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Study of the Technology Transfer Ecosystem of GREECE

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Comprehensive Study of the Greek Technology Transfer Ecosystem

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1 Introduction

This report presents a comprehensive analysis of the technology transfer (TT) ecosystems in Greece, Bulgaria, Türkiye, and Romania, conducted by four leading institutions specializing in innovation and technology commercialization. These institutions include the Centre for Research and Technology Hellas (CERTH) in Greece, the Bulgarian Association for Transfer of Technology and Innovation (BATTI) in Bulgaria, Karadeniz Technical University Technology Transfer Application and Research Center (KTU TTC) in Türkiye, and the "Dunărea de Jos" University of Galați (UDJG) in Romania.

The study is part of the broader "Technology Transfer and Innovation Network for the Black Sea Basin" (T3N-BSB) project (https://t3nbsb.net/), which is funded under the Black Sea Basin Cross-Border Cooperation Program for the 2021-2027 period. T3N-BSB aims to develop sustainable transnational networks and platforms to facilitate the exchange of best practices and knowledge on leveraging innovative technological advancements. With a budget of €498,120.00, the project fosters stronger collaboration among academia, industry, and policymakers, ensuring technology transfer processes are more effective across borders. By enhancing institutional capacities and interconnectivity, T3N-BSB seeks to create a robust ecosystem that supports economic growth through innovation and research commercialization in the Black Sea region.

The technology transfer (TT) ecosystem is a critical component in fostering innovation, economic growth, and competitiveness in a knowledge-driven global economy. In Greece, the effective transfer of technology from research institutions to industry has gained increasing importance due to rapid technological advancements and the pressing need for sustainable economic development. This study aims to provide a comprehensive analysis of the Greek technology transfer ecosystem, identifying its current state, challenges, and opportunities for enhancement. While previous initiatives and legislative efforts have been made to bolster TT activities in Greece, significant gaps remain in both the literature and practical implementation that hinder the full exploitation of its potential.

Importance of the Study

A thorough examination of Greece's TT ecosystem is essential for several reasons. Firstly, it helps in understanding the existing infrastructure and the efficacy of policies aimed at promoting innovation and commercialization of research. Secondly, it sheds light on the discrepancies between the strong academic research output and the relatively low rate of technology commercialization. Finally, by identifying the strengths and weaknesses within the ecosystem, the study provides valuable insights for policymakers, academic institutions, and industry stakeholders to develop strategies that can bridge existing gaps.

Existing Challenges

Despite Greece's robust academic and research environment, the TT ecosystem faces multiple challenges:

- **Inconsistent Institutional Performance**: There is a significant disparity among institutions regarding TT activities. While some universities and research centers have well-established Technology Transfer Offices (TTOs) and processes, many others offer limited or no TT services.
- **Limited Commercialization of Research**: The transition from research to marketable products or services is not as efficient as it could be, resulting in a low number of

patents, licenses, and spin-off companies compared to the country's research potential.
- **Underdeveloped Regulatory Frameworks**: Inadequate policies and lack of standardization hinder effective technology transfer and create uncertainties for both researchers and industry partners.
- **Resource Constraints**: Many TTOs suffer from a lack of dedicated funding, skilled personnel, and expertise in IP management and commercialization strategies.
- **Fragmented Ecosystem**: The innovation ecosystem is not fully integrated, leading to weak collaborations between academia, industry, and government.

Methodology

This study employs a multidisciplinary approach to analyze the Greek TT ecosystem:

- **Data Collection**: Information was gathered from official reports, legislative documents, institutional websites, and recent studies conducted by national organizations like the National Documentation Centre (EKT) and the General Secretariat for Research and Innovation (GSRI). In some cases direct contacts with TTOs executives were conducted as well.
- **Analytical Framework**: The study includes a PESTEL analysis to evaluate external factors affecting TT and a SWOT analysis to identify internal strengths and weaknesses.
- **Case Studies**: Profiles of major institutions, including leading universities, research centers, and public and private initiatives, were examined to understand their roles, processes, and impact on the TT ecosystem.

Coverage

The study focuses on:

- **Sectors**: Academic, industrial, and governmental sectors involved in technology transfer activities.
- **Geographical Scope**: The entire country of Greece, with particular attention to key innovation hubs in cities like Athens, Thessaloniki, Patras, and Heraklion.
- **Institutions**: Leading universities (e.g., National and Kapodistrian University of Athens, Aristotle University of Thessaloniki), prominent research centers (e.g., NCSR "Demokritos," CERTH), governmental entities responsible for planning and coordinating implementation of the policy for Research, Technological Development and Innovation (e.g. GSRI) and other public and private initiatives supporting the TT ecosystem (e.g., Elevate Greece, egg-enter•grow•go).

Limitations

- **Data Constraints**: Reliance on available secondary data may not capture the most recent developments or unpublished internal processes within institutions.
- **Scope of Institutions**: Due to the vast number of entities involved in TT, not all institutions could be covered in detail.

Practical Implications

The study's findings offer practical benefits:

- **Policy Development**: Insights can guide policymakers in formulating effective strategies and regulatory frameworks to enhance TT activities.
- **Institutional Improvement**: Academic and research institutions can identify best practices and areas needing improvement in their TT processes.
- **Industry Collaboration**: Businesses can better understand how to engage with research institutions for innovation and commercialization opportunities.
- **International Competitiveness**: Strengthening the TT ecosystem can improve Greece's position in the global innovation landscape, attracting foreign investment and fostering international collaborations.

2 Historical Context & Current State

2.1 Overview

Initial Efforts in Technology Transfer:

The formal attention to technology transfer (TT) in Greece dates back to the 1980s, influenced by global legislative movements like the U.S. Bayh-Dole Act of 1980, which revolutionized how universities manage and commercialize research outputs. Greece's technology transfer ecosystem has been shaped by a series of legislative efforts aimed at fostering innovation, protecting intellectual property, and promoting commercialization through academic and industrial collaboration. One of the foundational laws is Law 1514/1985 on Research and Technological Development, which first acknowledged the importance of the systematic transfer of knowledge from research institutions to industry. This law set the stage for future legislative initiatives, emphasizing the importance of innovation for national development (IPMED, 2023).

In 1987, Law 1733/1987 was enacted, further advancing the framework for intellectual property and technology transfer. This law regulated the protection of inventions and industrial designs, providing a legal basis for the commercialization of research and the exploitation of patents. It was a landmark in the formal establishment of Technology Transfer Offices (TTOs) within universities and research centers, facilitating the legal and administrative processes required for research commercialization (EKT, 2020). This law also promoted collaborations between public research organizations and private companies, setting the groundwork for Greece's evolving spin-off ecosystem (IPMED, 2023).

Industrial Property Protection:

The management and protection of industrial property rights in Greece have been guided by several key pieces of legislation. Law 1733/1987 established the framework for patents and industrial design rights, while Law 2121/1993 further developed intellectual property (IP) protection, particularly focusing on copyright. To address the evolving needs of the industrial sector, Law 4072/2012 on trademarks was introduced, aligning Greece with the European Union's harmonized trademark system. These laws have strengthened Greece's ability to protect and capitalize on intellectual property, encouraging greater innovation and investment in research and development (IPMED, 2023).

To oversee and protect industrial property rights, the Hellenic Industrial Property Organization (OBI) was created. OBI plays a pivotal role in patent filings, industrial design protection, and guiding inventors through the complex landscape of IP management. This is crucial in supporting researchers and businesses in transforming their ideas into legally protected innovations that can be commercialized both nationally and internationally (IPMED, 2023).

A key part of Greece's innovation strategy has been fostering a vibrant spin-off ecosystem. Spin-offs, which allow universities and research centers to commercialize their innovations, have been supported by several legislative measures. Law 4864/2021 on spin-offs introduced a comprehensive framework for the creation and operation of technology-based startups originating from academic research. This law was a game-changer, allowing universities to more efficiently establish spin-off companies, defining the roles of public research

organizations and researchers in the commercialization process, and streamlining administrative procedures (EKT, 2020).

Moreover, Law 4864/2021 provides detailed regulations on how intellectual property developed within public research institutions can be transferred to spin-offs, ensuring a clear path for researchers to become entrepreneurs while maintaining compliance with national and EU regulations. This has opened new avenues for investment and collaboration between Greek universities and venture capital firms (IPMED, 2023; SeedBlink, 2023).

The creation of spin-offs is now further supported by national and EU funding programs, which incentivize innovation, entrepreneurship, and industry-academia collaborations. For example, initiatives under the National Strategic Reference Framework (NSRF) and Horizon 2020 have been instrumental in providing the financial backing necessary to foster a thriving spin-off culture in Greece (EKT, 2020).

Creation of First Technology Transfer Offices (TTOs):

In the 1990s, the establishment of formal Technology Transfer Offices (TTOs) began at major institutions such as the National Technical University of Athens (NTUA) and Aristotle University of Thessaloniki (AUTh). These TTOs were established to facilitate the commercialization of academic research outputs, allowing researchers to transform their scientific discoveries into marketable products and services. For example, NTUA's TTO has been instrumental in generating collaborations with large-scale industries and securing patents, especially in fields such as energy, material sciences, and information technology (EKT, 2020; IPMED, 2023).

The Centre for Research and Technology Hellas (CERTH), was another early player in the Greek TT ecosystem, which became a driving force behind several successful technology transfer projects. The office focused on identifying potential commercial applications and worked closely with industry partners to bring innovations to market.

Expansion of TTOs and Related Organizations:

While the early legal framework laid the foundation, the commercialization of scientific knowledge in Greece initially faced challenges. The slow uptake of technology transfer activities was attributed to limited industry-academia connections, underdeveloped administrative structures, and the lack of experienced professionals within TTOs (IPMED, 2023). However, more recent years have witnessed a resurgence in these activities.

A significant turning point came with the National Strategic Reference Framework (NSRF) for 2014-2020, which included dedicated funding to establish and develop TTOs across the country. The Greek government launched a public tender in 2021, further supporting universities and research centers in developing comprehensive technology transfer infrastructures and strategies. Many institutions began offering services ranging from patent application support to market analysis and collaboration facilitation with industrial partners (EKT, 2020).

For instance, the PRAXI Network, established in 2007, has played a crucial role in bridging the gap between academia and industry. It supports technology transfer by assisting research institutes in connecting with businesses, developing commercial strategies, and navigating the complexities of intellectual property rights (EKT, 2020; SpringerLink, 2023).

Key Milestones:

Some of the key milestones in Greece's technology transfer development include:

1985: Introduction of Law 1514/1985, acknowledging the significance of technology transfer (IPMED, 2023).

1987: Enactment of Law 1733/1987, specifically addressing technology transfer, inventions, and technological innovation (EKT, 2020).

2007: Establishment of the PRAXI Network, which became a central pillar in supporting research commercialization (EKT, 2020).

2014-2020: National Strategic Reference Framework (NSRF) dedicated significant funds to establish and grow 28 National Research Infrastructures (NRIs) across Greece (MITEF Greece, 2020).

2021-2022: Public tender launched to support the creation and operation of TTOs in Greek universities and research centers (IPMED, 2023).

Notable Cases and Examples:

One standout success in Greek technology transfer is the **Centre for Research and Technology Hellas (CERTH)**, one of Greece's largest and most dynamic research centers. CERTH has been a key player in facilitating partnerships between academic institutions and industry. It has successfully commercialized several innovations, particularly in the fields of renewable energy, environmental technologies, and intelligent transport systems. One notable project includes CERTH's collaboration with multinational companies to develop and market solutions in energy efficiency and smart transportation, leading to both domestic and international recognition (Dianeosis, 2021; EKT, 2020).

Another significant example is the Athens Technology Center (ATC), which has spun out various successful innovations in IT and communications technologies. ATC works closely with NTUA and has been instrumental in launching new startups in the ICT sector (SeedBlink, 2023).

