM, 2022). Based on the NECI score, all nine individual elements of the entrepreneurial ecosystem in Bosnia and Herzegovina[2] can be analysed and the overall and individual scores compared with an

[2] The analysis of the entrepreneurial ecosystem in Bosnia and Herzegovina was conducted as part of the empirical research for the doctoral dissertation of Milica Vidović at the Faculty of Economics, University of Banja Luka, under the supervision of Prof. Dr Saša Petković.
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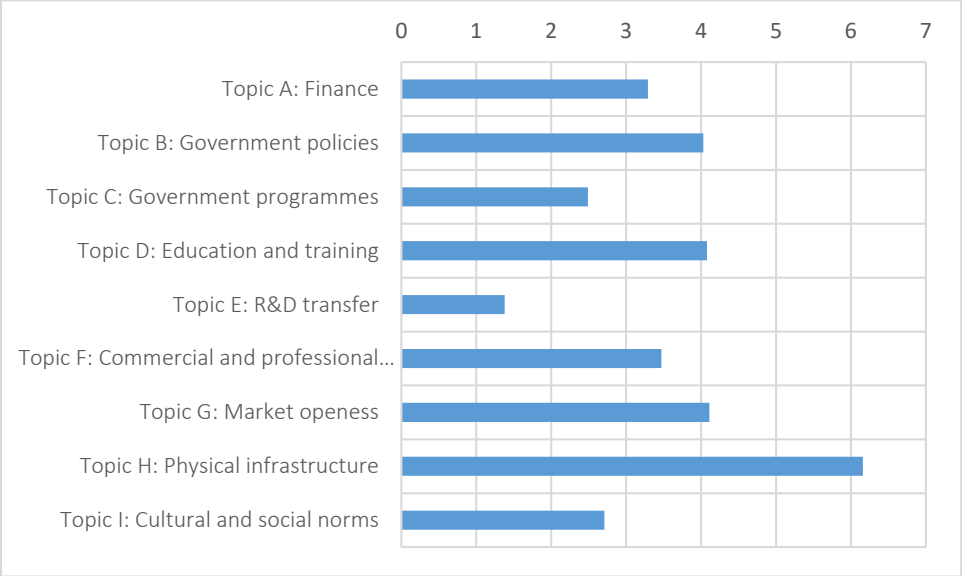
identical study conducted in 2021 across 50 countries worldwide. The following chart presents the individual scores for the nine elements of the entrepreneurial ecosystem, measured using Likert scales and ratings from one (1) to ten (10), where ten represents the highest score and five (5) is the threshold score, representing a "satisfactory level" of development for the component or the overall entrepreneurial ecosystem.

Chart 1

Entrepreneurial ecosystem in Bosnia and Herzegovina in 2021



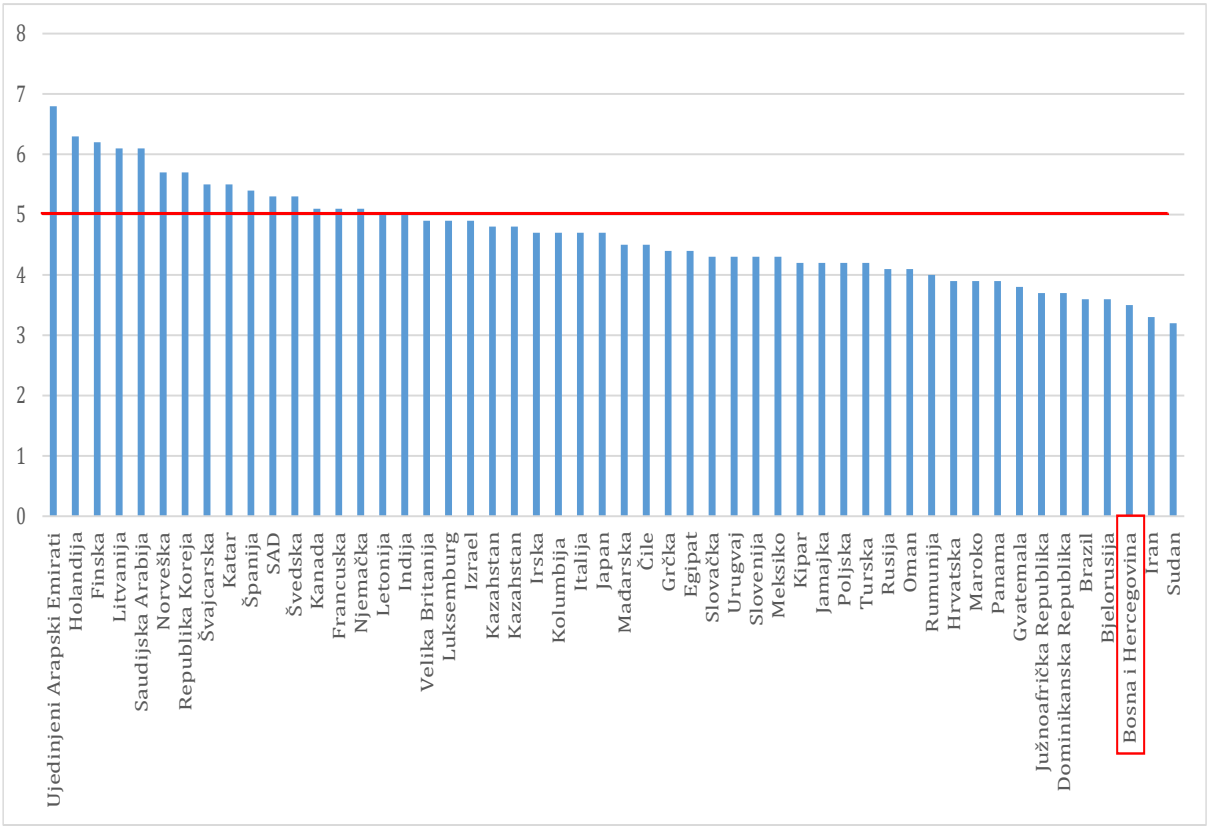
Notes. The chart presents the score for the nine elements of the entrepreneurial ecosystem in Bosnia and Herzegovina, according to the opinions of 36 experts from nine areas shown on the chart. The overall average score is 3.52, which is significantly below the "passing" score of five (5), representing a satisfactory level of development of the entrepreneurial ecosystem. This score represents the NECI score, or the National Entrepreneurial Context Index, according to the GEM methodology, derived from the GEM NES study (Vidović, 2022, p. 192).

According to the experts who participated in the study, the only category to achieve a passing score was physical infrastructure, with a score above five (5), specifically 6.16. However, even this score is questionable, given that the motorway network in Bosnia and Herzegovina is incomplete, the railway system barely functions and the availability of broadband fibre-optic internet and 5G mobile networks remains uncertain. Apart from the airport in Sarajevo, the Banja Luka and Tuzla airports rely on the policies of low-cost carriers from the EU, and Bosnia and Herzegovina lacks a national airline. More concerning than the lack of quality physical infrastructure is the extremely low proportion of funds allocated by entities and companies to research and development, while knowledge transfer between the academic and real sectors (in both directions) is negligible. In 2020, ***only 0.21% of Bosnia and Herzegovina's total GDP was allocated to research and development***, whereas during the same period Israel allocated 5.44%, South Korea 4.81%, Sweden 3.53% and the EU an average of 2.36% of total GDP (The World Bank, 2020). Cultural and social norms were also rated poorly, as were government programmes providing concrete support for entrepreneurial development. Funding sources received low scores as well, despite the banking sector in Bosnia and Herzegovina being relatively developed and liquid. Alternative sources of funding for early-stage entrepreneurial ventures, such as angel investors, venture capital funds and crowdfunding, are almost non-existent in Bosnia and Herzegovina, meaning that the overall score for this part of the entrepreneurial ecosystem is below average. ***The entrepreneurial ecosystem in Bosnia and Herzegovina is at a low level of development,*** with

an overall NECI score of 3.52. If compared with the NECI scores of the 50 countries that participated in the GEM 2021/2022 study, Bosnia and Herzegovina would rank 49th (Vidović, 2022, p. 194). Only Sudan and Iran scored lower, with 3.3 and 3.2 respectively. The score of 3.52 for Bosnia and Herzegovina is also lower than those of the nearest countries, Croatia and Slovenia, which participated in the GEM 2021/2022 study and received scores of 3.9 and 4.3 respectively. The highest NECI scores were achieved by the United Arab Emirates (6.8), the Netherlands (6.3), Finland (6.2), Saudi Arabia (6.1) and Lithuania (6.1), while the lowest scores were recorded for Sudan (3.2), Iran (3.3), Belarus (3.6) and Brazil (3.6) (GEM, 2022, p. 90).

Chart 2

NECI – National Entrepreneurship Context Index in 2021



Notes. Adapted and reprinted from GEM, 2022, p. 90 and Vidović, 2022.

To build a thriving entrepreneurial ecosystem, a rational combination of the personal characteristics of potential entrepreneurs and a supportive environment is essential. Encouraging an entrepreneurial culture cannot simply be "copied and pasted" from successful ecosystems, such as Silicon Valley in California, USA. "Personal factors such as intelligence, creativity, insight, motivation and perseverance play a role, but at the same time, the environment either stimulates or suppresses initiative. People can plant the seeds of individual effort on either barren or fertile soil" (Koven, 2021, p. 85). Many cities in the former Yugoslavia that were once leading industrial centres no longer hold that status, having restructured their economic structures to varying degrees of success (e.g. Maribor, Banja Luka). The question arises: can targeted strategic support for entrepreneurship, collaboration between the public and private sectors and the development of an innovative entrepreneurial ecosystem restore the "post-industrial shine" to certain cities

and regions and stimulate a wide range of industries from manufacturing to services? We believe this is possible, as will be further elaborated in the remainder of the Strategy.

1.2. Importance of Research and Innovation (R&I) for Ecosystem Development

Research and innovation (R&I) in the contemporary socio-economic environment are key drivers of change and the foundation for building a competitive and resilient economy (European Commission, 2025b). Rapid technological development, digital transformation, accelerated labor market changes, global connectivity and growing challenges such as climate change emphasise the need for continuous improvement of knowledge, technologies and business models (Eller et al., 2020). Innovations, often resulting from systematic and applied research, enable the transformation of creative ideas into products, services and processes that meet real end-user needs, stimulate economic growth and contribute to social development (Zhang, 2022).

