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A POLICY BRIEF ON TECHNOLOGY TRANSFER AND SKILLS DEVELOPMENT IN THE WESTERN BALKANS

Background

The Western Balkans region (Albania, Bosnia and Herzegovina, Kosovo[1], Montenegro, North Macedonia, and Serbia) has made significant progress in recent years towards economic development and integration with the European Union. However, there are still significant challenges to be addressed, particularly in the areas of technology transfer and skills development. Improving skills development for technology transfer is paramount for the successful implementation of economic and innovation policies, including the New Growth Plan for the Western Balkans, particularly in the context of economic convergence with the European Union. The growth plan, while respecting the ongoing accession processes, emphasizes the need to incentivize countries in the region to swiftly adopt and implement the EU acquis. A crucial aspect of the plan lies in boosting innovation, research, and entrepreneurship in the region. The growth plan also addresses the imperative to accelerate the transfer and upscaling of technological and social innovation solutions, crucial for achieving climate-neutral and smart cities. By focusing on skills development in these key areas, the Western Balkans can not only enhance their competitiveness but also contribute to the broader goals of the growth plan, fostering regional integration and overcoming bilateral challenges that impede progress in the region. This policy brief provides an overview of the current situation concerning skills development for technology transfer in the region and proposes recommendations for enhancing technology transfer and skills development to support economic growth and competitiveness. This policy brief is based on extensive research as part of a larger study aimed at analysing the technology transfer policies and systems in the Western Balkans economies, with a specific focus on the needs and challenges faced by enterprises to have access to skills-related services. Technology transfer is the process of transferring knowledge, skills, and technology from one organization or individual to another. It is a critical component of economic development, as it enables businesses to innovate and improve their products and services. The brief refers to Technology Transfer in two main ways. First, Horizontal Technology Transfer (HTT) refers to 'the transfer of established technology from one operational environment to another'. HTT normally involves fully mature technology, but also technology that is already well proven in the final working environment. HTT typically occurs across international borders and often as a result of Foreign Direct Investment (FDI). Second, Vertical Technology Transfer (VTT) refers to the transfer of technology from Basic Research to Applied Research to development and commercialization. Although VTT can take place inside an enterprise the term more typically implies the involvement of an external R&D partner in the form of a Public Research Organisation (PRO) and classically involves sale or licensing of patent rights. Moreover, the term skills-related services encompass a range of information, training (including re-skilling), and consulting services provided by both public and private organizations to support individuals, employees, and employers in the process of technology transfer and implementation. The current provision of skills-related support services in the region is uneven, and there are gaps in policy and legislation related to technology transfer and skills development. The research utilized an online survey to comprehensively analyse skills-related services and practices in the Western Balkans, involving a diverse sample of 95 institutions from various sectors, including public, private, and not-for-profit organizations. In addition to the quantitative analysis, qualitative data was gathered through semi-structured interviews (SSI) and moderated focus groups (FG) to provide valuable insights and a holistic understanding of the technology transfer landscape in the region. The findings and outcomes of this research serve as the foundation for the policy recommendations presented in this brief, aimed at enhancing technology transfer and skills development to foster economic growth and competitiveness in the Western Balkans. Table 1 presents an overview of the survey results on the current services available for technology transfer in the Western Balkan countries. It presents the results of the

[1] This designation is without prejudice to positions on status and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

research concerning existing skill based-service offerings for Horizontal Technology Transfer (HTT) and Vertical Technology Transfer (VTT).

Table 1. Summary of provision of skills-based services based on an ETF online survey

