Fostering Open Innovation and Technology Transfer: Insights from the Euro-Mediterranean Innovation Camp (EMIC)

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ABSTRACT / POVZETEK

The global marketplace is rapidly evolving, demanding innovative approaches to technology transfer that can bridge the gap between research and commercial application. The Euro-Mediterranean region, with its diverse socio-economic landscape, presents both challenges and opportunities for such endeavors. This paper presents the Euro-Mediterranean Innovation Camp (EMIC) as a successful model for implementing open innovation and technology transfer, particularly within the strategic framework of the Jožef Stefan Institute (JSI) and its partner institutions. The analysis not only draws on the outcomes of the recent EMIC initiatives but also aligns these practical insights with the theoretical foundations of open innovation as discussed in the doctoral disposition on technology transfer.

KEYWORDS / KLJUČNE BESEDE

Open Innovation, Technology Transfer, Euro-Mediterranean Region, EMIC, Jožef Stefan Institute

1 INTRODUCTION

The global marketplace is rapidly evolving, demanding innovative approaches to technology transfer that can bridge the gap between research and commercial application. The Euro-Mediterranean region, with its diverse socio-economic landscape, presents both challenges and opportunities for such endeavors. This paper presents the Euro-Mediterranean Innovation Camp (EMIC) as a successful model for implementing open innovation and technology transfer, particularly within the strategic framework of the Jožef Stefan Institute (JSI) and its partner institutions. The analysis not only draws on the outcomes of the recent EMIC initiatives but also aligns these practical insights with the theoretical foundations of open innovation, as discussed in the doctoral disposition on technology transfer. The main purpose of the paper is to examine the application of open innovation and technology transfer within the Euro-Mediterranean region, using the Euro-Mediterranean Innovation Camp (EMIC) as a case study. The paper explores how EMIC serves as a successful model for bridging the gap between academic research and commercial applications in a region that presents both challenges and opportunities due to its socio-economic diversity. Overall, the paper contributes to the literature on technology transfer by providing a detailed exploration of how structured innovation programs like EMIC can drive economic growth, address pressing global challenges, and create marketable solutions, particularly in the complex and diverse Euro-Mediterranean context.

The EMIC initiative has attracted applicants from over 17 countries, with a significant portion of the applications coming from Egypt and Jordan. The charts below illustrate the diversity and distribution of applicants by country of residence across the two seasons of the program.

(1)

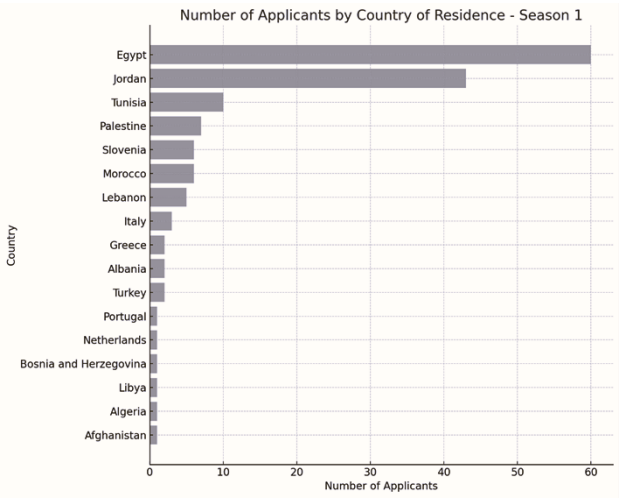

Figure 1: Number of applicants by country of residence – Season 1

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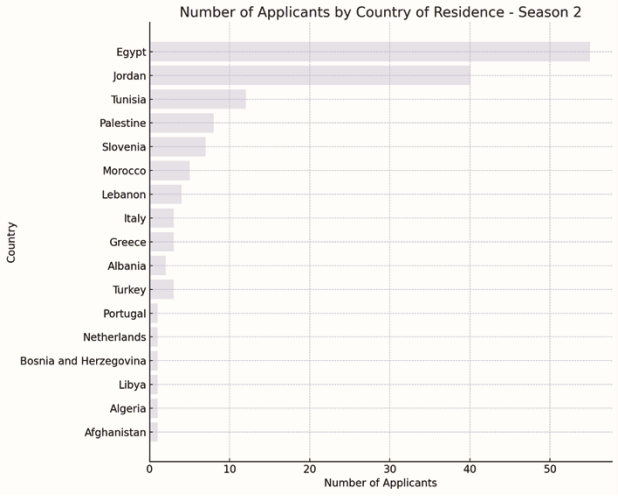