For the Western Balkan countries, which are in the process of European integration, investing in research and innovation capacities represents a strategic tool for overcoming current limitations and developing the economy through the establishment of a dynamic innovation ecosystem (Beaudry et al., 2021). Priorities include increasing competitiveness, modernising the economy, developing promising sectors, and empowering and encouraging entrepreneurs. The development of an entrepreneurial and innovation ecosystem cannot be viewed separately from the social context, so sustainable functioning requires coordination between the educational, research, private and public sectors, with universities in the Western Balkans playing a key role as change drivers and facilitators of collaboration between these sectors. It is particularly important that ecosystem development aligns with social and economic needs, as the sustainability of innovations is achieved only when they provide benefits to the wider community and the economy as a whole.

The development of a sustainable entrepreneurial ecosystem is a broader concept than developing a favorable business environment. A sustainable ecosystem implies the ability of enterprises to create and apply new knowledge, and through research and innovation, develop sustainable products and services that add value to the economy (Beaudry et al., 2021). Investment in R&I brings multiple benefits: improved productivity, economic diversification, creation of new jobs, strengthening export potential, resilience to external shocks and the introduction of green and digital solutions (Delechat et al., 2024). A developed innovation ecosystem should be dynamic, open, inclusive and connected—both nationally and at regional and European levels. This requires collaboration among businesses, academic institutions, civil society organisations and public institutions in jointly creating solutions to market and social challenges. Open innovation is particularly important, involving various stakeholders in the process of knowledge creation and diffusion, which increases the speed, quality and societal impact of innovation solutions.

1.3. Strategic Alignment with EU and National Policies

Several strategic documents form the basis for innovation and economic development policies in Bosnia and Herzegovina. The Directorate for Economic Planning of BiH prepared the Strategic Framework for Bosnia and Herzegovina in 2015 (Direkcija za ekonomsko planiranje BiH, 2015). During its preparation, existing strategic documents adopted by the Council of Ministers of BiH, as well as obligations arising from the Stabilisation and Association Agreement between BiH and the EU, were taken into account. The document is structured in accordance with the European Union 2020 Strategy and the South-East Europe 2020 Strategy, adopted by the Council of Ministers of BiH.

By identifying development areas within the objectives of the South-East Europe 2020 Strategy, which are interrelated, the following goals for BiH were established:

- *Integrated growth* through the promotion of regional trade and mutual investment and development, as well as through non-discriminatory and transparent trade policies;
- *Smart growth*, encompassing innovation, digitalisation and youth mobility, as well as the determination to remain competitive based on quality rather than low labour costs;
- *Sustainable growth*, focusing on balanced regional development and the improvement of efficiency and sustainability in natural resource management, supporting increased economic and social self-sufficiency, and creating better conditions for local development and employment;
- *Inclusive growth*, aimed at increasing employment, developing skills, ensuring inclusive participation in the labour market, providing inclusive and quality healthcare, and reducing poverty;
- *Governance as a function of growth*, entailing the strengthening of administrative capacity to implement the principles of good governance at all levels of authority, reinforcing the rule of law and combating corruption to create the business environment necessary for economic and social development.

In September 2015, Bosnia and Herzegovina, together with 192 United Nations member states, committed to implementing the 2030 Agenda for Sustainable Development, which consists of 17 Sustainable Development Goals (SDGs) and 169 targets. BiH recognised the importance and potential of implementing the SDGs and the 2030 Agenda as an opportunity to significantly improve the social, economic and environmental aspects of life in the country, as well as to enhance regional cooperation.

The first step in implementing the 2030 Agenda in BiH was the development of the Framework for Sustainable Development Goals in BiH (UNDP, 2020), a joint document involving all levels of government that defines the broader development directions to which all government levels and society in BiH wish to contribute to achieving the SDGs. Based on an analysis of the state of sustainable development in BiH – i.e. key development trends, opportunities and barriers, particularly in the context of EU accession, and extensive consultations with representatives of institutions at all levels of government and socio-economic stakeholders during 2018–2019 – three broad sustainable development directions were identified for BiH:

1. Good governance and public sector
2. Smart growth
3. Society of equal opportunities

Two horizontal themes were also defined:

1. Human capital for the future
2. The principle of "leaving no one behind"

The first initiative to prepare the Smart Specialisation Strategy (S3) in Bosnia and Herzegovina began in 2020, when the Council of Ministers established a working group to draft the strategy and appointed the Directorate for Economic Planning (DEP) as the coordinator of the S3 process. Adopting a "bottom-up" approach, smart specialisation brings together local authorities, the academic community, the business sector and civil society to implement long-term growth strategies. The concept of smart specialisation is based on detailed analysis and identification of competitive advantages at the national and regional levels, highlighting economic, innovation,

scientific and technological potentials. In October 2022, the Final Report on Quantitative Analysis for Smart Specialisation in Bosnia and Herzegovina was prepared (Galić & Hollanders, 2022) to identify potential priority domains for smart specialisation in BiH, based on an analysis of economic, innovation, scientific and technological data. Industries with economic potential were identified using employment and value-added data for 2017–2020 and export data for 2010–2020. One of the main conclusions is that an economy like BiH largely depends on labour-intensive and/or low-technology/less knowledge-intensive industries, which contribute to these potentials, rather than on knowledge-based sectors. Only 18% of the identified industries were classified as medium–high technology or knowledge-intensive. The absence of industries internationally considered research and development-intensive implies that many of the identified industries with economic potential have weak innovation capacity.

Republika Srpska has developed a comprehensive Industrial Strategy for the period 2021–2027, as well as a Strategy for the Development of Science and Technology, Higher Education and the ICT Industry for 2023–2029. The latter strategy (Vlada Republike Srpska, 2023) is aligned with the objectives of the Europe 2030 for Sustainable Development document, which recognises education, science, technology, research, innovation and digitalisation as prerequisites for achieving a sustainable EU economy, contributing to the realisation of the UN Sustainable Development Goals. This strategy is also aligned with the Framework for Achieving the SDGs in BiH, as well as with other sectoral strategies in Republika Srpska, such as the Strategy for the Development of SMEs in Republika Srpska for 2022–2027, the Industrial Development Strategy of Republika Srpska for 2021–2027 and the Employment Strategy of Republika Srpska for 2022–2027.

During the preparation of the strategy, recommendations from the European Commission were considered, including the introduction of the smart specialisation concept, the promotion of open access to scientific data (Open Science), improving the quality of education by modernising curricula to better align with domestic labour market needs, and the development and enhancement of e-services and digital skills.

The objectives, priorities and measures of the Industrial Strategy of Republika Srpska for 2021–2027 are aligned with EU industrial policies, with the overarching goal of increasing industrial competitiveness. The planned priorities include recovery and revitalisation of industry, development and digitalisation of industry, internationalisation, import substitution, ensuring a skilled workforce, improvement of the business environment, attraction of industrial investments, application of environmental standards in industry and efficient use of industrial resources. Priority 1.2 focuses on the development and digitalisation of industry, recognising that the manufacturing sector currently generates insufficient added value and contributes only a small share to the GDP of Republika Srpska. Therefore, restructuring domestic production is necessary by promoting higher value-added production and introducing innovations, modern technologies and equipment into production processes (Ibid).

The EU Action Plan for the Circular Economy (CEAP), adopted in 2015, establishes a framework to accelerate Europe's transition from a linear to a circular economy, with 54 measures designed to "close" the product life cycle, from production and consumption to waste management and secondary raw materials markets.

Based on the objectives of the European Green Deal, the Green Agenda for the Western Balkans was adopted at the Sofia Summit in November 2020 as part of the region's Economic and Investment Plan (European Commission, 2020). The Green Agenda is a key document for alignment with EU climate and environmental policies.

The five pillars of the Green Agenda for the Western Balkans are:

1. Decarbonisation – energy transition, renewable energy sources (RES), energy efficiency
2. Circular Economy – waste management, sustainable production and consumption
3. Pollution Prevention – air, water, soil
4. Sustainable Mobility – low-carbon transport and infrastructure
5. Protection of Biodiversity and Ecosystems – conservation of natural resources, forest and land restoration

Bosnia and Herzegovina is a signatory to the Sofia Declaration and has formally committed to implementing the Green Agenda (Regional Cooperation Council, 2021). However, the implementation of these policies requires a significant strengthening of institutional capacities, legislative harmonisation and investment in green infrastructure.

In this context, the Industrial Strategy of Republika Srpska for the period 2021–2027 sets Strategic Objective 5: Reducing harmful environmental impacts. Priority 5.1 relates to the application of environmental standards in industry, representing a transition to a green economy, while Priority 5.2 concerns the efficient use of resources in industry, that is, a transition to a circular economy.

The Digital Agenda is one of the seven pillars of the Europe 2020 strategy, which sets growth targets for the EU up to 2020. The Digital Agenda proposes better utilisation of the potential of information and communication technologies (ICT) to promote innovation, economic growth and societal progress. In 2018, the European Union launched the Digital Agenda for the Western Balkans with the aim of supporting the region's transition to a digital economy and realising the benefits of digital transformation, such as faster economic growth, higher employment and improved service quality.

The European Commission document, "Support Measures for the Digital Agenda for the Western Balkans," identifies the following priorities:

1. Reducing roaming costs through the establishment of a roadmap for the gradual elimination of tariffs;
2. Development of broadband internet;
3. Development of e-government, e-procurement, e-health and digital skills;
4. Strengthening capacities in the areas of security and industrial digitalisation so that all sectors can benefit from digital innovations;
5. Adoption and implementation of EU legislation in the field of the single digital market.

These priorities are also recognised in the context of future industrial development in Republika Srpska, with the Industrial Strategy of Republika Srpska for 2021–2027 defining Priority 1.2: Development and digitalisation of industry.

The Industrial Strategy of Republika Srpska for 2021–2027 notes that collaboration between the scientific research community and the business sector remains insufficient. Existing cooperation between companies and research institutions has not reached a level that enables significant innovation outcomes. Research potential, and therefore investment in innovation, is recognised in a limited number of enterprises, while scientific and research institutions do not sufficiently align their research with companies and the practical application of innovations. To increase the level of research and development (R&D) and innovation activity in companies, it is necessary to provide professional support from the scientific research community.

The Horizon Europe programme (2021–2027) represents the EU's most important instrument for financing research and innovation, with a budget of €95.5 billion (Consilium – Council of the European Union, 2025).

The main objectives of the programme are:

- Strengthening the scientific and technological base of the EU,
- Addressing global challenges (climate change, sustainable development),
- Promoting the competitiveness and economic growth of the EU, and
- Achieving the EU's sustainable development goals and political priorities.