TT Systems	Insights on skills related services for Technology Transfer
Albania	▪ Limited number of organizations providing skills-related services for technology transfer. ▪ More presence in horizontal technology transfer compared to vertical technology transfer. Some confusion around concepts of VTT and HTT due to early stages of technology transfer processes ▪ Primary providers of technology transfer services are government agencies, Business Innovation Support Organizations, research institutes, and educational institutions. ▪ Focus on agriculture and rural development sector for service provision. ▪ Skills development in technological innovations, digital transformation, and entrepreneurship is in demand. ▪ Multiple organizations involved in innovation, but limited evidence of technology transfer strategies.
Bosnia and Herzegovina	▪ Both vertical and horizontal technology transfer services provided by DIHs, development agencies, non-for-Profit organizations and public sector. ▪ HTT services focused on digital transformation; limited demand for VTT services. ▪ Service gap identified for different target groups; micro-businesses/start-ups receive local services, SMEs/large companies get local, regional, and international services. ▪ Main sectors for technology transfer: wood processing, metal processing, manufacturing, agriculture, food production, IT, and tourism. ▪ Focus on IT skills, with additional offerings in business development, project management, intellectual property rights (IPR), and organizational improvements.
Kosovo	▪ Kosovo's small economy has limited VTT and HTT support. Few skills-related services, actions, and practices for technology transfer. ▪ Innovation Centre and VET organizations lack HTT, VTT, and sector-specific skills development. ▪ Innovation centres may help, but not explicitly linked to VTT between public and private research. Innovation centres reliant on unstable funding sources. ▪ Sector-specific services driven by university technology projects rather than government policies.
Montenegro	▪ Montenegro's small size limits the diversity of support service providers. Current provision of skills-related services for technology transfer is almost non-existent, attributed to the early stage of the environment and lack of understanding about technology transfer. ▪ Service providers in Montenegro offer skills-based services for innovation, but these services are more focused on business development rather than technology transfer. ▪ Smart Specialization (S3) strategy's sector priorities provide a basis for establishing Vertical Technology Transfer (VTT) services. ▪ Planned infrastructure (Centralized Technology Transfer Offices, Science Technology Park) can support VTT services.
North Macedonia	▪ Many organizations in North Macedonia claim to offer both Vertical Technology Transfer (VTT) and Horizontal Technology Transfer (HTT) services. However, closer examination reveals that most don't differentiate between general and skills-related technology transfer services. ▪ Survey highlights lack of understanding of TT services and lack of systematic approach to integrating TT into innovation policies and programs. ▪ Current service providers target local SMEs with training and information services, lacking sector-specific support.

TT Systems	Insights on skills related services for Technology Transfer
	▪ Limited cluster development progress evident; innovation services mainly focus on start-ups, business development, and mentoring.
Serbia	▪ Support for Vertical Technology Transfer (VTT) in start-ups is more prominent than Horizontal Technology Transfer (HTT). Focus often on general entrepreneurship rather than specialized VTT or HTT support. ▪ VTT services focus on early stages; gap identified for specialized services at transfer points and post-transfer activities. ▪ Limited services for regional or international enterprises. ▪ Technology Transfer Offices (TTOs) offer services to researchers; benefits to start-ups from Faculties. ▪ Little training and consulting for HTT; potential for digital transformation support.

Examples of good practices

In the Western Balkans region, several organizations are leading the way in providing skills for technology transfer and innovation. Based on the results of the recent ETF study, a few interesting cases can be highlighted:

- One noteworthy example is the Agricultural University of Tirana, which collaborates with the private sector to provide information and advisory services on smart agricultural technologies. Through joint projects and partnerships, the university offers a robust array of services, including information, training, and consulting to farmers. This approach facilitates the adoption of new agricultural practices and technologies, creating a knowledge-sharing ecosystem between the university and the farming community.
- The Faculty of Electrical Engineering and Information Technologies (FEEIT) in Skopje, as part of the Ss. Cyril and Methodius University, has established the Centre for Technology Transfer and Innovations – INNOFEIT. This centre serves as a hub for interaction between FEEIT staff, students, and industrial partners, aiming to bridge the gap between academic education and practical expertise. INNOFEIT provides tailor-made services for companies engaged in research and development (R&D), offering a conducive environment for technology transfer and innovative idea generation. The centre's initiatives contribute significantly to the economic growth of the technology sector in North Macedonia.
- Innovation centres and technology parks, such as Innovation Centre Banja Luka, INTERA Technology Park Mostar, and BIT Centre Tuzla, play a crucial role in supporting startups and businesses. While primarily focused on incubation and business support, these entities also offer training programs that contribute to broader technology transfer skills development. This integrated approach enhances the capabilities of startups, preparing them for technology adoption and development in a competitive market.
- The Science and Technology Park of Montenegro, established in 2019, supports startups and growing companies by providing incubation, financing, training, mentoring, and connections with technological innovation ecosystems. This park aspires to be a generator of innovation processes in Montenegro, fostering a culture of creativity and growth in innovative companies. Similarly, Tehnopolis in Nikšić, Montenegro, is an innovation-entrepreneurship centre established by the government in 2016. While currently focusing on technology promotion, networking, and capacity building, Tehnopolis actively contributes to the local, national, and regional innovation and entrepreneurship development scene. It represents a strategic move toward establishing an innovation infrastructure entity with potential future technology transfer initiatives.