Figure 2: Number of applicants by country of residence – Season 2

Theoretical Foundations: Open Innovation and Technology Transfer

Open innovation, a concept popularized by Henry Chesbrough, has significantly reshaped our understanding of how innovation occurs in the modern business environment. Unlike traditional closed innovation models where companies rely solely on internal resources for R&D, open innovation promotes the use of both internal and external knowledge sources. This approach accelerates the innovation process and expands the potential market for new technologies (Chesbrough, 2005a). In the context of technology transfer, open innovation facilitates the commercialization of intellectual property (IP) through various channels, including licensing, joint ventures, and spin-offs, thus driving economic growth and enhancing competitiveness (Chesbrough, 2003b).

The Euro-Mediterranean region is a fertile ground for applying open innovation principles. However, the integration of public research outputs with industry needs has been a persistent challenge. Slovenia, for instance, excels in scientific output, ranking high in terms of research publications. Yet, as the OECD's 2012 report highlights, the country struggles with the commercialization of research findings, particularly in converting scientific discoveries into marketable products and services. This gap underscores the critical role of initiatives like EMIC, which aim to bridge the divide between academic research and industrial application through structured innovation programs.

The thematic focus of the EMIC projects aligns well with global challenges, as evidenced by the distribution of project types: 45% focused on health, 35% on renewable energy, and 20% on environmental issues, reflecting the alignment of participant interests with critical global needs.

The Euro-Mediterranean Innovation Camp (EMIC): A Model of Open Innovation

The Euro-Mediterranean Innovation Camp (EMIC) is a flagship initiative that embodies the principles of open innovation within the Euro-Mediterranean region. Launched by the Euro-Mediterranean University (EMUNI) in collaboration with the JSI and the EuroMed University of Fes (UEMF), EMIC provides a platform for young innovators to develop and showcase their ideas in response to pressing global challenges. The camp focuses on three critical areas: health, renewable energy, and climate change—fields that are not only relevant to the region but also globally significant.

The EMIC initiative is structured to promote iterative learning and development. Participants, who are selected through a rigorous process, receive mentorship and technical support from experts in their respective fields. This support is crucial in helping them refine their ideas and develop viable prototypes. The average age of participants was 24 years, with the youngest being 18 and the oldest 35, showcasing the youthful energy driving innovation in the Euro-Mediterranean region.

Selection Process of EMIC

The Euro-Mediterranean Innovation Camp (EMIC) follows a rigorous and multi-stage selection process to identify and support the most promising young innovators from across the Euro-Mediterranean region. Here's an overview of the selection process:

1. **Application Submission:**
    - **Eligibility:** Applicants must be between 18 and 35 years old, reside in one of the Euro-Mediterranean countries, and possess at least a high school diploma. The innovation they propose must address one of the three thematic areas: Health, Renewable Energy, or Environment (including Climate Change) and must be capable of being converted into a prototype within three months.
    - **Application Process:** Interested candidates submit their applications through an online form available on the EMUNI website. The application requires a detailed description of the innovative idea or invention, highlighting its novelty, feasibility, and potential for commercialization.
2. **Initial Screening:**
    - A panel of experts reviews all submitted applications. The review process evaluates the novelty of the idea, its practical applicability, and the feasibility of implementation within the specified timeframe.
    - **Shortlisting:** Based on the initial screening, a subset of applicants is shortlisted to advance to the next phase. For instance, in Season 2, out of 124 applications, approximately 40 candidates were

shortlisted for the online pitching phase (EMUNI).