The programme is divided into four main parts:

1. Excellence in Science
   Funding is provided for cutting-edge research through:
   - The European Research Council (ERC),
   - Marie Skłodowska-Curie Actions (MSCA) – researcher mobility and development,
   - Research infrastructures.
2. Global Challenges and European Industrial Competitiveness
   This part is divided into clusters covering areas such as health, digitalisation, climate and energy, food and environment, security, culture and society, as well as industry and space.
3. Innovative Europe
   Focused on pioneering innovations and supporting start-ups and small and medium-sized enterprises (SMEs) through:
   - The European Innovation Council (EIC),
   - European innovation ecosystems,
   - The European Institute of Innovation and Technology (EIT).
4. Widening Participation and Strengthening the European Research Area (ERA)
   The aim is to support Member States and associated countries with lower research capacities to actively participate and benefit from the programme (Ibid).

Bosnia and Herzegovina is an associated country of the EU Framework Programme for Research and Innovation, Horizon Europe, and participates on equal terms with EU Member States under an agreement in force from 1 January 2021 to 31 December 2027. The status of an associated country provides the academic and research community, as well as companies in Bosnia and Herzegovina, access to European funding for research and innovation for the period 2021–2027.

1.4. The Role of Universities in Implementing and Sustaining the Strategy

Universities form the foundation of a country's innovation ecosystem. Their primary role is to generate new knowledge, develop skilled human capital and stimulate and support research in collaboration with the business sector. As such, universities serve as the starting point for creating innovations, as well as the final point when knowledge about innovations is transferred. Consequently, the role of universities in implementing and sustaining a research and innovation strategy is multifaceted, encompassing educational, research, developmental and advisory functions (Morawska-Jancelewicz, 2022).

The Faculty of Economics at the University of Banja Luka (UNIBL), as a leading higher education institution in Bosnia and Herzegovina with strong regional partnerships and active development centres (including CPME and eLab), has particular potential to act as a bridge between the academic and business sectors. Its past activities have included actively promoting student

internships and involving students in projects, providing mentorship for participation in student competitions and international programmes, engaging academic and administrative staff in international research and development-innovation programmes, and fostering collaboration and networking with the business sector through lectures, workshops and the inclusion of experts in research projects.

In future activities, universities should contribute to improving research infrastructure, where business experts would also play a significant role, through the following actions:

- Enhancing existing research infrastructure, including laboratories, innovation hubs and digital platforms.
- Supporting entrepreneurs through specialised training programmes organised by CPME, eLab and other specialised subunits of UNIBL, including training in innovation and entrepreneurship, the application of generative artificial intelligence tools and the development of transversal skills available to students, faculty and other interested stakeholders.
- Providing training in related fields to strengthen entrepreneurial competencies, such as financial literacy, funding sources, use of digital tools, quantitative analysis and foreign languages.
- Collaborating with foreign universities and organisations to facilitate knowledge mobility, exchange of best practices and joint work on addressing regional challenges.

In this way, universities do not remain merely educational institutions but become key actors in social and economic transformation, directly influencing the innovation capacity of the state and its readiness for integration into the European research and entrepreneurial space.

2. Strategic Vision and Objectives

Our vision is the gradual development of a functional ecosystem for research, innovation and entrepreneurship in Bosnia and Herzegovina, taking into account existing challenges as well as untapped opportunities. We do not aim for a premature "miracle" like Estonia or Israel, but rather a stable, step-by-step development that will enable:

- Better utilisation of existing resources (human, institutional, financial);
- Real connections between the academic community and the private sector;
- Practical innovations that solve local problems (rather than forcing "world-changing revolutionary ideas").

Our mission is to actively foster the creation and development of an innovative entrepreneurial ecosystem in the broader environment of the University through collaborative engagement of key stakeholders led by the Faculty of Economics at UNIBL. This ecosystem will promote economic growth and development, enhance the competitiveness of both new and existing companies, and accelerate the transition of developing countries toward knowledge-based societies. By encouraging a new paradigm of an open innovation ecosystem, through joint activities in research and development, education, training and active engagement of students and academic staff with the real, governmental and non-governmental sectors, as well as with citizens and the media, we aim to create a sustainable innovative entrepreneurial ecosystem that will guide our country and the region toward prosperity and sustainable development, aligned with the United Nations Sustainable Development Goals.

This vision entails the development of institutional capacities, investment in research infrastructure and human capital, and stronger cooperation between science, industry and government institutions. The strategy must align with the principles of sustainable development, digital transformation and inclusivity.

2.1. Strategic Objectives

- *Strengthening the Role of the University as a Catalyst for Social Progress* – with particular focus on the Faculty of Economics at UNIBL – as an active actor in the regional innovation system through functional development centres and partnerships with the business sector.
    - *Enhancing basic research infrastructure*
    - Renovating existing laboratories and faculty centres and creating new development centres within UNIBL's organisational units
    - *Functional digitalisation* (provision of essential IT equipment for research and teaching processes in collaboration with private companies, institutions and support from European funds; stable broadband optical internet; modern software)
    - *Functional student incubators and accelerators with mentors* (not necessarily "world-class", but sufficient to help startups survive the first 2–3 years)
    - *Focus on applied research* (e.g., agriculture, tourism, IT outsourcing – areas where BiH already has certain advantages)
    - *Connecting local companies with faculties* (e.g., students working on practical innovation projects for companies)
    - *Equipping classrooms and laboratories according to modern pedagogical methods of interactive learning in the digital age* (smaller functional and flexible labs, projectors, smart boards, audiovisual tools, etc.)
- *Promoting Open Innovation* through interaction between the academic community, private and public sectors, aiming at jointly creating sustainable solutions for social and market challenges.
    - Reducing bureaucracy (e.g. faster company registration, simplified taxes for small businesses)
    - Changing legal regulations to enable active engagement of lecturers – mentors – and students in creating university spin-off companies.
    - Joint applications by academia and private companies for EU co-financing of research and innovation activities.
    - Microcredits and small grants (instead of unrealistic expectations for large investments)
    - Support for existing SMEs (already operating and potential innovation drivers) and startups, through subsidies and tax incentives
- *Building Capacities for Knowledge and Technology Transfer* through creating collaborative instruments (innovation laboratories, knowledge transfer offices, platforms, living labs).
- *Developing Human Capital* with emphasis on transversal competencies, digital skills and entrepreneurial spirit, focusing on empowering youth, marginalised groups and women in the innovation process.
    - Education supporting practical skills (e.g. digital literacy, financial literacy, soft skills)
    - Support for both traditional and innovative businesses
    - Fewer "inspirational stories", more concrete steps (e.g. workshops on how to launch a business, rather than motivational speeches)
- *Enhancing Regional Cooperation* to create a mutually connected and functional innovation space in the Western Balkans.
    - Preparation of project applications for EU funds, as well as entity and state institutional funding

- Collaboration with neighbouring countries (e.g. Croatia, Serbia, Montenegro – where existing connections are already established)
- Cooperation with the diaspora (not necessarily for large-scale returns, but for mentoring and occasional consultancy)

3. Current State of the Entrepreneurial and Research-Innovation Ecosystem in BiH

Entrepreneurship, as a multidimensional concept, has become a cornerstone of economic development and sustainability, as well as a prerequisite for achieving higher rates of economic growth. For the development of entrepreneurship and the sustainability of entrepreneurial ventures, continuous promotion of innovation is essential, as it represents a key feature of all entrepreneurial activities. Therefore, entrepreneurship can be viewed as a dynamic process of discovering and evaluating opportunities for introducing new products, services and processes. This definition does not rely solely on creativity, which involves generating new ideas and knowledge, but also emphasises the fact that resources can be used in entirely new ways. The current state of the entrepreneurial and research-innovation ecosystem in BiH is marked by significant progress, but also by numerous challenges that slow down its full development (Bosnia and Herzegovina [BiH], 2011). Positive trends in the entrepreneurial ecosystem include the growth of the startup sector (accompanied by a significant increase in events, business angel networks and initiatives), regional integration (BiH became a full member of the Horizon Europe program in January 2021, granting researchers and innovators access to significant EU funds), as well as support from international organisations—most often through initiatives aimed at strengthening cooperation between the academic community, the business sector and public institutions (Council of Ministers – Directorate for European Integration [DEI], 2020). Challenges still facing the entrepreneurial sector in BiH include a lack of venture capital (especially in early development stages), weak coordination among different actors and a limited number of qualified mentors and investors (BiH, 2011).

3.1. Research and Innovation Capacity

The research and innovation ecosystem in BiH has shown progress in international collaboration (BiH is actively involved in EU research and innovation programs, particularly in the fields of energy and the environment, which strengthens capacity and competitiveness) and digital transformation (the EU supports BiH's efforts to promote digital trends and market competitiveness, including the development of digital innovation hubs and the promotion of green and digital transitions). However, to unlock the full potential of the entrepreneurial and research-innovation sector, *it is necessary to address the issues of insufficient investment in research and development, improve cooperation between academia, industry and the public sector, develop innovation infrastructure and create an environment that halts the negative "brain drain" trend* – migration of researchers and experts from various fields.

By implementing these measures, BiH can become a more competitive and innovative actor both regionally and internationally (Ministry of Civil Affairs of Bosnia and Herzegovina [MCP], n.d.).

3.1.1. *Status of Academic and Research Institutions in Bosnia and Herzegovina*

The status of academic and research institutions in BiH is complex and shaped by a number of factors, including a decentralised governance system, limited investment in science and weak links with industry and international knowledge flows. Strengths and potentials include:

- A respectable network of higher education institutions (BiH has over 40 higher education institutions, including public and private universities, with notable universities in Banja

Luka, Sarajevo, Tuzla, Mostar and East Sarajevo) covering a wide range of scientific fields (Republika Srpska [RS], 2023);

- Increasing participation in EU programs—the country is associated with Horizon Europe, showing growth in funds accessed and relative advantages in the fields of energy and environmental protection—demonstrating potential for international collaboration and knowledge transfer (European Commission, 2024);
- Initiatives for knowledge and innovation transfer (a number of technology transfer offices have been established, and partnerships exist with UNDP, GIZ, and other actors to strengthen innovation capacit).

Weaknesses and challenges include a decentralised and uneven governance system, a fragmented normative-strategic framework and very limited capacities (no significant progress recorded in the "Science and Research" sector), with low R&D expenditure—around 0.19% of GDP—which significantly limits research and innovation reach (European Commission, 2024). Additional challenges include low international visibility (less than 1,000 scientific publications annually in Scopus/WoS databases), average age of academic and research staff (~50 years), insufficient connection with industry and the labour market, brain drain and low researcher motivation.

3.1.2. *Research and Development Financing and Infrastructure*

Funding for research and development (R&D) in BiH is statistically monitored through two approaches. One approach concerns the recording of budget allocations, where data are collected, processed and published to track government policy in this area. Reporting units are budgetary institutions that provide the funds for implementing activities. The other approach is the statistical survey *Science, Technology and the Digital Society*, where reporting units are institutions conducting research and development activities. Its aim is to collect and publish data on R&D personnel, expenditures and funding sources, as well as the results of R&D activities.