Institutionalization of Technology Transfer:

Despite the robust legal framework provided by Laws 1514/1985 and 1733/1987, the full institutionalization of technology transfer in Greece only gained traction in the 2010s. The establishment of **National Guidelines for the Protection of Intellectual Property** by the Hellenic Industrial Property Organisation (OBI) further standardized processes and provided a coherent framework for patent filings and licensing agreements.

In recent years, the General Secretariat for Research and Innovation (GSRI) launched two major funding calls to strengthen Technology Transfer Offices (TTOs) at universities and research centers in Greece. These calls, known as **Phase A** and **Phase B**, are part of a broader initiative to enhance the technology transfer ecosystem and promote the commercialization of academic research.

Phase A (2021): The initial call was aimed at creating and supporting TTOs within Greek universities and research centers. The focus was on building the necessary infrastructure and providing training to staff members involved in technology transfer activities. This phase also laid the foundation for establishing legal frameworks and operational processes required for

efficient technology transfer, including IP management, patent filing, and the commercialization of research outputs.

Phase B (2021): Following the initial success of Phase A, Phase B expanded the scope by providing additional funding to scale up the TTO operations. This phase introduced more sophisticated services such as technology marketing, licensing agreements, and partnerships with industry. The goal was to further promote collaborations between academia and the private sector, facilitating the creation of spin-offs and the commercialization of innovative technologies. The funding for both phases was co-financed by national resources and the European Union through the National Strategic Reference Framework (NSRF) (GSRI, 2023).

These initiatives are critical to enhancing Greece's innovation capacity by ensuring that research findings are successfully transferred to the market, contributing to economic growth and development. The outcomes from these calls have included the establishment of multiple TTOs, the successful commercialization of research projects, and stronger ties between academia and industry.

Additionally, the Ministry of Education launched a call for strengthening entrepreneurship at universities. This program aimed to create entrepreneurship hubs within academic institutions to encourage innovation-driven startups originating from university research. These hubs were designed to provide students and researchers with the tools and support needed to commercialize their innovations (GSRI, 2023).

Influence of Global Trends:

Global trends, particularly the rise of the knowledge economy and the increasing importance of intellectual property (IP) management, have greatly influenced Greece's technology transfer landscape. The country has aligned its IP frameworks with international standards, becoming a signatory to agreements like the **TRIPS Agreement** and the **Paris Convention** (IPMED, 2023). Moreover, Greece's participation in European research programs, especially **Horizon 2020**, has fostered the internationalization of Greek research outputs, encouraging collaboration between Greek universities and global industrial partners (EKT, 2020).

Emergence of New Stakeholders:

In recent years, venture capital firms and private equity have played a significant role in the Greek technology transfer landscape. Platforms like **Elevate Greece**, launched in 2020, provide visibility to innovative startups and attract funding. This has led to a surge in investments in technology-driven businesses, particularly in sectors like health tech, fintech, and ICT. Venture capital have been key players in this transformation, supporting the commercialization of research innovations and helping startups scale their technologies (MITEF Greece, 2020; SeedBlink, 2023).

Timeline of Key Events in the Greek Technology Transfer Ecosystem:

Year	Event
1985	Introduction of Law 1514/1985, recognizing the importance of technology transfer
1987	Enactment of Law 1733/1987, specifically addressing technology transfer, inventions, and technological innovation
1990s	Establishment of first TTOs in major universities
2007	PRAXI Network's creation to enhance national TT efforts.
2008	Financial crisis impacts the Greek R&I landscape, posing challenges in attracting talent and investment.
2014	Start of the program to establish and develop 28 National Research Infrastructures (NRIs)
2018	Establishment of the EU Technology Transfer Skills Centre and the Alliance of Technology Transfer Professionals (ATTP), promoting international standards and methodologies for technology transfer.
2020	End of the NRI development program
2021	Launch of the public tender to support the creation and operation of TTOs in universities and research centers.

2.2 Existing Studies

In recent years, multiple studies have been conducted to evaluate and improve the know-how and technology transfer ecosystem in Greece. These studies provide insights into the current state, challenges, and opportunities in the technology transfer landscape.

"Η Ελλάδα που Μαθαίνει, Ερευνά, Καινοτομεί και Επιχειρεί" (2021): This comprehensive report offers an in-depth analysis of Greece's research, innovation, and entrepreneurship ecosystem, highlighting key institutions and the legislative frameworks that shape technology transfer activities. It emphasizes the role of technology transfer in driving innovation and economic growth.

"Γραφεία Μεταφοράς Τεχνολογίας στην Ελλάδα: Μια Πρώτη Αποτύπωση" by the National Documentation Centre (ΕΚΤ): This study provides a snapshot of the existing Technology Transfer Offices (TTOs) in Greece, their operational structures, and their challenges. It emphasizes the need for stronger support systems and highlights the gaps in knowledge commercialization.

Technology Transfer Guide - Greece (2019): This guide outlines the key methodologies, workflows, and tools used in technology transfer. It offers a practical framework for facilitating knowledge transfer from research institutions to industry, focusing on intellectual property management, collaborative R&D, and best practices for commercialization.

Together, these studies provide a comprehensive overview of the strengths, weaknesses, and opportunities within Greece's technology transfer ecosystem, offering a roadmap for future improvements and policy initiatives.

The report titled ***"Η Ελλάδα που Μαθαίνει, Ερευνά, Καινοτομεί και Επιχειρεί"*** **(2021)** provides a comprehensive overview of the innovation, research, and entrepreneurship ecosystem in Greece, with a special focus on technology transfer. The study emphasizes the need for an integrated systemic strategy centered on innovation and knowledge as the country aims to boost its economic productivity in a rapidly evolving global environment.

Synopsis of Technology Transfer Ecosystem in Greece

Historical Context and Legislative Framework: The Greek technology transfer ecosystem began formalizing in the 1980s, driven by laws such as Law 1514/1985 and Law 1733/1987, which focused on the systematic transfer of research from academia to industry. These laws laid the foundation for the establishment of Technology Transfer Offices (TTOs) at major research institutions.

Challenges and Developments: Despite the early establishment of a legal framework, the report highlights challenges such as low commercialization of academic research, insufficient collaboration between universities and industry, and a generally low level of innovation-driven entrepreneurship. Recent legislative efforts, including Law 4864/2021 on spin-offs, have aimed to address these issues by facilitating the creation of technology-based startups, or spin-offs, from universities.

Key Players in Technology Transfer: Institutions like the National Technical University of Athens (NTUA), Aristotle University of Thessaloniki (AUTh), and the Centre for Research and Technology Hellas (CERTH) have been pivotal in driving technology transfer. Their TTOs have successfully managed intellectual property and facilitated collaborations with industry, particularly in high-tech sectors such as energy and information technology.

Metrics and Achievements: Greek research institutions have actively participated in competitive European research programs such as Horizon 2020. Between 1984 and 2020, seven Greek universities and research centers ranked among the top 100 European organizations in terms of participation in research networks. However, despite this strong academic output, the report identifies a gap in the commercial exploitation of research, as evidenced by Greece's low number of patent filings relative to other European nations.

Proposed Solutions and Future Directions: The study proposes several solutions to strengthen the technology transfer ecosystem, including improving collaboration between academia and industry, increasing investment in research and development (R&D), and providing better support for entrepreneurial initiatives within universities. Policies should focus on building a mission-oriented research agenda to tackle strategic national challenges and fostering an innovation-driven economy through better coordination of research activities and commercialization strategies.

Common Methods and Tools in Technology Transfer

The study highlights the importance of structured workflows within TTOs for managing intellectual property, conducting market analyses, and fostering industry partnerships. Tools commonly used in these processes include patent databases, market research platforms, and intellectual property management software. Additionally, entrepreneurial incubators and

accelerators, such as those found in NTUA, provide vital support for startups, offering business mentorship, funding opportunities, and infrastructure for scaling innovations.

The study titled ***"Γραφεία Μεταφοράς Τεχνολογίας στην Ελλάδα: Μια Πρώτη Αποτύπωση"*** by the **National Documentation Centre (EKT)** provides a detailed analysis of the existing Technology Transfer Offices (TTOs) in Greece, outlining their structures, methods, tools, and the challenges they face in commercializing research outputs.

Key Results of the Study:

Administrative Structure and Heterogeneity: The report identifies a significant variance in how universities and research centers organize their TTOs. Some institutions have fully developed structures that provide a range of technology transfer services, while others lag behind, offering minimal or no services.

Performance Metrics:

The majority of Greek institutions have limited output in terms of patents and other intellectual property (IP) protections. Only a few universities have achieved notable successes, with one institution recording 58 patents, while most others reported negligible outputs.

Technology-based spinoffs (known as "spin-offs") and startups are few, with only a couple of institutions recording the creation of more than five spinoffs or startups. This highlights the gap in turning academic research into commercial enterprises.

Services Provided by TTOs:

The report points out that only three institutions provide a full suite of technology transfer services, including IP management, patent filing, collaboration with industry, and licensing of technologies.

Many institutions lack structured internal policies regarding IP ownership, revenue sharing, and conflict of interest, limiting their ability to capitalize on research outcomes.

Methods and Tools in Use:

The report emphasizes the need for standardized workflows and tools, such as electronic systems for managing patent applications, databases for tracking innovation, and statistical tools for analyzing TTO performance.

The collection of data was performed using the LimeSurvey platform, with analysis conducted through SPSS software, which provided a statistical overview of TTO activities across different institutions.

Challenges: The main challenges facing Greek TTOs include insufficient funding, lack of expertise, and weak connections with the private sector. This has resulted in low commercialization rates of academic research and limited impact on the national economy.

Future Directions: The report advocates for the establishment of clear institutional guidelines, stronger legal frameworks, and increased investment in capacity-building for TTOs to support innovation. Furthermore, fostering collaborations between universities and industries is deemed essential for improving technology transfer outcomes in Greece.

The report ***Technology Transfer Guide - Greece*** **(2019)**, underlines the critical aspects of the technology transfer ecosystem in Greece, focusing on the procedures, challenges, and key players in promoting innovation through knowledge transfer.

Key Points on the Technology Transfer Ecosystem in Greece:

Conceptual Approach to Technology Transfer:

Technology transfer is the process of moving scientific and technological knowledge from research institutions to businesses, promoting the commercialization of innovations.

It involves both tangible and intangible components like patents, technical documentation, and expertise that can enhance industrial capacity or solve market needs (Van Wyk, 1988; Reddy & Zhao, 1990).

Forms of Technology Transfer:

The report distinguishes various forms of technology transfer, including licensing, patent sales, consultancy, and collaborative R&D projects. These methods help bridge the gap between academia and industry by facilitating knowledge dissemination and innovation diffusion.

Additionally, both "embodied" technology (e.g., equipment, materials) and "disembodied" technology (e.g., know-how, designs) are discussed as essential types for knowledge transfer (Jasinski, 1999).

Benefits and Challenges:

Benefits include increased economic growth, competitiveness, and internationalization of domestic markets. However, barriers such as limited access to funding, insufficient training in IP management, and weak industry-academia connections impede efficient technology transfer.

Organizational problems, technical issues, and a lack of awareness about available technologies are other identified obstacles (Cooke & Mayes, 1996).

Mechanisms for Supporting Technology Transfer:

Several key institutions in Greece, such as the Centre for Research and Technology Hellas (CERTH) and the PRAXI Network, play pivotal roles in facilitating technology transfer.

These organizations provide services ranging from IP management, networking events, R&D support, and consulting services that guide businesses through the commercialization process.

Legislative and Institutional Framework:

Greece has implemented several laws on industrial and intellectual property, notably Law 2121/1993, which governs copyright, and the role of the Hellenic Copyright Organization. The regulatory framework is essential for protecting the rights of innovators and ensuring that technology transfer activities operate within legal bounds.

Technology Transfer Models and Best Practices:

The guide outlines best practices, including the need for alignment of mission between stakeholders, proper resource allocation, and stakeholder involvement in the transfer process. Success in technology transfer also hinges on a robust regulatory environment and efficient IP management systems.