3. **Online Pitching:**
    - **Pitch Preparation:** Shortlisted candidates prepare a pitch presentation, which they deliver via an online platform. During this phase, they present their ideas to a jury comprising experts from relevant fields.
    - **Jury Evaluation:** The jury evaluates the pitches based on several criteria, including innovation, feasibility, potential impact, and the candidate's ability to articulate and defend their idea. The most innovative and viable projects are selected to move forward.
4. **Innovation Bootcamp:**
    - **Workshops and Mentorship:** The selected finalists, known as the "Innovation Squad," are invited to participate in a 10-week bootcamp held at facilities like the Jožef Stefan Institute in Slovenia or the EuroMed University of Fes in Morocco. During this period, they receive technical assistance, mentorship from subject matter experts, and support in refining their prototypes.
    - **Elimination Stages:** Throughout the bootcamp, participants go through multiple elimination stages. These stages are designed to progressively challenge the innovators, focusing on proof of concept, engineering, prototyping/testing, and customer validation. The best performers in each stage advance to the next round (EMUNI).
5. **The Finale:**
    - **Final Presentation:** The competition culminates in a live finale event where the remaining candidates present their fully developed prototypes. This event is attended by a live audience, including mentors, representatives from partner institutions, and other stakeholders.
    - **Scoring:** Final scores are determined by both the jury and audience voting, with each accounting for 50% of the final score. The winners are announced based on the combined results of these evaluations (EMUNI).

This selection process is designed to ensure that the most innovative and feasible ideas are given the support they need to develop into successful market-ready products. It also emphasizes the importance of mentorship and iterative development, helping young innovators turn their ideas into impactful solutions.

Case Studies: Innovations from EMIC Season 2

The impact of EMIC is best illustrated through the success stories of its participants. The most recent season of EMIC, concluded in June 2024, showcased a range of groundbreaking innovations that have the potential to address significant challenges in health and sustainability.

The Euro-Mediterranean Innovation Camp (EMIC) Season 2 brought together some of the brightest minds across the region to develop innovative solutions addressing critical challenges. This section highlights the top three projects that stood out for their creativity, technical expertise, and potential for real-world impact.

1. **Muhammad Mounir (Egypt) – "SugarHeal"**
    - **Project Overview:** Muhammad Mounir, a Molecular Biotechnology student from Galala University, developed "SugarHeal," an innovative wound dressing material designed to accelerate the healing process of chronic and acute wounds. During his time at the Jožef Stefan Institute (JSI), Muhammad explored two main fabrication techniques:
        - **Electrospinning:** He created a cellulose-based solution with antibacterial properties for electrospinning, resulting in a biodegradable wound dressing that promotes faster healing.
        - **3D Bioprinting:** Muhammad also developed a cellulose-based ink enriched with natural antibacterial extracts, which was used in 3D bioprinting to produce customizable wound patches.
    - **Current Stage:** Muhammad has successfully developed prototypes of the wound dressing through 3D bioprinting, which have shown promising results in terms of mechanical stability and biological response. His next steps include further optimization and exploring commercial applications (EMUNI).
2. **Rahma M. Tolba (Egypt) – "Interactive Augmented Reality for Lisp Correction"**
    - **Project Overview:** Rahma Tolba, a PhD researcher from Ain Shams University, developed an interactive Augmented Reality (AR) application designed to assist in speech therapy for individuals with a lisp. Her project focuses on improving phonetic learning through the use of 3D animated models that demonstrate correct tongue movements. The app guides users through pronunciation exercises, providing real-time feedback through an AI-based Automatic Speech Recognition (ASR) system.
    - **Current Stage:** Rahma has developed a fully functional prototype for Android devices, which has been tested on a small group of individuals. The next steps involve gathering user feedback from speech therapists and phoniatricians to refine the design and functionality (EMUNI).

3. **Med Aziz Mhalla (Tunisia) – "Drowsy Driver Detection System"**
    - **Project Overview:** Med Aziz Mhalla, an electronics engineering student from the National Engineering School of Sousse,

created the "Drowsy Driver Detection System" (DDDS). This system leverages machine learning, computer vision, and embedded hardware to monitor drivers in real-time, detecting signs of drowsiness, distraction, and sleep onset. The system uses a Convolutional Neural Network (CNN) model to classify eye states and detect blinks and yawns, which are key indicators of drowsiness.

- **Current Stage:** Med Aziz has successfully developed a proof of concept and prototype that has been tested in controlled environments and on a laptop. He is currently optimizing the system for real-time performance using NVIDIA Jetson Nano and preparing for on-road testing (Med Aziz - Drowsy Driver…).

These projects not only exemplify the innovative spirit fostered by EMIC but also demonstrate the potential for significant contributions to healthcare, road safety, and speech therapy. Each of these top three finalists utilized the mentorship and resources provided during the EMIC bootcamp to bring their ideas closer to real-world application.

The diversity of innovations emerging from EMIC highlights the program's success in fostering creativity across different fields. These projects are not just theoretical exercises; they represent tangible solutions that can have a real-world impact, addressing some of the most pressing challenges in the Euro-Mediterranean region and beyond.