In 2023, the total number of patent applications in BiH was 52, of which 7 were filed by foreign applicants (individuals and legal entities). In the same year, 3 patents were granted, all to foreign legal entities (Agency for Statistics of Bosnia and Herzegovina [BHAS], 2024).

> In 2023, the R&D sector in BiH employed 3,631 persons (full- and part-time), of whom 1,875 or 51.6% were women. Researchers constituted the largest share of total employment (80.2%). The majority of researchers were employed in the higher education sector (83.8%), while only 9.4% were employed in the business sector (BHAS, 2024). Budget allocations for R&D in BiH in 2023 amounted to BAM 73,881,655 (€37,775,090). By sector, the largest portion of funds was spent in higher education (69.4%), followed by the government sector (15.1%), the business sector (11.4%), the foreign sector (3.4%) and the non-profit sector (0.7%). The largest share of budget funding by socio-economic objective (37.0%) was allocated to general advancement of knowledge—research and development financed from general university funds. Gross domestic expenditure on R&D in BiH in 2023 amounted to BAM 94,115,000 (€48,120,235), or 0.18% of GDP. Of the 99 organisations engaged in R&D activities in 2023, the majority belonged to the higher education sector (61), while 28 were in the business sector. The total number of scientific publications in the same year was 1,533, of which fewer than 1,000 were indexed in Scopus/WoS databases. The largest number of publications (419 papers or 27.3%) was in the field of engineering and technology (BHAS, 2024).

In addition to relatively low percentage investment in R&D, the absolute amount allocated in BiH is extremely low on an annual basis, especially considering the country's low GDP. For comparison, in 2022 Austria allocated 2.2% of GDP to R&D, Belgium 3.4%, the Czech Republic 1.96%, Denmark 2.89%, Israel as much as 6.02%, while in the Western Balkans, Croatia allocated 1.4%, Serbia 0.90%, North Macedonia 0.40%, Montenegro 0.36% and Albania only 0.15% (World Bank Group, 2023).

R&D infrastructure in Bosnia and Herzegovina is largely underdeveloped and fragmented, which directly impacts the country's innovation capacity and its ability to participate in global knowledge and technology flows. Although BiH possesses certain technical and human resources within universities, institutes and some companies, the overall R&D infrastructure system is characterised by low coordination, insufficient funding and a lack of strategic planning.

Research institutions are mostly linked to public universities, while independent institutes and development centres have limited capacities and often operate in isolation. Technical equipment in many research centres is outdated, restricting the implementation of modern research, particularly in natural sciences, engineering and biomedicine. There is a shortage of young researchers and systemic support for their work. Funding comes predominantly from entity government budgets, while resources from international sources and partnerships remain underutilised. There is no dedicated national science fund.

Technology transfer and collaboration with industry are poorly developed. Most universities do not have functional technology transfer offices, nor do they hold patents that are commercially exploited. The use of digital tools is limited, and access to research databases and platforms is extremely poor (Parliament of Bosnia and Herzegovina [Parliament BiH], 2009). Persistent gaps in funding and collaboration also contribute to weak performance in intellectual property, which currently stands at 10.9% of the EU average for 2025. BiH ranks last among EU and neighbouring countries in terms of PCT patent applications and trademark filings. Nevertheless, the country recorded an increase of 7.4 percentage points in patent applications since 2018 (EC, 2025b).

3.1.3. *Inovation Performance and University–Industry Collaboration*

Bosnia and Herzegovina (BiH) consistently ranks low on the Global Innovation Index, indicating a weak level of innovation development compared with other countries in the region and Europe. A fundamental challenge is the chronic underinvestment in research and development (R&D), which amounts to less than 0.20% of GDP—well below the EU average and the recommended rate of 3% of GDP. In addition to financial constraints, the absence of coordinated strategies, legal frameworks and institutional support further slows innovation development. Most innovative activities originate from international donors and a few individual initiatives, while a systemic approach is almost non-existent. Although there is nominal connectivity between universities and industry, *collaboration is often symbolic and limited to sporadic projects or memoranda of understanding*. The educational system is predominantly theory-oriented, often lagging behind global innovations, and the lack of practical training and entrepreneurial education further distances students from the real sector. Conversely, the private sector often lacks trust in the academic community, perceiving it as closed and slow to adapt to market needs. Available data on collaboration metrics indicate weak performance, with joint publications between the public and private sectors at only 29.8% of the EU average for 2025. This reflects an underdeveloped infrastructure for cooperation between the business sector and academia, as well as limited R&D funding (OECD, 2024).

To improve innovation performance and strengthen university–industry collaboration in BiH, the following measures are recommended:

For the academic community:

- ✓ Redesign and accredit study programmes in line with UN Sustainable Development Goals (SDGs), ESG standards and a "student-centred" approach; develop English-language programmes aligned with labour market needs and the latest global scientific and technological advances.

- ✓ Establish partnerships with European universities to develop dual-degree programmes, enhancing knowledge transfer and internationalisation.
- ✓ Form and develop research centres in partnership with the private sector, following the paradigm of responsible open innovation.
- ✓ Embrace digitalisation and the ethical application of generative artificial intelligence tools in research and teaching.
- ✓ Establish technology transfer offices at public universities.
- ✓ Promote student internships, business incubators and accelerators, and mentoring programmes for nascent student entrepreneurs.

For the private sector:

- ✓ Actively participate in educational and research activities through guest lectures, promotion of responsible, green and smart innovations, motivational talks, conferences, round tables, joint projects with higher education institutions, scholarships and hosting students for internships; support the equipping of classrooms and laboratories.
- ✓ Invest in R&D and the development of responsible innovations in collaboration with universities.

For the government sector:

- ✓ *Local authorities*:
  - In cooperation with entity authorities and EU funds, identify non-viable military and commercial properties and convert them into business incubators and accelerators.
  - Eliminate parafiscal charges under local jurisdiction and reduce or remove local taxes for companies developing responsible and sustainable innovative solutions.
  - *Formalise partnerships via cooperation agreements* between municipalities/cities and universities to enable continuous student internships, industry-requested research and joint projects.
  - *Subsidise start-ups and green businesses* originating in university incubators and accelerators, as well as in newly established science and technology parks, through local innovation and sustainable entrepreneurship funds.
  - *Provide local scholarships and awards* for students and researchers whose work is applicable in the real sector or contributes to sustainable development (e.g. energy efficiency, circular economy, digitalisation).
  - *Implement mentorship programmes* in which local business leaders act as mentors to students and academic teams.
  - *Introduce green vouchers for SMEs*: funding for consultancy and research services from universities to enhance sustainable practices.

- ✓ Entity, canton, district and state authorities:
  - Increase R&D allocations through financial and non-financial incentives from 0.20% to a minimum of 1% of GDP by 2030.
  - *Create grant and tax incentive programmes for companies* investing in research projects with universities or engaging students and researchers in practical tasks.
  - Introduce supportive measures, such as the formation of innovation funds, innovation vouchers for purchasing R&D services from universities, tax breaks for SMEs investing in R&D, co-financing grants (matching grants),

vouchers for patenting and other intellectual property protection and enabling the formation of university spin-off companies with limited professor involvement (e.g. following the Italian model).
- Develop and consistently implement strategies for innovation and science–industry collaboration.

All proposed measures should actively involve civil society and the media as partners in promoting the development of sustainable, responsible entrepreneurship.

3.1.4. *Insights from the USE IPM Targeted Strategy for Research and Innovation in Higher Education Institutions (HEIs) Partnering with the EU*

The USE IPM document presents a targeted strategy aimed at enhancing the research and innovation capacities of higher education institutions through collaboration with EU partners. The strategy integrates specific experiences from visits to entrepreneurial innovation ecosystems in France, Italy, Belgium, Croatia, Spain, Portugal and the United Kingdom—countries with diverse practices in supporting innovation development and sustainable entrepreneurship. It constitutes a strategic framework developed within the EU Higher Education Reform Support programme, with a particular focus on strengthening institutional research management, knowledge transfer and private-sector collaboration. The strategy is based on identifying internal weaknesses of universities in candidate countries, including Bosnia and Herzegovina (BiH), and transferring best practices from partner institutions in the EU. Key objectives include the development of effective research management mechanisms, promotion of interdisciplinary projects and stimulation of industry collaboration through innovation hubs and joint initiatives. Special emphasis is placed on institutional autonomy, digitalisation of processes and active involvement of students and early-career researchers in international research flows (European Commission [EC], 2024).

USE IPM is recommended as a tool for strategic planning for universities in transition countries and serves as a foundation for alignment with EU frameworks such as the European Research Area (ERA) and Horizon Europe. Its implementation in BiH opens opportunities for systemic modernisation of higher education, particularly regarding research infrastructure, institutional governance and stronger connections with the real sector. Most BiH universities face challenges such as underdeveloped research management capacities, fragmented planning systems and weak links with industry and international research networks.

3.2. Key Challenges in Enlargement Countries – BiH

3.2.1. *Challenges for Policymakers*

The USE IPM guidelines provide recommendations for enhancing the existing entrepreneurial ecosystem in Western Balkan enlargement countries—Serbia, Albania, Bosnia and Herzegovina and North Macedonia. These recommendations are based on research conducted through focus groups, Delphi methodology and needs analyses between September 2023 and November 2024. The guidance highlights critical areas for developing the skills of young people, facilitating their integration into entrepreneurial ecosystems and understanding contemporary entrepreneurship. Four key thematic areas were identified: behavioural (soft) skills, sustainability and sustainability reporting, technology transfer and open innovation, and innovation process management. Since entrepreneurship is directly linked to innovation—used as a tool for market entry and

expansion—the management of innovation processes represents the ultimate objective of these recommendations.

3.2.1.1. Development of Soft Skills for Entrepreneurship

In enlargement countries, education systems continue to prioritise technical competencies over soft skills, which undermines the entrepreneurial capacities of young people. Employers often undervalue communication, teamwork and emotional intelligence. Cultural norms that emphasise hierarchy and formal authority limit openness, negotiation and conflict resolution. Assertive communication is underdeveloped; many employees struggle to articulate ideas clearly or actively listen to colleagues and clients. While technical knowledge remains highly valued, interpersonal competencies are often neglected, despite their potential to enhance team cohesion and client relations (Cimatti, 2016; Cacciolatti et al., 2017).