- Innovation funds, such as the Innovation Fund of Montenegro, the Fund for Innovation and Technological Development in North Macedonia, and the Innovation Fund of the Republic of Serbia, are key players in stimulating innovation. These government-owned entities encourage technology transfer, research, development, and innovation in collaboration with the private sector, providing financial support to startups and innovative companies. Moreover, these funds offer mentoring programmes and skills related activities that are crucial in their ecosystems.
- The Enterprise Europe Network (EEN) operates as a facilitator of trans-national technology transfer, supporting researchers and technology adopters in various aspects of the process. EEN services, predominantly oriented towards SMEs, include skills development, information on R&D results, and technology transfer brokerage events. The network fosters collaboration and technology exchange on both national and international levels.
- Chambers of commerce, such as the Serbian Chamber of Commerce, actively contribute to technology transfer through specific high-tech transfer programs. The Centre for Digital Transformation, established by the Serbian Chamber of Commerce, offers reduced fees for expert services to SMEs undergoing digital transformation. This consulting service has proven successful, with over 1000 SMEs benefiting from the process.

Action recommendations

Against this background, we propose the following recommendations to enhance technology transfer and skills development in the Western Balkans:

1. **Embrace EU Acquis**: The Western Balkans countries should align their legislation with the European Union Acquis to create a more favourable environment for technology transfer. Aligning the legislation of Western Balkans countries with the European Union Acquis offers several compelling advantages. This alignment would facilitate easier access to EU markets, streamline the exchange of technology-related goods and services through harmonized standards, attract foreign direct investment by signalling a commitment to a business-friendly environment, and promote capacity building and innovation through knowledge transfer. Additionally, it could foster regional collaboration, leading to a unified approach to technology transfer and the pooling of resources.
2. **Increase investment in skills for technology transfer in specific organizations**: The Western Balkans countries should increase investment in skills development for technology transfer, including training and specialization of specific types of professionals working on organizations such as chambers of commerce, universities, technology transfer offices, innovation centres, technology parks, and innovation funds.
3. **Enhance customized services for technology transfer in companies and start-ups**: The Western Balkans countries should improve the provision of customized skills-related support services to enable businesses to innovate and improve their products and services. Customization ensures that support services are tailored to the unique requirements of each company, aligning with their industry, size, and strategic objectives. This personalized approach enhances the relevance and effectiveness of skill development initiatives, enabling businesses to address precise challenges and seize opportunities in their respective sectors.
4. **Integrate Vocational Education system in the national systems of innovation**: Integrating vocational education into national systems of innovation is paramount for fostering a dynamic and robust economy. Excellent Vocational education not only equips individuals with practical skills and specialized knowledge, aligning them with the evolving needs of industries, but can also help to promote business-academia relationships, and even provide knowledge intensive services, such as applied research and consultancy (especially for SMEs). Therefore, the

introduction of Centers of Vocational Excellence can serve as catalysts for aligning vocational education with national systems of innovation by tailoring programs to industry needs, fostering research and development, facilitating collaborations, and promoting lifelong learning.

To conclude, Table 2 provides a comparative summary of the main needs, gaps, and improvement actions identified for both Horizontal Technology Transfer (HTT) and Vertical Technology Transfer (VTT) in the Western Balkan countries. The table offers a concise overview of the current strengths and weaknesses in the service provision for each type of technology transfer. It highlights the perceived needs and benefits of support, as well as the specific gaps in the existing services. Moreover, the table outlines actionable improvement actions that can be taken to enhance the service landscape for both HTT and VTT. By analysing this comparative summary, policymakers and stakeholders can gain valuable insights into the challenges and opportunities in the technology transfer ecosystem, enabling them to design effective strategies and policies to foster innovation and economic development in the Western Balkan countries.

Table 2. Comparative summary of main needs, gaps and specific improvement actions