Example models, such as the NASA and Federal Laboratory Consortium approaches, are highlighted as exemplary frameworks for facilitating technology transfer.

3 PESTEL Analysis of the Technology Transfer Ecosystem

The Pestel analysis for the **Technology Transfer Ecosystem in Greece** is a useful tool to helps us understand the key external factors affecting its development. By analyzing **political, economic, social, technological, environmental, and legal** environments, we expect to identify the strengths and challenges shaping innovation and knowledge transfer. This can reveal government support, funding opportunities, societal attitudes toward innovation, technological advancements, sustainability initiatives, and legal frameworks. The insights will inform strategies to enhance Greece's ability to foster technology transfer and drive economic growth through research and innovation.

- **Political Factors**: The Greek government has prioritized innovation through policies supporting technology transfer offices (TTOs). Legislative support, such as **Law 4864/2021**, encourages the creation of spin-offs, and most political parties favor tech-driven economic growth.
- **Economic**: Economic forecasts predict steady growth (~2.5% for 2024-2025), with funding from EU programs and national initiatives supporting TTOs. The second funding cycle (2024-2029) highlights a stable economic commitment to innovation.
- **Social**: Greece has a well-educated workforce, with a societal shift towards supporting **entrepreneurship** and **innovation**. Increased awareness of competitiveness and startups drives a more innovation-friendly culture.
- **Technological**: Greece's research ecosystem, supported by institutions like **CERTH**, is equipped with advanced technology and human capital. TTOs benefit from these resources to push cutting-edge research and innovation.
- **Environmental**: Technology transfer can promote green technologies and contribute to **sustainability goals** (ESG), aligning with global environmental trends and EU sustainability initiatives.
- **Legal**: The legal framework, strengthened by new legislation, encourages the creation of spin-offs and innovation-driven startups, offering clear pathways for intellectual property management and technology commercialization.

In conclusion, the PESTEL analysis of Greece's tech transfer ecosystem highlights strong governmental and societal support for innovation, reinforced by favorable economic conditions and technological advancements. Greece's legal framework is increasingly conducive to fostering spin-offs and startups, while the focus on sustainable technologies aligns with global environmental goals. The country's educated workforce and research infrastructure provide a solid foundation for the growth of technology transfer offices. Together, these factors present a promising environment for driving innovation and economic growth through technology commercialization in Greece.

4 Main Actors of the Technology Transfer Ecosystem in Greece

4.1 Profile of Major Institutions

4.1.1 Leading Universities and Their Technology Transfer Offices (TTOs)

4.1.1.1 National and Kapodistrian University of Athens (NKUA)

Founded in 1837, NKUA is Greece's oldest university and one of the largest. It offers a wide range of programs in humanities, sciences, and social sciences and is a major hub for research.

The Technology Transfer Office (TTO) of the (NKUA) established in 2019 and it is organized into two units, the Technology Transfer Office and the Business Accelerator. The TTO staff comprises a mathematician and a business consultant, while the Business Accelerator is manned by a business consultant, and an administrative executive. The TTO plays a key role in promoting the commercialization of research outputs, managing intellectual property (IP), and fostering collaboration between the university's researchers and industry (National and Kapodistrian University of Athens, n.d.). Here's an overview of its main functions:

Key Functions of the TTO at NKUA

- Intellectual Property Management: The TTO helps researchers protect their innovations by providing guidance on patents, copyrights, and trademarks. This includes evaluating the commercial potential of research and assisting with the legal processes required to secure IP rights.
- Commercialization of Research: The office facilitates the commercialization of research results by helping to identify market opportunities, attracting potential investors, and forming partnerships with industries. This can lead to the creation of spin-off companies or licensing agreements.
- Collaboration with Industry: The TTO at NKUA acts as a bridge between the academic community and the private sector, promoting research collaborations, joint ventures, and contract research. These partnerships often provide funding for further research and development.
- Support for Start-ups and Spin-offs: The office provides support for researchers who wish to start their own companies based on their innovations. This includes mentoring, business plan development, and access to funding opportunities.
- Raising Awareness and Training: The TTO also organizes workshops and seminars to raise awareness about the importance of intellectual property and technology transfer. It trains researchers on how to turn their academic work into marketable products or services.
- Funding and Grants: The TTO helps researchers identify funding sources for their projects, including national and EU-level grants, innovation funding schemes, and venture capital.

Funding Scheme

The operation of the TTO is mainly funded by the organization itself. Simultaneously, there are other parallel income streams like royalties from the Spin-Offs of the academic institution, royalties from licenses and subsides from the central government through specific programs.

Achievements

NKUA's TTO has successfully facilitated the commercialization of numerous technologies and research outcomes across various disciplines, particularly in the fields of biomedicine, pharmaceuticals, information technology, and environmental sciences.

Key Metrics

The TTO has submitted over 50 patent requests, has managed 4 spin-off applications, and has participated in over 80 technology transfer projects. Simultaneously, the Business Accelerator has served over 300 start uppers (29 groups with legal status) and has provided more than 400 hours of mentoring.

4.1.1.2 Aristotle University of Thessaloniki (AUTH)

Established in 1925, AUTH is the largest university in Greece, located in Thessaloniki. It covers a broad range of academic disciplines and is renowned for its research output.

The Technology Transfer Office (TTO) at the Aristotle University of Thessaloniki (AUTH) set up in 2015. It employs four persons, a mechanical engineer, a physics scientist and two lawyers while maintains a wide network of specialized patent attorneys. The TTO plays a significant role in advancing the university's research commercialization, fostering innovation, and establishing strong ties between academia and industry (Aristotle University of Thessaloniki, n.d.).

Key Functions of the TTO at AUTH

- Intellectual Property Protection and Management: The TTO helps researchers protect their intellectual property (IP), including patents, copyrights, trademarks, and other forms of IP. It provides support throughout the patent application process and advises on the strategic management of IP assets.
- Technology Licensing and Commercialization: AUTH's TTO facilitates the commercialization of research results by identifying technologies with market potential and negotiating licensing agreements with industry partners. This can lead to the development of new products or services, often through licensing deals with companies.
- Industry Collaboration and Partnerships: The TTO acts as a bridge between university researchers and private sector companies. It helps initiate and manage collaborative research projects, joint ventures, and contract research, ensuring that industry needs align with academic expertise.
- Support for Start-ups and Spin-offs: AUTH has a vibrant ecosystem for fostering entrepreneurship, and the TTO plays a central role in supporting the creation of start-ups and spin-off companies. The office provides mentorship, business development support, and connects entrepreneurs with investors and funding opportunities.
- Funding and Grant Support: The TTO helps researchers access funding opportunities for innovation projects, including national and European Union (EU) grants like Horizon Europe and other funding schemes designed for research and innovation commercialization.

- Training and Capacity Building: The TTO offers training workshops and seminars aimed at raising awareness of technology transfer processes, IP management, and entrepreneurship. It also provides training to students and researchers on how to commercialize their research and develop business plans.
- Technology and Market Assessment: The TTO conducts thorough assessments of new technologies to determine their commercial viability, including market potential, scalability, and competition analysis.

Key Areas of Focus

- Biotechnology and Life Sciences: AUTH has a strong research output in health, medicine, and biotechnologies, with many projects being commercialized in collaboration with the private sector.
- Engineering and Information Technology: The University's robust engineering faculties contribute innovations in technology, software, and advanced materials, which are key areas for the TTO's commercialization efforts.
- Environmental Sciences: AUTH is also active in promoting technologies related to sustainability, renewable energy, and environmental protection, areas where its research is highly sought after by industry.

Funding Scheme

The TTO's operation is primarily funded by the organization itself. In addition, it generates revenue from multiple sources, including royalties from spin-off companies associated with the academic institution, licensing agreements, and subsidies provided by the central government through targeted programs.

Achievements

The TTO at AUTH has facilitated the creation of numerous spin-off companies, patented technologies, and successful collaborations with both Greek and international industries. Its achievements span across fields like medical devices, agriculture, information and communication technologies (ICT), and pharmaceuticals.

Key Metrics

The TTO has a portfolio of sixty (60) active patents, it has involved in the creation of thirteen (13) spin-offs while it has negotiated over twenty five (25) license agreements.

4.1.1.3 University of Patras

Founded in 1964, the University of Patras is known for its strong focus on engineering, natural sciences, health sciences, and social studies, making it one of the leading research institutions in Greece (University of Patras, n.d.).

The Technology Transfer Office (TTO) at the University of Patras was established in 2004 . Its creation aimed to enhance the commercialization of research and innovation produced by the university and to facilitate collaboration between academia and industry.

The exact number of people working at the Technology Transfer Office (TTO) of the University of Patras can vary depending on the period, projects, and funding. Generally, TTOs at universities like the University of Patras tend to be relatively small teams, often comprising around 5 to 10 core staff members, including:

- Technology Transfer Specialists: Professionals who work on IP protection, commercialization, and licensing.
- Business Development Managers: Focused on connecting industry partners with university research.
- Legal Advisors: Experts in intellectual property law and patent filing.
- Administrative and Support Staff: Handling the office's day-to-day operations.
- Innovation and Startup Advisors: Assisting researchers with creating startups or spin-offs.

Additionally, the TTO may collaborate with external consultants and legal experts, depending on the projects they manage. The size of the team may increase when handling large or high-profile projects, or through partnerships with other research institutions.

Key Functions of the TTO at the University of Patras

- Intellectual Property Management: The TTO assists researchers in securing IP rights, including patents, copyrights, and trademarks, for their inventions and discoveries. This support includes identifying which research outputs have commercialization potential and guiding researchers through the patenting process.
- Technology Commercialization and Licensing: The TTO is responsible for the commercialization of research results, helping bridge the gap between university research and the market. This involves negotiating licensing agreements with companies interested in developing university-based technologies into products or services.
- Industry Collaboration: The TTO acts as a liaison between the university and the private sector, fostering partnerships for collaborative research projects, contract research, and consultancy services. These collaborations help leverage the university’s research expertise to address industry challenges.
- Support for Start-ups and Spin-offs: The TTO offers support to researchers and students who wish to establish start-ups or spin-off companies based on their research. This support includes business development advice, legal guidance, and connections to investors and funding opportunities.
- Funding and Grants for Innovation: The TTO provides assistance in securing funding for research and innovation projects. This includes identifying relevant funding programs (national and European, like Horizon Europe) and helping researchers prepare proposals to attract investment for their technologies.
- Consulting and Entrepreneurship Support: The office offers consulting services to researchers and students on topics like IP strategy, market potential, and entrepreneurial development. Workshops and seminars are regularly held to raise awareness of technology transfer, IP protection, and the commercialization process.
- Technology and Market Assessment: The TTO evaluates new technologies developed by the university to determine their market potential. This includes assessing the technical viability, commercial prospects, and potential market size for each innovation.

Key Areas of Focus

- Engineering and Technology: The university is well known for its research output in areas like mechanical engineering, electrical engineering, and computer science, which are core focuses of the TTO's technology transfer efforts.
- Health and Life Sciences: The university has a strong presence in biomedical research, pharmaceuticals, and medical devices, making these fields key areas for commercialization.
- Environmental Technologies: Given the increasing focus on sustainability, the university's research in environmental sciences and renewable energy also provides significant commercialization opportunities.

Funding Scheme

The TTO is primarily financed by the institution itself, but it also benefits from additional revenue streams. These include royalties from spin-offs created by the academic institution, licensing agreements, and government subsidies obtained through specialized programs.

Achievements

The TTO at the University of Patras has successfully facilitated the commercialization of various technologies, leading to the creation of spin-off companies, licensing agreements, and collaborative projects with both national and international companies. Some of the university's most successful commercialized innovations come from fields such as biomedicine, ICT (Information and Communication Technology), and renewable energy.

4.1.1.4 University of Thessaly

Founded in 1984, with campuses in Volos, Larissa, and other cities, it offers programs in agriculture, engineering, social sciences, and health, with a focus on regional development.