Challenges in Implementing Open Innovation

Despite its successes, the implementation of open innovation within the EMIC framework has not been without challenges. One of the primary challenges is the alignment of the diverse objectives of the program's international partners. The Euro-Mediterranean region encompasses a wide range of economic, social, and political contexts, each with its unique set of challenges. Coordinating efforts across such a diverse region requires careful planning and robust frameworks for collaboration.

Intellectual property (IP) management is another critical challenge in open innovation environments. While open innovation encourages the sharing of ideas and resources, it also raises questions about how IP is managed and protected. In the context of EMIC, ensuring that participants retain control over their innovations while still benefiting from the collaborative environment is crucial. This requires clear guidelines and agreements on IP management, which can be complex to negotiate across different legal and regulatory frameworks.

Another challenge is the scalability of the solutions developed through EMIC. While the innovations produced during the camp are often groundbreaking, bringing these solutions to market on a larger scale requires resources that may not be immediately available to the participants. This is where the support of institutions like JSI and the involvement of industry partners become critical. By providing continued support beyond the initial stages of development, these institutions can help ensure that the innovations produced at EMIC reach their full potential.

Opportunities for Enhancing Open Innovation

Despite these challenges, the EMIC model also presents significant opportunities for enhancing open innovation in the Euro-Mediterranean region. One of the key opportunities lies in the potential for cross-border collaboration. By bringing together participants from different countries and backgrounds, EMIC fosters a rich exchange of ideas and approaches. This diversity is a strength as it allows for the development of solutions that are informed by a wide range of perspectives and experiences.

The full cycle of open innovation and technology transfer has yet to be fully achieved, as both processes require more than just innovative ideas and technological breakthroughs. For these cycles to reach their full potential, business entities must engage early and consistently, starting from the initial stages of research and development. Their investment and involvement are crucial in ensuring that ideas and technologies not only progress beyond the conceptual phase but also successfully transition from labs to the market. Without the proactive participation of businesses, the promise of open innovation and effective technology transfer may remain unfulfilled, with many promising projects never realizing their full impact.

The collaborative model of EMIC, supported by the JSI's extensive research infrastructure, offers valuable insights into how open innovation can be effectively implemented in a complex and diverse region. The partnerships between academic institutions, industry players, and government bodies are crucial in providing the necessary resources for young innovators to translate their ideas into impactful technologies. These partnerships also help to ensure that the innovations produced at EMIC are aligned with market needs, increasing their chances of success.

Another opportunity for enhancing open innovation in the Euro-Mediterranean region is through the development of stronger networks and ecosystems. By fostering closer ties between research institutions, industry, and government, it is possible to create a more supportive environment for innovation. This includes not only providing funding and resources but also creating opportunities for mentorship, networking, and collaboration. Such ecosystems can help to sustain the momentum generated by initiatives like EMIC, ensuring that the innovations produced continue to evolve and have a lasting impact.

Conclusion

The Euro-Mediterranean Innovation Camp (EMIC) serves as a compelling example of how open innovation can be successfully implemented within a structured technology transfer framework. By leveraging the strengths of regional partnerships and focusing on critical areas such as renewable energy, health, and climate change, EMIC has successfully fostered a culture of innovation across the Euro-Mediterranean region. The initiative has not only provided a platform for young innovators to develop their ideas but has also facilitated the transfer of these ideas from research

to market, demonstrating the potential of open innovation to drive economic growth and address global challenges.

Moving forward, it will be crucial to address the challenges of IP management and resource allocation to sustain the momentum generated by these initiatives. The ongoing collaboration between academic institutions like JSI, industry partners, and government bodies will be key to enhancing the commercial viability of the innovations emerging from EMIC. As Slovenia and the broader Euro-Mediterranean region continue to refine their approaches to technology transfer, the lessons learned from EMIC will serve as a valuable guide for future innovation policies and practices.

The success of EMIC highlights the importance of fostering innovation among young people across the Mediterranean region. By providing the necessary support and resources, initiatives like EMIC can help to unlock the full potential of the region's young innovators, driving economic growth and addressing some of the most pressing challenges of our time. As we look to the future, it is clear that open innovation will continue to play a critical role in shaping the global innovation landscape, and initiatives like EMIC will be at the forefront of this exciting journey.

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