TT Systems	Needs and Gaps	Improvement Actions (See country summaries for detailed version)
Albania	▪ Agriculture heavily represented in interviews/focus groups due to priority status in Albania; sector-specific issues beyond agriculture not clearly identified. ▪ Diminishing support for VTT and HTT due to lack of inclusion in national/institutional policies. ▪ Lack of local private sector providers for technology adoption a significant barrier; limited info, training, consulting for local companies. ▪ Insufficient, uncoordinated, fragmented information, training, consulting services. ▪ Lack of formal linkages between state-funded providers, SMEs, research centres, experts hinders knowledge and expertise coordination for private sector.	▪ Support SMEs and start-ups through skill development, including consulting for businesses, and training in digital technologies and skills ▪ Foster collaboration between universities, industry, and public sectors. ▪ Enhance technical skills for HTT in private sector, through training and professional development. ▪ Assist SMEs with in-house IPR policies and patents, foreign expertise, as well as certification and standardization consultancy; Utilize Chambers of Commerce for business support.
Bosnia and Herzegovina	▪ Need for improving capacities, raising awareness, expertise in technology adoption, innovation management, and funding access. ▪ Key barriers include: low adoption capacities, limited VTT interest, absent viable technology for transfer. ▪ Support providers face continuity, sustainability, expert availability, low staff capacity, ecosystem-level barriers. ▪ Support mainly for wood and metal processing sectors, neglecting sectors like health/pharmacy, chemicals, plastics, finance.	▪ Tailor policies for encouraging company-university collaboration for tech projects, including SME innovation through product development and funding ▪ Develop local expertise for innovation support, expanding service providers, including innovation design and marketing. ▪ Raise awareness about VTT benefits through campaigns. ▪ Attract foreign experts for tech adoption consulting. ▪ Train service providers for integrated HTT services.
Kosovo	▪ Key barriers identified: lack of government initiatives and support, lack funding for related services and lack of FDIs due to political and social reasons.	▪ Create clear government policies for improving university-private sector collaboration, offering incentives for companies in VTT, as well as developing sector-specific VTT policies.

TT Systems	Needs and Gaps	Improvement Actions (See country summaries for detailed version)
	▪ Sectors with potential for support: wood processing, pharmaceuticals, IT (cybersecurity) with untapped potential in external markets.	▪ Raise awareness of VTT benefits through campaigns. ▪ Develop government strategy for HTT, including improving business climate to attract FDIs, and fostering public-private partnerships for HTT; Seek diverse funding for HTT activities.
Montenegro	▪ Need for policy vision, TTO, Science-Technology Park, strong clusters, structured training programs. ▪ Infrastructure needs: first Technology Transfer Office (TTO), technology campuses, VET training centres, digital collaboration platforms, open public lab use. ▪ Clear intellectual property (IP) rules and access to finance for tech upgrading as major barriers. ▪ Barriers: misconceptions, slow policy changes, lack of communication strategies, administrative barriers, unstable infrastructure.	▪ Develop comprehensive technology policy for VTT, including clear IP rules for academia-business collaboration, funding for VTT-related education and tech upgrades; Expand successful innovation hub models. ▪ Raise TT awareness through education and events. ▪ Train providers for effective VTT and HTT services, especially to address green technology upgrading. ▪ Strengthen cluster organizations for HTT, and replicate successful HTT models for expansion.
North Macedonia	▪ Need for increased awareness and technology transfer skills among stakeholders. Need for in-depth analysis of potentials, needs, and skills; establishment of strategic guidance. ▪ Gaps identified: lack of specialized support, industry-academia collaboration, resources/training, global supply chain involvement. ▪ Key barriers include: lack of understanding of TT, unclear IP regulation, funding, training, consultancy support.	▪ Implement national policy for VTT with IP support and funding. ▪ Support university spin-offs and entrepreneurship, strengthen collaboration between these actors, TT centres and Digital Innovation Hubs. ▪ Train service providers for diverse VTT and HTT skills to better develop tech transfer skills for stakeholders. ▪ Establish national HTT programs for incentives and foster global HTT cooperation for local companies.
Serbia	▪ Key barriers include: regulatory issues, limited support scope, lack of trained staff, low TT project priority/number, competence gaps, inadequate HTT support organizations. ▪ Sector-specific challenges raised: agriculture, food, healthcare, machine production, green energy. ▪ Limited specialization among participating organizations, except for a few notable examples.	▪ Develop specific VTT services for startups, including IP consulting for startups and tech valuation, and expert support. ▪ Enhance academia-industry collaboration, promoting TTOs connection with academia and industry. ▪ Introduce aligned national HTT policy and resources, including updating FDI framework to support HTT environment. ▪ Promote specialized service providers for sector-specific HTT support, including for SMEs. ▪ Raise HTT awareness among stakeholders.

Key references and useful links

- Country Summary Albania
- Country Summary Bosnia and Herzegovina
- Country Summary Kosovo
- Country Summary Montenegro
- Country Summary North Macedonia
- Country Summary Serbia

For further information on our activities, please contact:

info@etf.europa.eu

+39 011 6302222

+39 011 6302200