The Technology Transfer Office (TTO) at the University Of Thessaly (UTH) employs from six to nine people depending on the implementing projects of each specific period. The TTO may collaborate with external consultants and legal experts, depending on the projects they manage (University of Thessaly, n.d.).

Key Functions of the TTO at the University of Thessaly

- Intellectual Property Management: The TTO assists researchers in protecting their intellectual property rights, including patents, copyrights, and trademarks. It provides guidance on IP strategy, helps with patent applications, and manages the university's IP portfolio to maximize its commercial value.
- Technology Commercialization: The TTO is responsible for turning research outcomes into marketable products and services. This involves identifying technologies with commercial potential, negotiating licensing agreements, and facilitating the transfer of technology to industry partners.
- Industry Collaboration and Partnerships: The TTO promotes collaborations between UTH and industry by establishing joint research projects, contract research

agreements, and consultancy services. It helps businesses access the university's research expertise to address their specific needs.

- Support for Start-ups and Spin-offs: The TTO provides support for the creation and development of start-ups and spin-off companies based on UTH's research. This includes business development advice, assistance with business planning, and connecting entrepreneurs with investors and funding sources.
- Funding and Grants: The TTO helps researchers secure funding for innovation projects by identifying relevant national and European funding opportunities, such as those from the Horizon Europe program. It also supports the preparation of grant proposals.
- Training and Capacity Building: The TTO organizes training sessions, workshops, and seminars on technology transfer, IP management, and entrepreneurship. These initiatives aim to enhance the university community's understanding of commercialization processes and foster an innovative culture.
- Technology and Market Assessment: The TTO evaluates the commercial potential of new technologies developed at UTH. This includes conducting market analyses to determine the viability of innovations and providing strategic recommendations for commercialization.

Key Areas of Focus:

- Engineering and Technology: UTH's research in engineering disciplines, including civil, mechanical, and electrical engineering, is a significant focus for the TTO's commercialization efforts.
- Agricultural Sciences: Research in agriculture, including crop science, animal husbandry, and agricultural technology, provides valuable opportunities for commercialization and industry collaboration.
- Health and Life Sciences: UTH's research in health sciences and biotechnology is another key area of focus, with potential applications in medical devices, pharmaceuticals, and healthcare solutions.

Funding Scheme

The TTO's primary funding comes from the institution itself, supplemented by various other income sources. These include royalties from the academic institution's spin-offs, revenue from licensing agreements, and subsidies from the central government through specific initiatives.

Achievements

The TTO at UTH has facilitated the commercialization of various research outcomes, including licensing agreements and the creation of spin-off companies. These achievements reflect the office's role in turning innovative research into marketable solutions and contributing to technological and economic development.

Collaboration with Industry

The TTO actively engages with industry partners to develop collaborative research projects and commercial ventures. It helps align UTH's research strengths with industry needs, fostering innovation and addressing practical challenges.

4.1.1.5 National Technical University of Athens (NTUA)

Also known as the Athens Polytechnic, NTUA is the oldest and most prestigious technical university in Greece, specializing in engineering and technology.

The Technology Transfer Office (TTO) at the National Technical University of Athens (NTUA) was re-established in 2020 being a central entity responsible for facilitating the commercialization of research, managing intellectual property (IP), and fostering collaborations between the university and industry. The TTO employs four engineers and maintains two external collaborations with a lawyer and an engineer specialized in the field of Economic and Strategic Analysis of Innovation and Technology (National and Kapodistrian University of Athens, n.d.).

Key Functions of the TTO at NTUA

- Intellectual Property Management: The TTO helps researchers protect their intellectual property through patents, copyrights, and trademarks. It provides guidance on IP strategy, assists with patent applications, and manages the university's IP portfolio to maximize its commercial value.
- Technology Commercialization: The TTO is instrumental in translating research outcomes into marketable products and services. It identifies technologies with commercial potential, facilitates licensing agreements, and helps negotiate terms with industry partners.
- Industry Collaboration and Partnerships: The TTO acts as a bridge between NTUA and the private sector, promoting partnerships for joint research projects, consultancy services, and contract research. It helps businesses leverage the university's technical expertise to address their needs.
- Support for Start-ups and Spin-offs: The TTO provides support for the creation of start-ups and spin-off companies based on NTUA's research. This includes business development advice, assistance with business planning, and connections to venture capital and funding sources.
- Funding and Grants: The TTO assists researchers in securing funding for innovation projects. It identifies relevant national and European funding opportunities, such as those from the Horizon Europe program, and supports the preparation of grant proposals.
- Training and Capacity Building: The TTO offers training and workshops on topics related to technology transfer, IP management, and entrepreneurship. These initiatives aim to enhance the university community's understanding of commercialization processes and encourage innovation.
- Technology and Market Assessment: The office evaluates the commercial potential of new technologies developed at NTUA. This includes conducting market analyses to determine the viability of technologies and providing strategic recommendations for commercialization.

Key Areas of Focus:

- Engineering and Technology: NTUA is renowned for its research in various engineering disciplines, including civil, mechanical, electrical, and computer engineering. These areas are central to the TTO's technology transfer efforts.

- Information and Communication Technology (ICT): NTUA's research in ICT includes advancements in software, hardware, and telecommunications, which are key areas for commercialization.
- Energy and Environment: Research in renewable energy, environmental technology, and sustainability is also a focus area, reflecting NTUA's commitment to addressing global challenges.

Funding Scheme

The operation of the TTO is mainly funded by the academic institution. Simultaneously, there are other parallel income streams like royalties from the Spin-Offs of the academic institution, royalties from licenses and subsides from the central government through specific programs.

Achievements:

The TTO at NTUA has successfully facilitated numerous technology transfers, including licensing agreements and spin-off companies in sectors such as engineering, ICT, and renewable energy.

It is important to highlight that besides the institutions already mentioned, many well-established Greek universities with significant academic and research outputs have recently begun setting up their own Technology Transfer Offices (TTOs) to advance in this area. This movement has been spurred by government-funded programs, like the following:

Phase A (2021): The initial call was aimed at creating and supporting TTOs within Greek universities and research centers where they do not exist at all. The focus was on building the necessary infrastructure and providing training to staff members involved in technology transfer activities. This phase also laid the foundation for establishing legal frameworks and operational processes required for efficient technology transfer, including IP management, patent filing, and the commercialization of research outputs.

Phase B (2021): Following the initial success of Phase A, Phase B expanded the scope by providing additional funding to scale up the TTO operations. This phase introduced more sophisticated services such as technology marketing, licensing agreements, and partnerships with industry. The goal was to further promote collaborations between academia and the private sector, facilitating the creation of spin-offs and the commercialization of innovative technologies. The funding for both phases was co-financed by national resources and the European Union through the National Strategic Reference Framework (NSRF) (GSRI, 2023).

4.1.2 Prominent Research Centers

The research centers presented in the following paragraphs are considered the most mature in relation to the delivery of technology transfer services.

4.1.2.1 National Centre for Scientific Research (NCSR) "Demokritos"

The National Centre for Scientific Research (NCSR) "Demokritos" was established in 1959 as a research center for nuclear science and technology. Over the decades, Demokritos expanded its research areas, becoming a hub for advanced research in multiple fields of science and technology including on top of nuclear science, nanotechnology, energy, information technology and biosciences (National Centre for Scientific Research "Demokritos," n.d.).

Demokritos Technology Transfer Office: Technology transfer activities are performed by the Innovation Office.

Team Composition: 1 Support Staff: Manages the administrative workload (Degree in Social Sciences). 2 Legal Advisors: 1 specializing in innovation and IP-related agreements (LLM in Intellectual Property and Digital Economy), 1 specializing in EU funding and consortium agreements (PhD in IP Law). 2 Funding Experts: 1 senior funding expert (PhD in Engineering), 1 junior funding expert (PhD in AI), 1 Tech Transfer Officer: An IP protection expert with a scientific background (PhD in Life Sciences), 1 Commercialization Officer: With a business and innovation background (Master's Degree in Economics). 1 Head of Innovation (Master's degree in Banking).

Core services of Demokritos TTO

- Intellectual Property Protection and Management: The TTO helps researchers protect their intellectual property (IP), including patents, copyrights, trademarks, and other forms of IP. It provides support throughout the patent application process and advises on the strategic management of IP assets.
- Technology Licensing and Commercialization: commercialization of research results by identifying technologies with market potential and negotiating licensing agreements with industry partners. This can lead to the development of new products or services, often through licensing deals with companies.
- Industry Collaboration and Partnerships: The TTO acts as a bridge between university researchers and private sector companies. It helps initiate and manage collaborative research projects, joint ventures, and contract research, ensuring that industry needs align with academic expertise.
- Support for Start-ups and Spin-offs: the TTO plays a central role in supporting the creation of start-ups and spin-off companies. The office provides mentorship, business development support, and connects entrepreneurs with investors and funding opportunities.
- Training and Capacity Building: The TTO offers training workshops and seminars aimed at raising awareness of technology transfer processes, IP management, and

entrepreneurship. It also provides training to students and researchers on how to commercialize their research and develop business plans.

- Technology and Market Assessment: The TTO conducts thorough assessments of new technologies to determine their commercial viability, including market potential, scalability, and competition analysis.

Funding Mechanisms: the sources of financing the operation of Demokritos TTO combine: internal funds, income from our Technology Park and accelerator Programmes, royalties from IP licensing from companies, startups and our spin offs, sponsorships, grants through national and EU programmes.

Internal Processes & Practices: The Office has established a set of internal rules and procedures that guide its operations. These processes are supported by an Advisory Committee for Research Exploitation, which plays a key role in ensuring the proper management and commercialization of research outputs. More info: https://innovation.demokritos.gr/rules-procedures/. It utilizes innovative IP management tools to support effective intellectual property management. These tools streamline the evaluation, protection, and commercialization of IP, ensuring efficient handling of agreements and collaborations. Demokritos TTO monitors and reviews agreements with companies and other third parties involving IP, ensuring all arrangements comply with industry best practices while protecting Demokritos' IP existing and future rights. This includes licensing agreements, joint ventures, and research collaboration agreements.

Key Achievements:

- Commercialization of disruptive and emerging technologies, such as Hydrogen Technology: The innovative hydrogen compressor technology is being commercialized through NCSR Demokritos spin off CYRUS , along with the establishment of the first hydrogen refueling station **in** Greece, located on the NCSR Demokritos campus.
- Industrial Fellowship Programme: A pioneering program in Greece (2017-2022), with 74 fellows, 61 companies, and 9 higher education institutions (HEI), initially funded by a Foundation. The program also successfully attracted additional funding from companies and EU/national grants.
- European Enterprise Promotion Awards (2020): Recognized in the category of Promoting the Entrepreneurial Spirit for fostering entrepreneurship and innovation.
- Proof of Concept Programs: In 2023-24, our Office 3 proof of concept programs, advancing research towards commercialization.
- Defence Innovation Accelerator for the North Atlantic: Selected as one of the first 11 accelerator sites globally, under NATO's initiative to support companies with dual-use technologies in growing and thriving. From 2025 onwards, will host the most innovative deep tech dual use companies.

Metrics and Impact:

- 40 Invention Disclosures (for the period 2022-2024)
- 196 national and international patents in total out of which 76 are still active. 1 utility model. 3 copyrights. 9 patent families, 2 Unitary.
- 2022-2024:

- 15 Licensing Agreements with companies, startups, or spin-offs(for the period 2022-2024)
- Material Transfer Agreements (MTAs) (for the period 2022-2024)
- 108 Contract Research Agreements (for the period 2022-2024)
- 110 Co-development Agreements (for the period 2022-2024)
- 30 spin offs over the years, now 14 active

4.1.2.2 Centre for Research and Technology Hellas (CERTH)

The Centre for Research and Technology-Hellas (CERTH), founded in 2000, is a leading Research Centre in Greece and the EU. It is a legal entity governed by private law with non-profit status, supervised by the General Secretariat for Research and Innovation (GSRI) of the Greek Ministry of Development & Investments. CERTH has important scientific and technological achievements in many areas including Energy, Environment, Processes, Materials, Manufacturing, Information & Communication Technologies, Transportation, Sustainable Mobility, Logistics, Biosciences, Biotechnology, Health, Agri-technology, Safety & Security, as well as in several cross-disciplinary areas (Centre for Research and Technology Hellas, n.d.).