3.2.1.2. *Technology Transfer and Open Innovation*

Technology transfer and the application of open innovation in Bosnia and Herzegovina face deeply rooted structural barriers. Universities, the private sector and public institutions largely operate in a fragmented manner, without established mechanisms of synergy and mutual trust. The regulatory framework is fragmented and burdened by bureaucratic procedures, which complicates the registration of innovations and discourages potential investors. Financial support remains insufficient and often poorly aligned with specific local needs, while capacities for research commercialisation and access to venture capital are extremely limited. Awareness of intellectual property rights is low, leaving many entrepreneurs without adequate protection or means to monetise their ideas. The market's low purchasing power further reduces motivation for innovation, and resistance to digital tools slows the transition towards knowledge-driven sectors (Chesbrough, 2003; Bigliardi & Galati, 2018; Radičić & Petković, 2023).

3.2.1.3. Sustainability and Sustainability Reporting

Although EU policies emphasise the strategic importance of sustainability and ESG reporting, enlargement countries face serious barriers to implementing these frameworks. In Bosnia and Herzegovina, sustainable development is hindered by regulatory and infrastructural deficiencies. Environmental protection regulations are vague and poorly enforced, while weak waste management systems result in illegal dumpsites, inadequate recycling infrastructure and insufficient wastewater treatment. Although renewable energy projects (such as hydropower plants and solar systems) are being developed, they often cause ecological disturbances in sensitive areas. Financial barriers particularly affect small and medium-sized enterprises (SMEs), which lack resources to adopt green technologies or comply with ESG standards. Public awareness of environmental issues remains low, and cooperation between government, academia and industry is insufficiently coordinated, reducing the potential for joint responses to sustainability challenges (Rosário et al., 2022; Sreenivasan & Suresh, 2023).

3.2.1.4. Innovation Process Management

Innovation processes in enlargement countries are weakened by limited resources, inadequate institutional support and a focus on short-term profitability. Universities and research institutions often produce theoretical knowledge with little practical application. The absence of standardised

methods for measuring innovation outcomes prevents effective policy monitoring and adaptation. In Bosnia and Herzegovina, the innovation ecosystem is fragmented, with weak coordination between universities, research centres, the private sector and government institutions. Companies are frequently risk-averse and resistant to change, preferring routine and stability. There is no legal framework for supporting social enterprises or responsible innovation, and knowledge of innovation methodologies is limited. The lack of support for green innovations further prevents the economy from seizing opportunities within the EU's digital and green transition (Gustina et al., 2024; Leon-Roa et al., 2025).

- Policy recommendations, actions and expected impacts

a) Strengthening Soft Skills for Entrepreneurship

To overcome deficiencies in soft skills, governments should integrate communication, teamwork, negotiation and emotional intelligence into national curricula at both secondary and university levels. Teacher training and professional development for academic staff must include modules on the pedagogy of soft skills to ensure that the education system itself becomes a generator of entrepreneurial culture. Partnerships between universities and industry should provide internship programmes where students gain experience in collaborative environments. Policymakers should also support lifelong learning centres and digital platforms offering affordable programmes that enable young entrepreneurs to continuously improve their competences.

Actions

- Integrate soft skills modules (communication, teamwork, emotional intelligence, negotiation) into curricula and study programmes.
- Train teachers and university staff in the pedagogy of soft skills.
- Establish structured internship programmes with participation from the business sector.
- Support lifelong learning centres and digital platforms offering accessible training programmes.

Expected impacts

- A more adaptable and innovative workforce, better prepared for entrepreneurial ventures.
- Increased employability of graduates through a balanced combination of technical and soft skills.
- Stronger cooperation between the education and business sectors, with improved alignment to labour market needs.

b) Strengthening Technology Transfer and Open Innovation

A stronger innovation ecosystem requires institutional reforms that simplify administrative procedures for intellectual property registration and establish clear legal frameworks for technology transfer. Collaboration between academia and industry should be institutionalised through innovation hubs, incubators and public–private partnerships. Governments should increase access to funding not only for pilot projects but also for the commercialisation of research outcomes. It is necessary to expand advisory, mentoring and training services on intellectual property so that innovators can protect and market their work.

Actions

- Simplify procedures for the registration and protection of intellectual property.

- Establish innovation hubs and incubators to foster collaboration between academia and business.
- Direct funding towards the commercialisation of research outcomes.
- Develop mentoring, advisory and training programmes in the field of intellectual property law.
- Encourage digital transformation through financial and institutional support.

Expected impacts

- Stronger protection and commercialisation of domestic innovations.
- Increased private sector investment in research and development.
- Closer alignment between research work and industry needs.
- Enhanced competitiveness of SMEs in regional and EU markets.

c) Improving Sustainability and ESG Practices

For Bosnia and Herzegovina and the region, it is essential to strengthen regulatory implementation and alignment with EU standards. Governments should introduce fiscal incentives, such as tax reliefs or grants, for SMEs that adopt green technologies and circular economy models. National strategies should develop waste management infrastructure and support renewable energy projects through transparent environmental impact assessments. Awareness-raising campaigns, in cooperation with academia and civil society, can increase environmental awareness. The state should subsidise the preparation of ESG reports to ensure that small enterprises are not excluded due to associated costs.

Actions

- Align environmental and sustainability regulations with EU standards (CSRD, ESG).
- Introduce fiscal incentives (tax reliefs, grants, favourable loans) for SMEs adopting green technologies.
- Expand infrastructure for recycling and waste management.
- Subsidise ESG reporting and organise related training sessions.
- Launch public awareness campaigns on sustainability, involving academia and civil society.

Expected impacts

- Greater compliance with EU green transition policies.
- Wider adoption of circular economy practices among SMEs.
- Reduced environmental risks (illegal dumpsites, biodiversity loss, poor wastewater management).
- Improved reputation of domestic companies and easier access to EU markets and funds.

d) Enhancing Innovation Process Management

To establish a coherent innovation framework, Bosnia and Herzegovina should develop standardised metrics for evaluating the efficiency of incubators, accelerators and university–industry collaboration projects. Academic institutions should incorporate innovation methodologies such as design thinking and prototyping into study programmes. Public institutions should simplify procedures and direct funding towards market-driven needs. Encouraging a culture of experimentation and rewarding innovative projects will help companies shift from short-term profit orientation towards long-term innovation strategies. It is particularly

important to provide financial incentives and support to academic staff engaged in research, thereby strengthening the connection between academia and industry.

Actions

- Develop standardised metrics for evaluating innovation outcomes (e.g. start-up survival rate, commercialisation of research).
- Introduce legal frameworks and fiscal incentives for green business models.
- Integrate innovation methodologies (design thinking, prototyping, agile methods) into education.
- Simplify public programmes and reduce bureaucratic barriers.
- Encourage companies to take risks and innovate through reward schemes.
- Provide incentives and support for academic staff engaged in scientific research.

Expected impacts

- More effective monitoring and evaluation of innovation policies.
- Development of inclusive and sustainable business models.
- Greater integration of universities in addressing practical challenges.
- Transition from short-term to long-term, innovation-driven economic strategies.

Table 1

Key challenges, recommended actions and anticipated impacts on the entrepreneurial ecosystem in Bosnia and Herzegovina

Thematic area	Key challenges	Actions	Expected impacts
Soft skills for entrepreneurship	Insufficient integration into education and business; hierarchical cultures; underestimation by employers.	Integrate soft skills into curricula; train teachers; create internship programmes; support lifelong learning.	A workforce more prepared for entrepreneurship; higher employability; stronger collaboration between education and business sector.
Sustainability and ESG practices	Weak implementation of regulations; poor waste management; high costs for SMEs; fragmented institutional cooperation.	Align regulations with EU standards; introduce fiscal incentives; develop recycling infrastructure; subsidise ESG reporting; conduct public awareness campaigns.	Greater alignment with EU policies; wider adoption of the circular economy; reduced environmental risks; improved access to EU markets.
Technology transfer and open innovation	Weak collaboration between academia and industry; fragmented legal frameworks; weak IP protection; limited funding for commercialisation; resistance to digitalisation.	Simplify IP procedures; establish innovation hubs; finance commercialisation; provide mentorship and advisory support; promote digital transformation.	Stronger protection of innovations; increased R&D investment; closer research–industry cooperation; higher SME competitiveness.
Innovation process management	Fragmented ecosystem; risk aversion; absence of legal frameworks for	Develop innovation performance metrics; introduce legal frameworks for social	More effective monitoring; development of sustainable business

	social enterprises; lack of innovation metrics.	enterprises; integrate innovation methodologies into education; reduce bureaucracy; encourage risk-taking and innovation.	models; universities more aligned with market needs; long-term, innovation-driven growth.

Notes. Author's elaboration.

3.2.2. *Broader Contributions to the Enhancement of the Entrepreneurial Ecosystem in Bosnia and Herzegovina*

The proposed set of recommendations goes beyond the immediate goal of supporting young entrepreneurs and improving the entrepreneurial ecosystem. Their broader contributions lie in creating systemic, long-term impacts that strengthen innovation capacity, economic resilience and social well-being in Bosnia and Herzegovina (BiH).

- *Strengthening Cooperation Between Academia and Industry*

By promoting joint research centres, innovation hubs and structured partnerships between academia and industry, these recommendations contribute to bridging the gap between theoretical knowledge and practical application. Such collaboration enhances the commercialisation of research results, facilitates knowledge and technology transfer and ensures that educational programmes remain aligned with the dynamic needs of the labour market. The broader impact of these activities lies in building a knowledge-based economy and increasing the employability and competitiveness of graduates.

- *Advancing Entrepreneurial Education and Skills Development*

A key contribution is the transformation of education systems to integrate entrepreneurship, sustainability and innovation into university and vocational curricula. Practical training, interdisciplinary learning and experiential programmes create generations of graduates equipped to handle complex challenges. Such human capital not only drives business development but also embeds principles of sustainability and innovation across various sectors. This fosters a culture of entrepreneurial thinking that gradually reshapes social attitudes towards risk-taking, collaboration and long-term value creation.

- *Establishing Systematic Impact Measurement*

The introduction of standardised indicators and key performance measures for monitoring entrepreneurial and innovation activities has far-reaching policy implications. By enabling authorities and institutions to assess the effectiveness of initiatives in real time, these recommendations promote evidence-based policymaking, more efficient resource allocation and greater accountability. The broader contribution of such systems lies in strengthening institutional transparency and trust among stakeholders — investors, academia and civil society.

- *Promoting Sustainable and Responsible Innovation*

The recommendations offer a vision of entrepreneurship that is not solely profit-driven but also environmentally and socially sustainable. By embedding ESG principles, circular economy models and responsible innovation management into entrepreneurial ecosystems, Bosnia and Herzegovina gains the capacity to align its business practices with EU standards and global development goals. The broader contribution is twofold: it facilitates integration into European markets while ensuring that growth remains inclusive, resilient and environmentally responsible.