CERTH's Technology Transfer Office: Early from 2005 TT activities were performed by the Liaison Office. Nowadays, TT activities are performed by the relevant office that is part of the department of Extroversion of Central Directorate of the organization. The TTO is staffed with 2 engineers with experience in innovation management and 2 economists with expertise in innovative entrepreneurship development and IPR protection and commercialization. In addition the TTO is supported by the legal department of CERTH.

Core services of CERTH's TTO

- Intellectual Property Protection and Management: The TTO helps researchers protect their intellectual property (IP), including patents, copyrights, trademarks, and other forms of IP. It provides support throughout the patent application process and advises on the strategic management of IP assets.
- Technology Licensing and Commercialization: CERTH's TTO facilitates the commercialization of research results by identifying technologies with market potential and negotiating licensing agreements with industry partners. This can lead to the development of new products or services, often through licensing deals with companies.
- Industry Collaboration and Partnerships: The TTO acts as a bridge between university researchers and private sector companies. It helps initiate and manage collaborative research projects, joint ventures, and contract research, ensuring that industry needs align with academic expertise.
- Support for Start-ups and Spin-offs: the TTO plays a central role in supporting the creation of start-ups and spin-off companies. The office provides mentorship, business development support, and connects entrepreneurs with investors and funding opportunities.
- Training and Capacity Building: The TTO offers training workshops and seminars aimed at raising awareness of technology transfer processes, IP management, and

entrepreneurship. It also provides training to students and researchers on how to commercialize their research and develop business plans.

- Technology and Market Assessment: The TTO conducts thorough assessments of new technologies to determine their commercial viability, including market potential, scalability, and competition analysis.

Funding Mechanisms: the sources of financing the operation of CERTH's TTO combine: internal funds, income from provision of services/consultation within CERTH and towards third parties, rent from the business incubator, spin offs royalties, sponsorships and grants through national and EU programmes,

Policies/ Strategies about TT: CERTH/TTO operates under a specific policy/regulation on research results commercial exploitation. In this regulatory framework definitions, responsibilities and processes are thoroughly described covering all the technology transfer path from the IP protection to the commercial exploitation. In addition to the organization's TT policy/regulations, the TTO has developed a business plan in which main aspects of its operation and sustainability are clarified.

Internal Processes & Practices: CERTH's TT policies and regulations are translated into practices and processes. An operations manual exists including forms, templates, databases as well as clear workflows for TT process, invention disclosure, IP protection, IP management, Spin off creation and conflict of **interest.** The TTO is in continuous communication with the BoD and the departments of the organization, with which collaboration is deemed necessary for feedback and the continuous improvement of process flows.

Key Achievements: CERTH's TTO lead one the TTO's network formed during the period 2022-2023, called SPIRA. In this network CERTH's TTO's base on the pre-existing experience and know-how supported also four more organizations, the Hellenic Agricultural Organisation Demetra, the International Hellenic University, the University of Macedonia and the University of Western Macedonia, serving their immediate needs for technology transfer services. Through spira more than 1500 researchers gained access to added value TT services.

Metrics and Impact:

- Number of Invention Disclosures: >60 invention disclosures submitted by researchers or faculty to the TTO during the period 2022 – 2023
- IP Portfolio Size: 43 patents
- Number of spin offs: 23 currently operating

4.1.2.3 Foundation for Research and Technology – Hellas (FORTH)

The Foundation for Research and Technology – Hellas (FORTH) was founded in 1983. It is one of the largest research centers in Greece with well-organized facilities, highly qualified personnel and a reputation as a top-level research institution worldwide. FORTH conducts specialized scientific research in strategic high-added value sectors, focusing on interdisciplinary research and development (R&D) activities in areas of major scientific, societal and economic interest, such as: Lasers and Photonics, Microelectronics, Advanced Materials/Nanotechnology, Molecular Biology and Genetics, Biotechnology, Computer Science, Bioinformatics, Precision Medicine, Systems Biology, Robotics, Telecommunications,

Applied and Computational Mathematics, Chemical Engineering Sciences, Energy, Environment, Human and Social Sciences, Astrophysics and Astronomy.

FORTH Technology Transfer Office operates under the unit "Praxi network". PRAXI Network was established in 1991 and has developed know-how in assisting innovation and technology transfer services to enterprises and research organizations for achieving innovation driven competitiveness, accessing public and private funding and exploring new market opportunities in Europe and beyond and exploiting and commercializing research results. The team consists from 6 to 9 people Technology Transfer Specialists and Business Development Managers, depending on the implementing projects of each specific period. The TTO may collaborate with external consultants and legal experts, depending on the projects they manage.

Core Services:. The services provided are addressed to all stages of the development and exploitation of research activity, covering a wide range of needs throughout the entire development of the activity, from the initial idea and its implementation, advice on fund raising for the implementation of research activities, recognition of technological innovation, protection of intellectual property rights, market analysis, selection and evaluation of optimal business models for the exploitation of the results of research activities, and the development of new technologies.

Funding Mechanisms: the sources of financing the operation of FORTH TTO combine: internal funds, income from our Technology Park and accelerator Programmes, royalties from IP licensing from companies, startups and our spin offs, sponsorships, grants through national and EU programmes.

Policies/ Strategies about TT: FORTH TTO operates under a specific policy/regulation on research results commercial exploitation. In this regulatory framework definitions, responsibilities and processes are thoroughly described covering all the technology transfer path from the IP protection to the commercial exploitation.

Internal Processes & Practices: An operations manual exists including forms, templates, databases as well as workflows for TT process, invention disclosure, IP protection and management, spin off creation and conflict of interest.

Key Achievements:

- Since 2008 PRAXI Network is member of the Enterprise Europe Network, the largest network of contact points providing information and advice to EU companies on EU matters, in particular small and medium enterprises (SMEs). PRAXI Network is also the co-ordinator the **Enterprise Europe Network Hellas**, the Greek node of the network.
- PRAXI Network is appointed as the National Contact Point (NCP) for the Framework Programmes for Research and Innovation of the European Commission. Under this role, PRAXI Network serves as an official entity for information and advisory support for EU-funded research programmes. The General Secretariat for Research and Innovation (GSRI) has appointed on March 2021, PRAXI Network/FORTH as Horizon Europe National Contact Point (NCP) for 13 thematic areas.

Metrics and Impact

- IP Portfolio Size: 33 active patents
- Number of Startups/Spin-offs: 20 currently operating

Apart from the aforementioned research centers there are several more with significant research activities but with less mature technology transfer processes. Such organizations include Athina RC, the National Hellenic Research Foundation, the Hellenic Pasteur Institute, the Hellenic Centre for Marine Research, the biomedical Science Research Centre "Alexander Fleming" and the biomedical research foundation Academy of Athens.

4.1.2.4 Networks of TTOs

At this point it is worth mentioning that during the period 2022 – 2023 universities and research centers with less developed/new TTOs were partnered with universities and research organizations with more mature TTOs, forming networks in which the more mature organizations served also TT needs of the new ones by sharing resources for TTO staff training, for researchers entrepreneurial mindset development, for inventions disclosure, for research results innovation readiness evaluation, for patents drafting and filing and for spin off creation.

Three of these networks were led by 3 Research Centres. The National Centre for Scientific Research "Demokritos" coordinated the *Science Agora* Network that was established as a technology transfer hub through the collaboration of five leading research and academic institutions in Greece. These include apart from Demokritos, the National Technical University of Athens, the Athens University of Economics and Business, the Research Center "Athena", and the ICCS (Research University Institute of Communication and Computer Systems).

The Foundation for Research and Technology – Hellas (FORTH), coordinated the *Gnosis* network that brought together leading universities (University of the Aegean, University of Crete, Technical University of Crete, University of West Attica, Ionian University and the Greek Mediterranean University) and research institutions (Foundation for Research and Technology – Hellas (FORTH), Biomedical Science Research Center-Alexander Fleming, Hellenic Pasteur Institute, Hellenic Centre for Marine Research (HCMR) and the National Hellenic Research Foundation) to promote knowledge transfer by supporting technology discovery, intellectual property protection, and commercialization of research results.

Centre for research and Technology Hellas (CERTH), coordinated the *SPIRA* network. SPIRA supported four major research and academic organizations, the Hellenic Agricultural Organisation Demetra, the International Hellenic University, the University of Macedonia and the University of Western Macedonia, serving their immediate needs for technology transfer services

In the following table major output from the operation of Science Agora & SPIRA networks are summarized (for the period 5/2022 – to dated):

Science Agora	SPIRA
• Intensive monitoring of inventions/innovative technologies and business opportunity assessment (66) • Training of the research community in technology transfer and entrepreneurship development (10 sessions) • Applications for Patents (45) • License agreements (9) • Teams that received acceleration services (40) • Spin-offs established (18) • Networking events (15) • Proof of concept actions (6)	• Intensive monitoring of inventions/innovative technologies and business opportunity assessment (>60) • Training of the research community in technology transfer and entrepreneurship development (>100 hours) • Sessions on IP protection (>120) • Consultancy for entrepreneurship development (>400 hours) • Applications for national patent (23) • International PCT applications (7) • Commercialisation scenarios / feasibility studies (35) • Preparation of business plans (15) • Spin-offs established (6) • Meetings with investors (2) • Proof of concept actions (4) • > 50 innovative technologies promoted • 2 Study visits

4.1.3 Public and Private Initiatives Supporting the TT Ecosystem

4.1.3.1 Elevate Greece: A Catalyst for Innovation and Technology Transfer

Mission and Objectives

Elevate Greece, launched in 2020 by the Ministry of Development and Investments, aims to support and promote innovative startups in Greece. It acts as a formal registry for startups, offering them access to funding, mentorship, networking, and policy advocacy. The initiative plays a key role in facilitating technology transfer (TT) and advancing economic growth through innovation (Ministry of Development and Investments, 2020)..

Key Services and Operations

- **Funding Programs:** Provides access to government grants, private investments, and EU funds.
- **Innovation Challenges:** Hosts national competitions to foster creativity and solve industrial challenges.
- **Networking Events:** Organizes events connecting startups with investors and industry leaders.
- **IP Management and Commercialization:** Supports startups with patent filing, licensing, and protecting intellectual property.
- **Startup Incubation:** Offers tailored mentoring and incubation programs, along with co-working spaces.

Key Achievements

- **Registry of Startups:** Over 600 startups are officially registered, covering sectors such as IT, healthcare, and AI.
- **Funding Impact:** More than 200 startups have received funding support.
- **Job Creation:** Over 5,000 jobs have been created within the startup ecosystem.
- **Venture Capital:** The initiative has attracted over €50 million in venture capital investments.
- **International Exposure:** Startups supported by Elevate Greece have gained global recognition, participating in events like Web Summit and the European Startup Festival.

Metrics and Impact

- **Patents Filed:** A significant number of patents have been filed with the support of Elevate Greece.
- **Licensing:** Several startups have successfully licensed their technologies, promoting commercialization.
- **Economic Growth:** The initiative has had a profound impact on job creation and attracting investment into the Greek startup ecosystem.

4.1.3.2 Egg: A Leading Greek Initiative for Innovation and Entrepreneurship

Mission and Objectives

Established in 2013, the *egg-enter•grow•go* initiative is a joint effort between Eurobank and Corallia aimed at supporting and accelerating innovative entrepreneurship in Greece. The program focuses on fostering startups by offering comprehensive support for business development, extroversion, and financing. Its mission is to empower young entrepreneurs, help them scale their ideas, and create synergies between academia, industry, and the investment community in Greece (egg, 2024).