- *Enhancing Economic Competitiveness and Stability*

Collectively, these proposals lay the foundation for a more innovative, adaptable and competitive economy. They help mitigate structural weaknesses within BiH's entrepreneurial landscape — such as fragmented stakeholder cooperation, underdeveloped financial mechanisms and low digitalisation — thus creating a favourable environment for long-term competitiveness. In doing so, they contribute to regional economic stability, social cohesion and the strengthening of BiH's position within the European and global knowledge economy. The recommendations for improving the entrepreneurial ecosystem in BiH are not merely a technical set of measures, but a framework for broader socio-economic transformation. Their true value lies in fostering collaboration among academia, industry, policymakers and civil society — building the foundation for a sustainable and innovation-driven future.

3.2.3. Enhanced Higher Education Strategy for Research and Development at All Levels of Government in Bosnia and Herzegovina

The modernisation of higher education is a key factor in strengthening the entrepreneurial and innovation ecosystem of Bosnia and Herzegovina (BiH). In the context of European integration, aligning the higher education and research system with the European Research Area (ERA) and the European Higher Education Area (EHEA) is essential for building institutional capacities, facilitating knowledge transfer and ensuring that academic outputs are more closely aligned with market and societal needs. Universities in BiH play a central role as drivers of innovation, sustainability and entrepreneurial growth. Strengthening cooperation among academia, industry, and the state is crucial for accelerating the commercialisation of research, fostering technological development and enhancing the resilience of the national economy. By incorporating business engagement into curricula, expanding interdisciplinary education and cultivating a culture of innovation, higher education can produce generations of graduates equipped with entrepreneurial, digital and sustainable skills.
Equally important is the integration of innovation methodologies such as design thinking, prototyping and agile project management into university programmes. These tools enable students and researchers not only to generate new ideas but also to translate them into practical solutions that contribute to economic growth and social development. Universities, in cooperation with innovation hubs and incubators, can stimulate the development of start-ups and strengthen the connection between research and practice.

Strengthening research capacities forms the backbone of higher education modernisation and the innovation system in BiH. It is necessary to systematically develop infrastructure for scientific research within universities and institutes, thereby creating better conditions for scientific and innovation progress. In addition to infrastructure, stable and predictable funding is of crucial importance, allowing for long-term projects rather than reliance on sporadic sources. Such an approach directs research towards strategic goals with a clear contribution to social and economic development. Particular emphasis should be placed on interdisciplinary approaches that combine knowledge from different fields to address the complex challenges facing BiH. At the same time, higher education institutions in BiH should build international links more proactively. Participation in European programmes such as Erasmus+, Horizon Europe and COST Actions increases university visibility, facilitates student and researcher mobility, and strengthens cooperation through joint projects and publications.

The development of human capital remains at the core of this strategy. By improving doctoral and postdoctoral programmes aligned with labour market dynamics, systematically promoting lifelong learning and creating incentive mechanisms for diaspora engagement in domestic research activities, BiH can significantly strengthen its base of highly qualified professionals and enhance its overall research and innovation capacity. Continuous professional development of

academic staff—especially in digital skills, pedagogy and research methodologies—further supports the modernisation of the system.

Together, these measures are designed to position BiH's higher education system as a catalyst for innovation, entrepreneurship and sustainable development. By linking academia and industry, integrating universities into global knowledge networks and nurturing an entrepreneurially oriented workforce, BiH can advance its readiness for EU membership and secure a stronger role within the European and regional innovation landscape.

4. Key Pillars of the Research and Innovation Strategy

The research and innovation strategy should rest on several key pillars that guide the development of the entrepreneurial and innovation ecosystem. In the context of the Republic of Srpska and Bosnia and Herzegovina (BiH), these pillars are particularly important given existing challenges such as low investment in research and development (R&D), limited innovation capacity and weak connections between science and industry. Comparative reviews from regional countries (BiH, Serbia, Albania and North Macedonia) and global examples can provide valuable guidance on how to strengthen these pillars and accelerate integration into the European Research Area.

4.1. Research Excellence

The pursuit of research excellence involves improving the quality of scientific research, strengthening research infrastructure and human resources, and increasing participation in international projects. Currently, R&D investment in BiH is among the lowest in Europe—estimated at below 0.3% of GDP (European Commission [EC], 2023). Such low funding, combined with a fragmented legislative framework, limits the country's scientific capacity and contributes to lagging behind the EU average (EC, 2023). This underinvestment is reflected in the modest number of high-impact scientific publications and patents originating from BiH. According to the *European Innovation Scoreboard 2025*, BiH is categorised as an "Emerging Innovator", achieving only 25.7% of the EU average innovation performance, and particularly underperforming in indicators such as internationally cited publications and the number of new PhD graduates (European Commission [EC], 2025c). In comparison, Albania scores 37.9%, North Macedonia 40% and Serbia 51.5% of the EU's average innovation performance (EC, 2025c).
Enhancing excellence requires systemic reform. It is essential to substantially increase financial support for research—both through public budgets and competitive funds, as well as through private sector engagement (EC, 2023).

> The European Commission, in its latest report, recommends that BiH adopt a new *Science Development Strategy 2023–2028* along with an accompanying Action Plan, and that it increase the research budget—particularly in the field of innovation—to stimulate economic recovery. Furthermore, a more efficient, merit-based competitive funding system is needed to encourage quality and results (EC, 2023).

Regional examples show positive trends—for instance, Serbia has recently established a Science Fund and increased R&D allocations, which has been followed by a rise in highly cited publications and participation in international projects. Another dimension of excellence lies in human capital. BiH continues to face limited research capacity alongside ongoing brain drain, as the most talented young researchers often leave for better conditions abroad, particularly in medicine and information technology (EC, 2023). To mitigate this, it is vital to create more attractive opportunities domestically: *introduce incentives for researchers* (scholarships, postdoctoral training, grants for young scientists) and improve career pathways within universities and institutes. *The quality of doctoral programmes and mentorship also needs to be enhanced* to

produce highly skilled human resources. *Establishing centres of excellence and large-scale joint research infrastructure projects* (such as EU-funded laboratories) can help retain talent and boost scientific productivity. As the European Commission notes, integration into the European Research Area and increased international cooperation act as catalysts for reform and can enhance the capacity to achieve scientific excellence (European Commission, 2021). Therefore, BiH at all levels should engage more proactively in programmes such as *Horizon Europe*, *COST* and *EUREKA*, which not only provide funding but also connect local researchers with leading European peers, facilitating the transfer and diffusion of knowledge.

4.2. Technology Transfer and Exploitation

The transfer of knowledge and technology from academia to industry is one of the key preconditions for creating added value from research. In Bosnia and Herzegovina, this pillar remains weakly developed — university–industry collaboration is limited, as noted by the European Commission, which emphasises the need to strengthen systemic interaction within the *triple helix* model connecting academia, industry and government (EC, 2023). The lack of networking means that research results often remain unutilised in practice. Furthermore, government support for research and development (R&D) in enterprises is virtually non-existent, while private-sector R&D investment remains very low. According to the *European Innovation Scoreboard 2025*, Bosnia and Herzegovina has almost no public investment in R&D for enterprises and lacks developed venture capital, which severely constrains the technological development of its economy (EC, 2025a).

It is therefore essential to establish mechanisms that will stimulate the commercialisation of research. One of the first steps should be *developing the legal and organisational infrastructure for technology transfer* – for example *establishing Technology Transfer Offices (TTOs)* at universities, *business incubators, accelerators and science and technology parks*. A study by Đonlagić Alibegović et al. (2022) on science and technology parks in BiH highlights their potential to play a key role in linking research and business by applying the triple helix model and promoting interaction between universities, industry, and government through joint projects, spin-off companies and innovation initiatives. A positive example is the BIT Centre in Tuzla, which has produced several technology start-ups in collaboration with local faculties (Đonlagić Alibegović et al., 2022). Beyond infrastructure, *policy and legislative adaptation* is also required. Intellectual property (IP) regulations should encourage the patenting and licensing of public research outcomes. Currently, the number of patent applications in BiH is very low.

> The Institute for Intellectual Property of Bosnia and Herzegovina reported that in 2024, a total of 47 patent applications were submitted — 34 by domestic applicants and 13 by foreign applicants — marking a 9.6% decrease compared to the previous year. Of the domestic applications, all were submitted by individuals, while among foreign applicants, 46.2% were from individuals and 53.8% from legal entities (Agency for Statistics of Bosnia and Herzegovina, 2025, p. 1).

Incentives for scientists and innovators to protect their results through patents and attract investors are urgently needed. One possible measure is to introduce *Proof of Concept* programmes that finance early stages of research commercialisation. Innovation funds can also play a significant role in stimulating innovation activities. Countries in the region, such as Serbia and North Macedonia, have established dedicated funds that co-finance innovative projects by companies and consortia with researchers, leading to an increase in technology transfers and joint patents (World Bank, 2013).

Institutional culture must also shift towards more open collaboration. The traditionally separate systems of science and industry must be bridged through proactive measures. Organising

business–science forums, encouraging research and development consortia, and involving industry in setting research agendas can make research outcomes more relevant to market needs. The European Commission has noted that Bosnia and Herzegovina lacks regular triple-helix interaction and that the absence of a *Smart Specialisation Strategy (S3)* has further limited the focus of research on commercially viable areas (EC, 2023). Therefore, developing an S3 strategy is a priority — by identifying niche areas (for instance, agri-technology, renewable energy or ICT), Bosnia and Herzegovina can concentrate resources on sectors where it has comparative advantages and facilitate the transfer of innovations into production. Global practice also offers guidance: universities in developed countries have established spin-off programmes and science–technology clusters around them. For example, Silicon Valley emerged through strong interaction between Stanford University and industry, supported by venture capital and an entrepreneurial culture. Although such an ecosystem remains distant for BiH, the country can begin building its own "mini valleys" by networking key actors and positioning technology transfer as a central pillar of its innovation strategy.

4.3. Innovative Entrepreneurship

The culture of *innovative entrepreneurship* eflects a society's ability to generate new business ventures based on knowledge and innovation, to support the growth of start-up companies and to enable existing small and medium-sized enterprises (SMEs) to become engines of innovation. In Bosnia and Herzegovina, the entrepreneurial ecosystem is still developing but demonstrates clear potential. According to the *European Innovation Scoreboard (EIS) 2025*, BiH has a relatively high share of SMEs introducing new products and processes – above the EU average for this indicator (EC, 2025a). Moreover, employment in innovative firms is relatively strong for a country of this size (EC, 2025a). These indicators suggest that, despite a challenging institutional and economic environment, the private sector in BiH shows an increasing capacity for innovation. However, a key challenge remains the lack of financial instruments and support mechanisms for start-ups and innovative businesses. The venture capital (VC) market is almost non-existent, institutional investors rarely invest in high-risk projects, and state support in the form of grants or incentives for innovative entrepreneurship is minimal (EC, 2025a).