Operations

- **Services Offered:**The egg program provides extensive services for startups, including funding opportunities, mentorship, business bootcamps, and support in networking and international expansion. It also encourages participation in innovation challenges and promotes collaboration with the private sector. Additionally, it supports intellectual property management, startup incubation, and legal entity creation for participating business teams.
- **Funding Mechanisms:**The program offers multiple funding sources for technology transfer (TT) activities, including:
    - **Equity funding:** More than €45.8 million has been raised from private investors.
    - **Bank financing:** Eurobank has provided approximately €3.3 million to 51 startups.
    - **Cash prizes:** A total of €75,000 has been awarded through competitions (egg, 2024).
- **Policies and Strategies for Technology Transfer:** The program supports IP management and commercialization, guiding startups in licensing their technologies. It also facilitates the formation of spin-offs and encourages partnerships with larger enterprises. Furthermore, egg helps entrepreneurs navigate the technology licensing process and craft effective go-to-market strategies.
- **Internal Processes and Practices:** Egg utilizes innovative business acceleration models and regularly monitors the progress of each startup through milestones. It fosters synergies among alumni and new participants, facilitating collaborations within the ecosystem. The program also places a strong emphasis on internationalization, sending startups abroad to connect with global innovation hubs (egg, 2024).

Major Achievements

- Hosted more than **1,200 entrepreneurs**.
- Facilitated the creation of **200 legal entities** and **360 jobs**.
- Helped **55 companies** file patents.
- Alumni startups have generated **€48 million** in turnover (egg, 2024).

Metrics and Impact

- **Investments:** Raised over **€45.8 million** in equity funding for 67 startups.
- **Job Creation:** Helped create **360 jobs** in Greece's startup ecosystem.
- **International Exposure:** Supported **77 startups** in expanding to international markets (egg, 2024).

4.1.3.3 NBG Business Seeds: Promoting Innovation and Entrepreneurship in Greece

Mission and Objectives Established by the National Bank of Greece (NBG), the *NBG Business Seeds* initiative aims to support and promote innovation-driven entrepreneurship in Greece. Launched in 2010, its mission is to assist startups in scaling their ideas into viable businesses, fostering technology transfer (TT), and connecting entrepreneurs with the academic, business, and investment communities. The initiative focuses on sectors such as fintech, digital transformation, environment, energy, and women's entrepreneurship (NBG, 2024).

Operations

- **Services Offered:**NBG Business Seeds offers a wide array of services, including funding opportunities, a comprehensive business development program, mentorship, networking events, and intellectual property support. Participants receive tailored guidance, including bootcamps held across Greece, online mentoring programs, and participation in innovation competitions.
- **Funding Mechanisms:**The initiative secures funding through private equity, venture capital partnerships, and NBG's own financing tools. In addition, it offers cash prizes totaling €54,000 through annual competitions and access to loans and grants provided by NBG and partner funds.
- **Policies/Strategies for Technology Transfer (TT):**NBG Business Seeds promotes commercialization by helping startups manage intellectual property, licensing, and developing market strategies. The initiative encourages spin-offs, especially from research institutions, and supports entrepreneurs in navigating the complexities of technology licensing and patenting.
- **Internal Processes & Practices:**The program employs a structured approach to help startups, including business plan development, market readiness evaluations, and technology licensing strategies. NBG also provides international networking opportunities, connecting startups with global markets and potential investors.

Major Achievements Over the years, NBG Business Seeds has supported more than 100 startups, with many companies receiving significant investments and international recognition. The program has enabled successful collaborations with universities and corporate partners, helping participating startups attract venture capital and secure partnerships with established firms.

Metrics and Impact

- **Funding:** NBG Business Seeds has facilitated more than **€50 million** in private and institutional investments for participating startups.
- **Awards:** Participants can win up to **€20,000** in prize money from innovation competitions, with additional awards available for women-led businesses.
- **Growth:** Since its inception, the initiative has helped scale over **150 startups**, contributing to job creation and the broader Greek startup ecosystem.

4.1.3.4 EquiFund: A Boost to Innovation and Growth in Greece

Mission and Objectives EquiFund was established as a collaboration between the Hellenic Republic and the European Investment Fund (EIF) to enhance Greece's venture capital ecosystem. Launched in 2018, EquiFund's primary goal is to support innovation-driven startups and small and medium-sized enterprises (SMEs) by providing access to equity financing. The initiative promotes entrepreneurship, helping researchers and startups develop their ideas into commercially viable businesses, while also fostering technology transfer and growth across various sectors.

Operations

- **Services Offered:** EquiFund operates through three "windows" that address different stages of business development:
  - **Innovation Window:** Supports researchers and early-stage entrepreneurs working on technology transfer, offering financial backing to develop prototypes or launch initial products.
  - **Early Stage Window:** Focuses on startups with high growth potential, providing venture capital along with business expertise and networking opportunities.
  - **Growth Stage Window:** Targets established businesses looking to scale up, offering growth capital for internationalization, expansion, and new product development.

  These windows cover sectors such as ICT, deep tech, energy, cleantech, fintech, and more, with a strong focus on intellectual property and commercialization strategies.

- **Funding Mechanisms:** EquiFund is co-financed by the European Union, national funds, and contributions from private partners such as the European Investment Bank and the Onassis Foundation. Investments through EquiFund range from €30,000 to €12 million, depending on the business stage and sector.

Policies/Strategies for Technology Transfer EquiFund emphasizes supporting technology transfer by providing capital for research projects linked to universities and research centers. It aims to transform research into commercially viable products through its Technology Transfer funds, which offer both financial and managerial support. The initiative also

collaborates with accelerators and incubators to help early-stage startups navigate intellectual property management and bring their ideas to market.

Internal Processes & Practices EquiFund offers tailored financing and expertise based on the specific needs of businesses at different stages. Fund managers, selected for their sector expertise, provide not only capital but also managerial advice, technical skills, and access to international networks. This "smart money" approach ensures that businesses receive holistic support beyond just funding, enhancing their chances of long-term success.

Major Achievements Since its inception, EquiFund has played a significant role in shaping the Greek venture capital landscape. The initiative has helped dozens of startups access crucial funding, with many companies successfully scaling their operations and competing internationally. EquiFund has also fostered stronger collaborations between research institutions and the private sector, leading to the commercialization of cutting-edge technologies.

Metrics and Impact

- **Funding:** EquiFund has allocated significant equity financing, ranging from €30,000 for early-stage investments to up to €12 million for growth-stage companies.
- **Growth:** Numerous startups supported by EquiFund have expanded internationally, and many have raised additional venture capital.
- **Sectors:** Targeted sectors include ICT, energy, cleantech, and more, with a strong focus on technology transfer and innovation.

4.1.3.5 Thess INTEC: A 4th Generation Science and Technology Park in Thessaloniki

Mission and Objectives Thessaloniki Innovation and Technology Center (Thess INTEC) established in 2017 and is set to become operational in the near future, will serve as a 4th generation science and technology park. The park's mission will be to promote innovation, foster collaboration among academia, industry, and research institutions, and enhance technology transfer (TT). Thess INTEC aims to establish Thessaloniki as a regional hub for innovation, contributing significantly to the knowledge economy of Greece (Thess INTEC, 2024).

Operations (Planned)

- **Services Offered:** Thess INTEC will provide a comprehensive suite of services designed to support startups, scaleups, and mature companies. These services will include:
  - **Incubation and Acceleration Programs** to help foster new technology-based firms.
  - **Funding Programs and Investment Opportunities** to support innovative product development.
  - **Networking Events** to connect stakeholders from industry, research, and academia.

- **IP Management and Consultancy**, including patent filing and licensing services.
- **State-of-the-art Facilities**, such as advanced laboratories, coworking spaces, and conference centers, to accommodate various business and research needs.

- **Funding Mechanisms:** Thess INTEC will secure funding through a mix of government contributions, European Union funds, and investments from private entities. These resources will ensure that companies within the park can access the necessary capital and expertise to accelerate their technological innovations.

Policies/Strategies for Technology Transfer (TT) The park's strategy will be focused on facilitating the commercialization of research by promoting collaboration between universities and industry partners. Spin-offs and start-ups are expected to emerge from research efforts, with robust support for managing intellectual property, licensing, and commercialization strategies.

Internal Processes & Practices Thess INTEC plans to implement innovative processes to manage technology licensing and commercialization. The park will provide:

- **Structured Technology Licensing Processes** to help startups transition from research to market.
- **Comprehensive Support for Digital Competency Building** through training programs aimed at modernizing local businesses.
- **Ongoing Monitoring and Evaluation** of technology transfer activities, with a focus on international expansion and partnerships.

Major Achievements (Expected) Once operational, Thess INTEC is expected to foster numerous collaborations between research institutions and industry. It aims to become a cornerstone in Greece's digital transformation, helping local and international businesses develop cutting-edge products in areas such as clean energy, artificial intelligence, and nanotechnology.

Metrics and Impact (Projected)

- **Total Area:** Thess INTEC will span **760,000 sqm**, with **250,000 sqm** allocated for research facilities and **340,000 sqm** for green spaces.
- **Community:** The park aims to support a dynamic ecosystem of over **7,000 professionals, researchers, and entrepreneurs**.
- **Facilities:** Thess INTEC will offer top-tier resources, including high-speed fiber connectivity and state-of-the-art laboratories, facilitating collaboration and technological advancement.

4.1.3.6 General Secretariat for Research and Innovation (GSRI): Calls for the Creation of Clusters and Competence Centers

Mission and Objectives

The General Secretariat for Research and Innovation (GSRI) is driving innovation in Greece through two pivotal calls for the establishment of Clusters and Competence Centers. These initiatives aim to strengthen the country's research and technology transfer ecosystem by promoting collaboration between academia, research institutions, and industry. The primary goal is to foster synergies that will accelerate the commercialization of research outputs, increase the competitiveness of Greek enterprises, and position Greece as a regional innovation leader.

Launch of Calls for Clusters and Competence Centers

In 2020, GSRI launched two major funding calls as part of the broader national strategy for research and innovation:

- **Call for Clusters Creation:** This call aimed to establish **innovation clusters** that unite businesses, research institutions, and other stakeholders to promote collaboration in specific sectors such as ICT, energy, and health. These clusters are expected to foster innovation through joint research projects, shared infrastructure, and a focus on commercialization.
- **Call for Competence Centers Creation:** The second call was for the creation of **competence centers** that specialize in providing technological services and support for research and development (R&D) activities. These centers are designed to offer expertise in areas such as intellectual property (IP) management, advanced manufacturing, and digital transformation, helping businesses develop new products and services.

Implementation and Timeline

The implementation of both calls began in 2021, with the initial phase focused on selecting the most promising proposals from research institutions, universities, and businesses. The funding for these initiatives was co-financed through national resources and the European Union's **National Strategic Reference Framework (NSRF)**. The selected clusters and competence centers were expected to be fully operational by 2023.

Expected and Actual Outcomes

- **Clusters:** The expected outcome for the clusters was the formation of several innovation-driven networks capable of commercializing cutting-edge research. The clusters were projected to boost Greece's innovation output, especially in high-tech sectors. To date, over 10 clusters have been successfully established, particularly in

ICT, clean energy, and health, leading to increased cooperation between research institutions and industries.

- **Competence Centers:** The competence centers were expected to become hubs of technological expertise, providing critical services to both startups and established firms. These centers have already contributed to the **commercialization of over 20 research projects** and have offered advanced training programs, assisting businesses in fields such as **robotics, AI, and cybersecurity**. The initial goal of establishing 8 competence centers has been achieved, with plans for further expansion by 2025.

Funding Mechanisms

Both initiatives were funded through a mix of national budgets and European Union contributions, particularly from the **NSRF**. Additional funding came from private sector partnerships and contributions from participating companies.