For the development of innovative entrepreneurship, it is crucial to build a more favourable business environment and a supportive ecosystem. This means *simplifying procedures for establishing start-up companies*, *introducing tax relief for research and development in the private sector* and *creating a legal framework that enables new financing models* (such as crowdfunding platforms, business angels and similar instruments). Business incubators and accelerators are an important part of this ecosystem. Although several exist in BiH (for example, the ICBL business incubator in Banja Luka), their capacity and networking with investors need to be strengthened. Experiences from the region are valuable. *The Innovation Fund of Serbia* through seed funding and mentorship programmes, has supported hundreds of early-stage start-ups, while *The Fund for Innovation and Technical Development (FITD) of North Macedonia* has co-financed numerous innovative SME projects and contributed to building a start-up community in Skopje (EC, 2025a). An interesting programme of the FITD, The Western Balkans Innovation Vaucher, supports the development of business ideas and entrepreneurial ventures. Establishing similar institutions in BiH – such as a national innovation fund or agency offering a wide range of support programmes, packages and measures for sustainable innovation management – could accelerate entrepreneurial activities. Republika Srpska has made some progress in this respect, adopting the *Law on Innovation Activity* and planning the establishment of an Innovation Fund, while in the Federation of Bosnia and Herzegovina such institutional initiatives are still absent.

Entrepreneurial education and culture are also important aspects. The formal education system, starting from preschool, should integrate programmes that foster innovative thinking and entrepreneurial and digital skills. Universities can establish start-up centres and organise

competitions for the best innovative ideas or prototypes developed by students, thus stimulating the entrepreneurial spirit during education. Cultural barriers such as fear of failure or resistance to change should be reduced through the promotion of successful domestic entrepreneurial stories. At present, the perception of risk is high and confidence in starting a business is low, so the state and the media can play an important role in affirming innovators and creating a positive image of entrepreneurship. When the role of civil society and citizens in promoting sustainable development, entrepreneurship and environmental protection is added, the Triple Helix Model of development evolves into the Quintuple Helix Innovation Model.

Removing administrative barriers to starting a business is another limiting factor. Regulations should facilitate easier operation of innovative companies – for example *through more flexible labour laws for start-ups, better protection of minority investors and faster registration of patents and intellectual property rights for firm-developed innovations*. Global experience shows that countries which have introduced so-called "one-stop-shop" systems for start-ups – providing legal, financial and mentoring support in one place – achieve faster growth of innovative businesses.

In Republika Srpska and the Federation of BiH, local authorities can further encourage innovative entrepreneurship through public–private initiatives. For example, the establishment of business incubators and technology parks near university centres (such as the existing one in Mostar or the planned Science and Technology Park in the University of Banja Luka campus) in partnership with private companies could create clusters where ideas are more easily turned into businesses. Connecting with the diaspora is also important, as many successful innovators of BiH origin abroad are willing to invest in and mentor domestic start-ups if transparent mechanisms for collaboration are in place.
Finally, *digital transformation and the global market* enable entrepreneurs from small countries to launch innovative business models, products and services worldwide. Strengthening digital skills and infrastructure – such as high-speed internet and digital platforms for e-commerce – is therefore directly linked to the success of innovative firms. Currently, fewer than 20% of small businesses in BiH are active in e-commerce (EC, 2023), but improving this area will open new opportunities for innovative companies to scale and access global markets. Viewed as a whole, the pillar of innovative entrepreneurship requires a comprehensive approach: *financial, mentoring and infrastructural support for start-ups*, removal of bureaucratic barriers and the cultivation of a culture that celebrates creativity and accepts controlled risk. Successful implementation of this pillar would lead to an increase in new companies, new jobs and faster innovation-driven economic growth – which is the ultimate goal of the research and innovation strategy.

5. Implementation Framework

The preceding sections of this document have defined the strategic objectives of research and innovation (R&I) in fostering the development of the entrepreneurial ecosystem in the enlargement countries, with particular emphasis on the role of universities, alignment with European policies (Horizon Europe, ERA, S3, EU Green Deal) and the need to strengthen cooperation between the academic and business sectors. The implementation framework serves as a bridge between these strategic objectives and the expected outcomes, providing an overview of the key opportunities and mechanisms through which the vision can be operationalised.

5.1. Governance

Effective governance of strategy implementation requires the establishment of a coordinated system of leadership, monitoring and evaluation. It is necessary to form national and institutional bodies for R&I, with a clear division of responsibilities and coordination mechanisms among universities, ministries, the private sector and other relevant stakeholders. Transparent, data-

driven decision-making processes, grounded in performance indicators, will ensure long-term sustainability and integration with the European Research Area.

- State level (BiH): A Council/coordination body for R&I (chaired by the Council of Ministers or the competent minister) with a small Secretariat (analytics, monitoring, reporting), alongside a network of NCP coordinators for Horizon Europe and an S3 working group (policy alignment).
- Entity level
  - Republika Srpska: A Council for Science and Innovation within the relevant ministries (MNTRVO, MPP), the Innovation Fund acting as an operational body (calls, contracting, M&E) and a university TTO network (technology transfer).
  - Federation of BiH: FMRPO (operational SME/innovation calls), FZZPR (planning and monitoring of the FBiH Strategy) and university R&I offices (TTOs/centres).
- Universities: Vice-Rector for Science and Technology Transfer, TTO/Project and Entrepreneurship Centre, Ethics Committee, Open Science Committee and an Industrial Advisory Board.

5.2. National Strategy for Research and Innovation

The implementation framework must align with existing national development documents, including smart specialisation strategies and those for green and digital transitions. This ensures horizontal coherence with other policy areas (education, industrial development, climate policy), as well as vertical alignment with European strategic frameworks. The national strategy should also provide stable sources of funding through a combination of public and private funds, in addition to access to European programmes. Given the complex constitutional structure of BiH and the clearly defined division of competences, this strategy will be harmonised with entity-level strategies and those of joint institutions, as presented in the following table.

Table 2

Strategic documents containing elements of support for research and development

Level	Document	Status	Period	Lead institution	Instruments	Implementation	Examples of calls
Joint institutions (state level)	Science Development Strategy in Bosnia and Herzegovina 2017–2022 (revised framework document)	Expired	2017 – 2022	Ministry of Civil Affairs of Bosnia and Herzegovina (MCP)	Framework measures for science and innovation; since 2022, there has been no valid state-level R&I strategy; S3 has not been adopted at the state level	N/A – document expired; recommendations from the European Commission guide the development of a new strategy and S3	Expired; at the state level, examples include services provided by the Institute for Intellectual Property of BiH (e.g. IP pre-diagnostics) and statistical support by BHAS; no active grant instruments under this strategy

Republika Srpska	Strategy for the Development of Science and Technology, Higher Education and the Information Society of Republika Srpska 2023–2029	Adopted	2023 – 2029	Government of Republika Srpska / Ministry for Scientific and Technological Development and Higher Education of Republika Srpska	Objectives, priorities and measures, including key projects; institutional strengthening (including the establishment of the Innovation Fund)	Detailed measures and projects with indicative budgets; a combination of funding from the RS budget, loans and donors	MNTRVO calls (e.g. international exchange/co-financing of R&D); development of the Innovation Fund; projects on digitalisation and internationalisation
Republika Srpska	Action Plan for Innovation in SMEs of Republika Srpska 2024–2027	Adopted	2024 – 2027	Ministry of Economy and Entrepreneurship of Republika Srpska	Design and launch of the Innovation Fund; strengthening innovation infrastructure; participation in EU/Western Balkans programmes	Operationalises innovation measures through projects and financing (RS budget + donors/IFIs)	Public calls of the Ministry of Economy and Entrepreneurship of Republika Srpska (promotion of SMEs, innovation); planned instruments of the Innovation Fund; participation in EU/Western Balkans programmes
Federation of BiH	Development Strategy of the Federation of BiH 2021–2027	Adopted	2021 – 2027	Government of the Federation of BiH / Federal Institute for Development Programming (FZZPR)	78 measures and approximately 550 activities; accelerator: Innovation and Digitalisation; implementation through annual and mid-term plans, Public Investment Programme (PIP), and institutional budgets	Each measure is translated into a programme within annual work plans and further integrated into the Budget/PIP; funding from institutional budgets and external sources	Annual grant schemes by line ministries; public calls by FMRPO (e.g. Digital Transformation of SMEs 2021; grant schemes 2025); implementation through the PIP and annual budget
Federation of BiH	Strategy for the Development of Small Enterprises in the Federation	Adopted	2022 – 2027	Federal Ministry of Development, Entrepreneurship and Crafts (FMRPO)	Public calls and incentives for SMEs; measures for innovation and digitalisation; support for	Operationalised through FMRPO's annual programmes (SME grants, innovation measures,	FMRPO public calls supporting SME innovation and digitalisation; non-repayable grants and mentoring

	of BiH 2022–2027				internationalisation	vouchers/technical assistance where applicable)	schemes; annual grant programmes by priority area

Notes. The table provides an overview of the current status of strategic documents related to research, development and innovation at both the entity level and the level of joint institutions in Bosnia and Herzegovina. The overview was prepared by the authors with the assistance of the ChatGPT-5o model on 8 September 2025.

5.3. Universities

As highlighted in the introductory sections of the document, universities are key actors in the innovation ecosystem. Implementing the strategy requires strengthening their research infrastructure, developing innovation centres (laboratories, hubs, "living labs") and enhancing capacities for knowledge and technology transfer. Universities, through their organisational units—such as the Faculty of Economics at UNIBL with its centres (CPME and eLab)—should act as the primary bridge between the academic and business sectors, fostering collaboration programmes, mentoring support and research internationalisation. The first concrete step is the establishment of the UNIBL Technology Transfer Office. Existing centres and other sub-organisational units should be strategically restructured and adapted to meet the demands of operating in a digital and post-digital era.

5.4. Cultural Change

Successful implementation requires a shift in both societal and institutional culture—from administrative inertia towards fostering innovation, collaboration and openness. It is necessary to cultivate a culture based on meritocracy, cross-sector collaboration and a willingness to take risks. Integrating innovation into the education system, promoting entrepreneurial spirit, and recognising research work in society form the foundation for sustainable change.