Policies/Strategies for Technology Transfer (TT)

The GSRI has developed clear strategies for technology transfer, focusing on:

- **IP Management:** Supporting researchers and businesses in protecting and commercializing their intellectual property.
- **Spin-off Creation:** Encouraging the creation of spin-off companies from universities and research centers, with the aim of transforming innovative ideas into marketable products.
- **Technology Commercialization:** Offering commercialization strategies to help businesses bring their research to market effectively, increasing Greece's innovation output.

Metrics and Impact

- **Clusters and Competence Centers Created:** As of 2023, the program has successfully supported the establishment of over 10 clusters and 8 competence centers, surpassing initial projections.
- **Patents Filed:** More than **50 patents** have been filed through the support of these initiatives, showcasing the program's role in enhancing Greece's technological footprint.
- **Economic Impact:** The combined efforts of the clusters and competence centers have contributed to a **10% increase in R&D spending** among Greek SMEs and a measurable rise in exports of high-tech products.

4.1.3.7 Hellenic Business Angels Network (HeBAN)

Mission and Objectives: Established in 2015, the **Hellenic Business Angels Network (HeBAN)** plays a vital role in fostering early-stage investments in Greece's startup ecosystem. Its mission is to bridge the gap between startups and investors, providing the capital, mentorship,

and strategic partnerships necessary for the commercialization of innovative ideas. HeBAN focuses on promoting technology transfer (TT) and helping Greek startups thrive in various sectors, such as ICT, energy, and life sciences

Operations:

- **Services Offered**: HeBAN connects startups with a vast network of angel investors, providing them with opportunities to secure funding and receive feedback from experienced investors. The network also organizes exclusive events and workshops that offer mentoring and guidance on scaling businesses, managing intellectual property (IP), and entering global markets
- **Funding Mechanisms**: HeBAN's funding comes from private angel investors, many of whom collaborate with international venture capital funds to co-invest in promising startups. The organization fosters syndicated investments, allowing startups to access a broader capital base for TT and growth.

Policies/Strategies about Technology Transfer (TT): HeBAN emphasizes TT through assisting startups in protecting their intellectual property and guiding them through the commercialization process. The network encourages the creation of spin-offs and provides the strategic support necessary to bring research-driven innovations to market

Major Achievements: Since its establishment, HeBAN has helped many startups secure funding, scale their operations, and attract international investment. Through its efforts, HeBAN has enhanced the visibility of Greek startups, contributing significantly to the country's innovation and entrepreneurial landscape

Funding Mechanisms: HeBAN is funded primarily through private investments from business angels, complemented by partnerships with international venture capital firms and co-investment partners, enabling startups to access diverse funding streams for technology transfer activities.

4.1.3.8 Hellenic Network of Technology Transfer Offices (METEX)

Mission and Objectives: Established in 2023, the **Hellenic Network of Technology Transfer Offices (METEX)** aims to create a national framework that supports innovation and the commercialization of academic research across Greece. The primary objective of METEX is to connect universities, research institutions, and businesses through a unified technology transfer ecosystem, streamlining processes and fostering collaboration to bring research innovations to the market.

Operations:

- **Services Offered:** METEX provides critical services including intellectual property (IP) management, patent filing, technology licensing, and promoting partnerships

between academia and industry. It also organizes networking events, training, and innovation challenges to bridge the gap between research and commercialization.

- **Funding Mechanisms:** The network receives funding from government grants, industry collaborations, and EU programs, including the National Strategic Reference Framework (NSRF). METEX also coordinates pooled resources from member institutions to optimize the funding and effectiveness of technology transfer (TT) activities.

Policies/Strategies about Technology Transfer (TT): METEX focuses on building robust technology transfer policies by supporting the creation of spin-offs and fostering the commercialization of intellectual property generated by research centers and universities. It provides strategic support for IP management, business development, and internationalization efforts.

Internal Processes & Practices: The network establishes best practices for technology transfer through the standardization of processes across member institutions. METEX ensures that technology licensing, project evaluations, and industry collaborations follow a coordinated framework that boosts innovation and facilitates international partnerships.

Major Achievements: Since its establishment, METEX has integrated 20 universities and research institutions into a cohesive national network, significantly enhancing technology transfer and innovation across Greece. The network has facilitated numerous collaborations and continues to play a pivotal role in promoting Greek innovations at both the national and international levels.

4.1.3.9 One Stop Liaison Office (OSLO) - Region of Central Macedonia

Mission and Objectives: The **One Stop Liaison Office (OSLO)**, established as part of the **RIS3 Strategy** for the Region of Central Macedonia, aims to support innovation and technology transfer (TT) by connecting academia, research institutions, and businesses. The primary mission of OSLO is to bridge the gap between research and industry, facilitating the commercialization of academic knowledge and promoting entrepreneurship within the region's innovation ecosystem.

Operations:

- **Services Offered**: OSLO provides a variety of services to stimulate collaboration between research and industry. These include networking events, innovation challenges, and IP management support. The office also facilitates industry partnerships, startup incubation, and patent filing services to promote innovation transfer.
- **Funding Mechanisms**: The funding for OSLO's activities is sourced from both national and European Union initiatives, particularly through the **National Strategic Reference**

Framework (NSRF) and other innovation funds aimed at promoting research and technology transfer.

Policies/Strategies about Technology Transfer (TT):

OSLO supports TT by implementing strategies for intellectual property protection and commercialization. The office plays a key role in fostering spin-off creation from research institutions and aligning research projects with market needs to ensure a smoother transition from innovation to commercial product development.

Internal Processes & Practices: The office employs innovative approaches to facilitate technology licensing and industrial partnerships. OSLO works to create standardized procedures for evaluating and monitoring technology transfer projects, ensuring the successful implementation of TT activities. The office also promotes international collaboration through various initiatives.

Major Achievements: OSLO has successfully initiated partnerships between regional businesses and research institutions, helping to commercialize multiple research projects. The office has become a key hub for fostering innovation, driving numerous projects that have led to the launch of new startups in the region.

Synopsis of Key Outcomes

Several initiatives in Greece, such as **Elevate Greece**, **egg-enter•grow•go**, **NBG Business Seeds**, **EquiFund**, **Thess INTEC**, **HeBAN**, **METEX**, and **OSLO**, play crucial roles in driving innovation and technology transfer (TT). These programs focus on supporting startups through funding, mentorship, networking, intellectual property management, and facilitating the commercialization of research outputs.

- **Elevate Greece (2020)**: The platform has registered over 600 startups, created 5,000 jobs, and attracted €50 million in venture capital. It offers access to government grants, private investments, and EU funds to support innovation.
- **egg-enter•grow•go (2013)**: Egg has supported 1,200 entrepreneurs, facilitated the creation of 200 legal entities, and generated €48 million in turnover through its funding programs and mentorship. It has raised over €45.8 million from private investors, helping startups scale and expand internationally.
- **NBG Business Seeds (2010)**: This initiative has facilitated over €50 million in private and institutional investments, supporting more than 150 startups. NBG Business Seeds provides a comprehensive business development framework, including mentorship, innovation competitions, and partnerships with universities.
- **EquiFund (2018)**: Operating through three windows (Innovation, Early Stage, and Growth), EquiFund provides equity investments between €30,000 and €12 million. It has helped many startups scale internationally by providing "smart money" (capital and expertise).

- **Thess INTEC (2017)**: A science and technology park set to become operational, Thess INTEC aims to create a vibrant ecosystem for startups, researchers, and businesses. Spanning 760,000 sqm, it will support a community of 7,000 professionals.
- **Hellenic Business Angels Network (HeBAN, 2015)**: HeBAN connects startups with angel investors, helping secure early-stage funding and offering strategic mentorship. It has fostered spin-off creation and commercialization efforts in sectors such as ICT, energy, and life sciences. The network has played a pivotal role in scaling Greek startups and attracting international investments through private investments and partnerships with venture capital firms.
- **Hellenic Network of Technology Transfer Offices (METEX, 2023)**: METEX unites 20 universities and research institutions into a national framework aimed at supporting innovation and the commercialization of academic research. It provides services such as IP management, patent filing, and fostering industry partnerships, funded through government grants, industry collaborations, and EU programs.
- **One Stop Liaison Office (OSLO, Central Macedonia)**: OSLO was established to connect academia, research institutions, and businesses in the Region of Central Macedonia. It supports innovation and TT through networking events, IP management support, and the facilitation of industry partnerships, funded by both national and EU initiatives.

These initiatives collectively foster a culture of innovation, facilitate technology commercialization, and enhance Greece's economic growth through increased R&D, job creation, and international collaborations.

4.2 Main Conclusions on TT Processes and Practices

Greek Technology Transfer Offices (TTOs) are specialized entities that support the commercialization of research outcomes from universities and research institutions. Although relatively new compared to their counterparts in more established innovation ecosystems in other European countries, TTOs in Greece have been growing and developing in recent years, driven by the need to connect academia with industry and stimulate innovation. In the framework of the current study information was retrieved for the operation of more mature TTOs (operating within 5 Universities and 4 research organizations) as well as of 3 TTOs networks in which more mature TTOs collaborated with less mature one.

Below an effort is made to outline the most popular TT processes and practices of the previously identified entities.

1. Academic-Industry Linkages

- Bridging Academia and Industry: the TTOs identified focus on bridging the gap between academic research and industry, helping researchers commercialize their

work. They act as intermediaries between universities, research institutions, and private companies.

- Facilitating Knowledge Transfer: Their primary mission is to facilitate knowledge transfer from research labs to industry by identifying promising research that can lead to new products, services, or business ventures.

2. Focus on Intellectual Property (IP) Management

- IP Protection and Licensing: the TTOs identified assist researchers in protecting their inventions through patents and other forms of intellectual property. They help navigate the legal processes of filing patents and licensing technologies to companies or startups.
- Commercialization Strategy: they support in the development of strategies for commercializing the technology, which may include licensing agreements, joint ventures, or the creation of spin off companies

3. Support for Entrepreneurship and Startups

- Spin-Off Creation: all TTOs play a significant role in creating spin-off companies based on research conducted at universities or research institutions. From one hand they assist researchers in building business models and plans. On the other hand TTOs advise the administrations of the academic/research organizations on the sustainability of the venture in order for them to take the right decisions.
- Startup Ecosystem Collaboration: the TTOs identified collaborate with incubators, accelerators, and venture capital firms to provide further support to newly created startups.

4. Training and Capacity Building

- Building Innovation Capabilities: TTOs identified provide training programs and workshops for researchers, helping them understand IP rights, commercialization strategies, and entrepreneurship.
- Encouraging an Innovation Culture: they also play a role in promoting a culture of innovation within academic and research institutions, encouraging researchers to think parallel to the traditional academic publishing practical applications of their work as well.

5. Funding mechanisms/financing of operations

- Participation in EU Projects: Greek TTOs actively participate in European Union-funded programs (e.g., Horizon 2020, Horizon Europe) to secure funding and collaborate with other European universities and research institutions.

- National Initiatives: They are also involved in Greek national innovation and research initiatives supporting technology transfer activities.
- Internal funds: Part of their operational costs are covered through internal financing
- Services/consultation towards third parties: a small percentage of income derives from TT services towards third parties (i.e. delivery of capacity building programs)
- Rent from the business incubator: where academic/research organisations run business incubators, the rent for the use of the premises by spin off companies consists income for the TTO
- Spin offs royalties: The most common form of royalties involves the payment of a percentage of the gross or net revenues derived from the sale of products or services based on the spin-off technology. Spin off royalties is an income for the TTO as well.

6. TTOs staffing

- Specialized Teams: the TTOs identified operate with small, specialized teams of professionals experienced in technology management, legal aspects of IP, and business development.
- Multidisciplinary Approach: These teams often consist of individuals with backgrounds in law, engineering, science, and business to handle the multifaceted aspects of technology transfer.