5.5. International Orientation

The implementation framework also emphasises a strong international orientation, particularly through collaboration with universities, research centres, and business actors from the EU and beyond. Regional networking within the Western Balkans, as well as participation in European and global networks, will enhance knowledge exchange, improve access to funding and strengthen competitiveness. Researcher mobility, joint projects and the exchange of good practices will be key tools in this process.

5.6. Stakeholder Communication

The success of the strategy depends on active and continuous communication with all relevant actors: the academic community, entrepreneurs, policymakers, civil society, and citizens. Inclusive dialogue mechanisms (forums, advisory bodies, public consultations) must be developed to ensure the legitimacy of the process and encourage co-creation of innovative solutions. Transparent communication fosters trust and a greater willingness to collaborate.

5.7. Digital Transformation

Digital transformation is a horizontal priority of the strategy's implementation. This includes developing digital infrastructure, introducing new digital tools and platforms and training human

resources in digital skills. Digital solutions enable more efficient knowledge transfer, better collaboration between universities and industry and increase the international visibility and competitiveness of the entrepreneurial ecosystem.

5.8. Green Transformation

In line with the European Green Deal, green transformation is a key element of the implementation framework. It involves promoting research and innovation in renewable energy, the circular economy and sustainable business models. Involving SMEs and startups in this process is particularly important for market development and reducing dependence on traditional resources. Green transformation, combined with digital transformation, allows for the simultaneous enhancement of competitiveness and the preservation of socio-ecological sustainability.

6. Expected Outcomes and Impact

The implementation of the Research & Innovation (R&I) Strategy for the development of the entrepreneurial ecosystem in Bosnia and Herzegovina is expected to achieve measurable and sustainable results, contributing to the transformation of the business and innovation environment, strengthening the competitiveness of SMEs, fostering collaboration between the academic community and the private, public and non-governmental sectors, and promoting entrepreneurship and self-employment as a viable career option for students and graduates. It will create conditions for long-term socio-economic progress. The outcomes focus on strengthening institutional capacities, developing human resources, improving innovation infrastructure and enhancing the regulatory framework, while the impact will be visible across the economy, academia and society as a whole.

Expected Outcomes of the Strategy include:

1. *Strengthening institutional and organisational capacities of the academic community and R&I institutions*. This Outcome involves increasing the number of research centres with established mechanisms for knowledge and technology transfer, as well as expanding activities in existing centres. New innovation and development centres will be established at universities that currently lack them, while existing centres will be strengthened, facilitating better collaboration with industry and two-way knowledge transfer.
2. *Increasing investment in research and development*. By enhancing cooperation between industry and universities, as well as promoting international collaboration among universities, the number of joint projects will rise, facilitating access to European and other funding sources. Collaboration on practical problems between academia and business will also attract both public and private investment.
3. *Enhancing collaboration between academia, public, private and non-governmental sectors*. Joint projects create a spillover effect, establishing cooperation beyond formal channels, networking researchers and developing new forms of collaboration. This leads to increased joint research outputs, patents and licensed technologies.
4. *Supporting inclusive and sustainable development*. Innovative solutions will encourage the active participation of vulnerable groups in the innovation process. Innovations will contribute to both the green and digital transformation of society and the economy.

The Strategy's implementation is expected to have multiple impacts, ranging from the immediate strengthening of research capacity and networking of actors to the long-term shaping of an innovation culture in society.

Economic impact would primarily be reflected through the increased competitiveness of entrepreneurs and SMEs. The implementation of the strategy would enable better entrepreneurial education and preparation for starting a business, access to resources and innovations, as well as

mentoring support in the early stages of entrepreneurial ventures. Greater support for entrepreneurs would lead to an increase in the number of newly established enterprises and self-employment initiatives, which would diversify the current economic structure of Western Balkan countries and create new jobs, especially in knowledge- and technology-based sectors.

Social impact entails strengthening the culture of innovation and entrepreneurship in society, raising awareness of the importance of entrepreneurship and job creation in modern business conditions, which would ultimately contribute to reducing youth emigration. Cooperation between the academic community, industry and public administration would increase, thereby harmonising the resolution of social challenges. Additionally, the quality of research capacities and innovation outputs would improve, and their transfer into practice would be facilitated.

7. Conclusions and Recommendations

7.1. Summary of Key Strategic Priorities

Based on empirical evidence, comprehensive and sequenced policy packages can be recommended for local, entity/district and state authorities, as well as the management of higher education institutions, through mutually connected lines of action. The next steps for policymakers and practitioners are clear:

1. *Expand SME participation in the system of open sustainable innovation*. Develop and implement inclusive innovation schemes such as SME vouchers, appropriate grants and simplified tax incentives tailored to SMEs. This will reduce barriers for SMEs and broaden the innovation base.

2. *Simplify administration of research and innovation support*. Implement administrative reforms to reduce bureaucratic complexity and accelerate the application and approval processes for research and development incentives, as well as the digitalisation of these services. Introduce digital application portals, standardise requirements and transition to user-oriented, trust-based procedures.

3. *Strengthen links between universities and industry*. Invest in the establishment and professionalisation of Technology Transfer Offices (TTOs) at public universities and collaborative research centers. *Introduce incentives for university-industry consortia*, *joint laboratories* and *cluster-based initiatives* to promote sustainable partnerships and knowledge exchange.

4. *Build and strengthen research capacities in academia, companies and research and innovation centres. Provide targeted training and advisory programmes* for SMEs and researchers, focusing on project proposal writing, project management and access to international funds, as well as strengthening transversal skills (soft, entrepreneurial and digital skills) of students, professors, researchers, entrepreneurs and managers. Develop a virtual mentoring scheme for secondary school students, university students and all those interested in starting their own entrepreneurial venture, and in subsequent phases, implement peer mentoring (students who "survived" the first year of running their startup become co-mentors for the next generation of student entrepreneurs).

5. *Ensure transparent governance*. Establish transparent eligibility criteria, digitalised workflows, public registers of allocated funds and measurable performance indicators (e.g. joint patent applications, spin-off companies, co-authored publications). These steps will build trust and credibility in public support programmes.

6. *Sequence policy incentive instruments*. Begin with collaborative grants and quick results in the area of intellectual property to build trust and capacity, and then introduce innovation

vouchers, tax incentives and subsidies for the commercialisation of sustainable innovations to support scaling and market entry.

7.2. Next Steps for Policy Implementation and Adoption

Although Bosnia and Herzegovina has initiated the planning process and preparatory steps, the Smart Specialisation Strategy has not yet been formally completed or adopted. Bosnia and Herzegovina remains the only country in the region that has not yet adopted such a strategy. The Smart Specialisation Strategy should identify the country's developmental potentials and focus on directing resources towards their growth. This will be achieved by connecting research and innovation capacities with the needs of the economy and will serve as a model for establishing the necessary conditions for accessing EU Structural Funds.

Republika Srpska, by adopting *Law on Innovation Activity* (*Official Gazette of RS*, No. 31/21)[1], has established the normative framework for the development of its innovation ecosystem. The planned construction of the *Science and Technology Park of Republika Srpska* (STP) and the establishment of the *Innovation Fund of Republika Srpska* represent key instruments for strengthening knowledge transfer, supporting start-up development and connecting universities with industry. The STP of Republika Srpska was founded as a result of a partnership between the Government of Republika Srpska and the University of Banja Luka, with the vision of becoming a central hub for linking innovative ideas and projects, in close cooperation with key actors in the entrepreneurial, scientific and business sectors. These initiatives reflect a strategic effort to create sustainable institutional mechanisms for supporting research and innovation (European Commission, 2023). In the Federation of BiH, innovation activities have been fragmented and primarily driven by strategic development documents, without the adoption of a specific Law on Innovation Activity. Several innovation centres and technology parks have been developed with the support of international donors, particularly through IPA funds and EU programmes. However, the absence of a coordinated and integrated institutional framework remains a significant obstacle (OECD, 2023; UNESCO, 2021).

7.3. *Recommendations for Long-Term Sustainability and EU Integration*

1. *Develop a unified, inter-entity coordinated Innovation Strategy at the level of the joint institutions of Bosnia and Herzegovina for research and innovation,* aligned with the European Research Area (ERA) and the Smart Specialisation Strategy (S3).
2. *Strengthen R&D infrastructure* through the construction and development of science and technology parks in both entities, as well as digital innovation hubs, business incubators and accelerators under public–private partnership models.
3. *Establish a harmonised network of innovation funds* in Republika Srpska and the Federation of BiH to ensure transparent, long-term and sustainable financial support for innovation projects.
4. *Encourage university–industry collaboration* (A2B) by creating and professionalising technology transfer offices (TTOs) and introducing tax incentives and grants for joint projects.
5. *Internationalise the research sector* through greater participation in programmes such as Horizon Europe, Digital Europe and EIT KICs[3], which would enhance competitiveness and accelerate Bosnia and Herzegovina's integration into the EU Research Area.

[3] EIT KICs označava Knowledge and Innovation Communities (zajednice znanja i inovacija) koje je osnovao European Institute of Innovation and Technology (EIT), tijelo Evropske unije.

7.4 Strategic Directions for CPME for the Period 2025–2035

7.4.1. Department for Artificial Intelligence and Digitalisation

- Training in artificial intelligence for business applications, data-driven decision-making and digital entrepreneurship.
- Establishment of joint laboratories with IT companies for applied student projects.
- Alignment with the Digital Europe Programme and the objectives of the EU Artificial Intelligence Act.

7.4.2. Student Incubator

- Pre-incubation support: idea validation, prototype development, legal counselling.
- Incubation support: mentorship, networking with investors, international mobility.
- Organisation of annual Demo Days.
- Benchmarking against incubation models of EIT Digital.

7.4.3. Training Centre

- Certification programmes:
  - "Entrepreneurship and Sustainability Management"
  - "Innovation and Digital Business Models"
  - "Social Entrepreneurship and Community Impact"
- Short training sessions for SMEs: Lean Startup methods, Circular Economy in practice, and Green Finance.
- Hybrid delivery (online and in-person).

7.4.4. Mentor Network

- Database of local and international mentors (alumni, entrepreneurs, academics).
- Individual mentoring for incubator participants.
- Cross-border mentor exchange programmes.

7.4.5. Expected Outcomes and Impacts of the Strategy at the Faculty of Economics Level

Through its proactive engagement, CPME will:

- Strengthen the entrepreneurial ecosystem in Bosnia and Herzegovina and across the Western Balkans.
- Equip young people with entrepreneurial, soft and digital skills for employment and self-employment.
- Promote innovation with social and environmental responsibility.
- Attract investment and create new jobs, contributing to the EU integration process.
- Position CPME and the University of Banja Luka as a regional centre for innovation, artificial intelligence and digital entrepreneurship.

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