7. TT Policy / strategy / process & practice

- The TTOs identified operate under specific policies/regulations on research results commercial exploitation. In these regulatory frameworks definitions, responsibilities and processes are thoroughly described covering all the technology transfer path from the IP protection to the commercial exploitation. In addition to the organization's TT policy/regulations.
- Operations manuals exists in the TTOs previously referred, including forms, templates, databases as well as clear workflows for TT process, invention disclosure, IP protection, IP management, spin off creation and conflict of interest.

8. TTO's Metrics and Impact

The most common indicators used by the TTOs referred in this report, to measure their success in transferring technology from research labs to the market and assess their effectiveness, include:

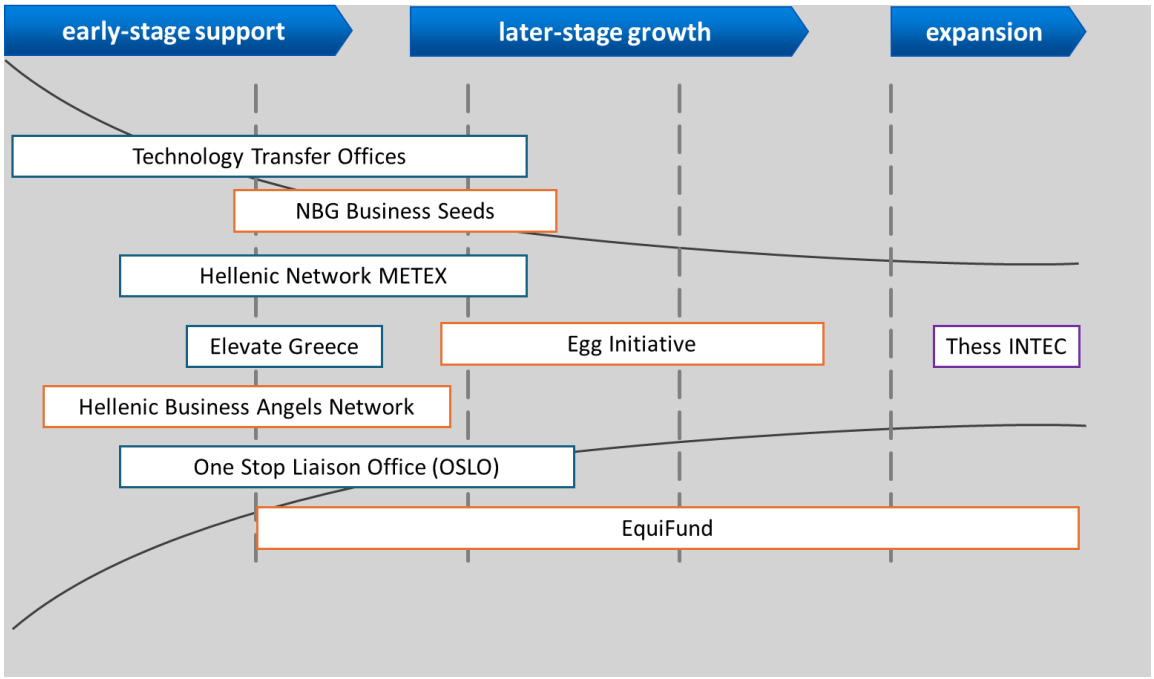
- No of Invention Disclosures: Invention disclosures are the first step toward identifying marketable technologies.
- No of Patent Filings and Grants Patents are essential for protecting intellectual property (IP) and creating opportunities for commercialization. They also enhance the institution's research reputation.

- No of Licensing Agreements. These are a clear metric of how effectively the TTO is moving innovations into the marketplace.
- No of startups/spin-Offs created. These are also a clear metric of how effectively the TTO is moving innovations into the marketplace.

9. Public and Private Initiatives Supporting the TT Ecosystem

Referring to the initiatives described in 4.1.3, it is noticed that each of them plays a significant and in many case complementary role in the different early innovation supporting stages where the entrepreneurial risk is high. The services provided cover:

- Seed Stage where support is needed for ideas development, bootstrapping, early prototypes development (HEBAN, grants, NBG innovation contest)
- Startup Stage where support is needed for product development and initial market entry (HEBAN, grants, egg incubator/accelerator, VCs)
- Early Growth Stage were support in needed for scaling up operations (VCs, strategic partners)



4.3 SWOT Analysis

A SWOT analysis is a valuable tool for assessing the strengths, weaknesses, opportunities, and threats within Greece's technology transfer ecosystem. By systematically evaluating these four dimensions, stakeholders—including universities, research centers, policymakers, and private enterprises—can gain a clear understanding of the current state of technology transfer. This analysis helps identify both the potential areas for growth, such as increased collaboration between academia and industry, and the barriers that must be addressed, like inconsistent performance among institutions and limited commercialization of research (Sarsby, 2016). Moreover, it highlights how Greece can leverage external funding and emerging innovation ecosystems while mitigating threats like economic instability and global competition.

Strengths:

1. **Growing Research Activity:** Greece has a strong academic base, with several research institutions producing high-quality research in fields like engineering, information technology, and biotechnology. This provides a solid foundation for technology transfer (EKT, 2020).
2. **Emerging Innovation Hubs:** Certain Greek institutions are excelling in tech transfer, creating spin-offs, startups, and filing patents. For example, some institutions have created multiple spin-offs and have a notable number of patent applications. This is backed up by the operation of Technology Transfer Networks previously described.
3. **Support from European Programs:** Programs like Horizon 2020 and the European Structural Funds provide critical financial and strategic support, enhancing the capabilities of TTOs.
4. **There is a variety of initiatives both public and private** addressing acceleration and innovation financing at different stages

Weaknesses:

1. **Inconsistent Performance Among Institutions:** Many universities and research centers in Greece offer very limited or no technology transfer services. Only a few institutions have developed robust tech transfer mechanisms, while the rest lag behind, with minimal regulatory frameworks and limited service provision.
2. **Lack of monitoring of metrics and impact.** Few TTOs have developed monitoring mechanisms to measure their success in transferring technologies from lab to market. As a result, there is no sufficient visibility and marketing activities from their side towards the multiple stakeholders of the innovation ecosystem.
3. **Low Commercialization Rates:** Despite strong research output, the commercialization of research results remains limited. The number of patents and successful spin-offs is low in most institutions, with only a handful of cases showing significant success. Simultaneously, the lack of heavy industries in Greece result in limited market driven research further reducing the commercialization rates.

4. **Lack of Dedicated Resources:** Many TTOs lack of institutional (internal) funding, human resources, and expertise, which hampers their ability to effectively support researchers and institutions in the commercialization of their ideas.
5. **The concept of technology transfer is relatively new in Greece** compared to countries with long established innovation ecosystems. Many TTOs have been formed in the past decade and the ecosystem is still evolving.
6. **Fragmented Innovation Ecosystem:** The Greek innovation ecosystem is still somewhat fragmented and there is a need for a better integration between academia industry and government to improve the effectiveness of technology transfer.
7. **The profession of Technology Transfer Officer** is relatively new in Greece and as a result it is difficult to attract employees with the required multi-disciplinary skills.

Opportunities:

1. **Increased Government and EU Funding / Incentives:** Greece has access to substantial EU funding aimed at enhancing innovation and research commercialization. This presents opportunities for institutions to strengthen their tech transfer offices and develop innovative ecosystems. At the same time the Greek government has established specific tax incentives for activities relates research and development.
2. **Potential for University-Industry Collaboration:** There is significant untapped potential for collaboration between universities, research centers, and private industry. Strengthening these relationships can enhance the practical application of research findings and increase the commercialization success rate.
3. **Growth of Startups and Innovation Ecosystem:** Greece's startup ecosystem, especially in sectors like technology and biotech, is expanding. This provides a fertile ground for research commercialization and technology transfer, with many opportunities for academic institutions to play a central role.
4. **Increasing demand from specific industries** like biotech, Clean Tech, Reg Tech and Defence require deep tech solutions from academic and research institutions.
5. **There is an emerging trend in embracing open innovation practices** from Greek SME's that require R&D collaboration with academic – research community.

Threats:

1. **Brain Drain:** The emigration of highly skilled researchers and innovators to other countries (due to better funding and opportunities) could undermine the capacity of Greek institutions to retain top talent and translate research into marketable technologies.
2. **Economic Instability:** Greece's economic challenges may lead to fluctuations in public funding and resources for research and innovation, potentially limiting the ability to develop a sustained technology transfer infrastructure.
3. **Global Competition:** Greek TTOs are competing in a highly competitive global innovation landscape. Without substantial improvements in performance and resources, Greece risks being left behind by countries with more established tech transfer frameworks.

4. **Limited Awareness and understanding of IP rights** among researches and industry partners leading in underutilization of IP assets.
5. Although TTOs hubs may achieve economies of scale and may leverage expertise and resources their size and the sophisticated operational model may put in danger timely response to the TT request.

Here's a **Prioritization Matrix** based on the SWOT analysis of the Greek Technology Transfer Ecosystem.

Priority Areas	Impact	Effort	Urgency	Priority Level
1. Develop Institutional Policies	High	Medium	High	**High**
2. Regulatory Country Frameworks	High	High	High	**High**
3. Strengthen Collaboration with Industry	High	High	High	**High**
4. Leverage EU and Government Funding	High	Medium	High	**High**
5. Improve Human and Financial Resources in TTOs	Medium	High	High	**Medium**
6. Address Brain Drain by Retaining Talent	High	High	High	**High**
7. Promote Innovation and Startups Through Incubators/Accelerators	Medium	Medium	Medium	**Medium**
8. Increase Patent and Intellectual Property Outputs	Medium	High	Medium	**Low**
9. Spin-off Creation	High	Medium	Medium	**High**
10. Mitigate Economic Instability's Impact on R&D	Medium	High	Medium	**Low**
11. Establishment of Pool of Experts	High	Medium	High	**High**
12. Promotion of Open Innovation as Tech Transfer Pool	High	High	Medium	**Medium**
13. Create and Establish a Tech Transfer Network	High	High	High	**High**

Explanation

1. **High Priority Level**:
   - **Criteria**: High Impact, High Urgency, and either Low or Medium Effort.
   - **Rationale**: Initiatives with high impact and urgency are critical and should be addressed immediately, even if the effort is high.
   - **Applied to**:
     - Develop Institutional Policies

- Regulatory Country Frameworks
- Strengthen Collaboration with Industry
- Leverage EU and Government Funding
- Address Brain Drain by Retaining Talent
- Spin-off Creation
- Establishment of Pool of Experts
- Create and Establish a Tech Transfer Network

2. **Medium Priority Level**:
    - **Criteria**: Medium Impact with High Urgency, or High Impact with Medium Urgency and High Effort.
    - **Rationale**: These initiatives are important but may require more resources or have slightly less urgency.
    - **Applied to**:
        - Improve Human and Financial Resources in TTOs
        - Promote Innovation and Startups Through Incubators/Accelerators
        - Promotion of Open Innovation as Tech Transfer Pool
3. **Low Priority Level**:
    - **Criteria**: Medium Impact, High Effort, and Medium Urgency.
    - **Rationale**: These can be deprioritized in the short term but should be considered for long-term goals.
    - **Applied to**:
        - Increase Patent and Intellectual Property Outputs
        - Mitigate Economic Instability's Impact on R&D

Notes

- **High-Impact, Low-to-Medium Effort Initiatives**: Prioritized as they can yield quick and valuable results with manageable resources.
- **Critical Issues with High Urgency**: Regardless of effort, these need immediate attention due to their significant impact on the ecosystem.
- **Medium-Impact, High-Effort Areas**: Deprioritized in the short term but remain important for long-term strategic planning.

The **Prioritization Matrix** helps stakeholders in Greece's technology transfer ecosystem strategically allocate resources and efforts where they will have the greatest impact. High-priority areas such as **developing institutional policies** and **strengthening collaboration with industry** are critical for establishing a strong foundation, as they directly affect the ability of universities and research centers to effectively commercialize innovations. These actions have a high impact but require a moderate amount of effort, making them urgent for immediate attention.

On the other hand, leveraging **EU and government funding** is both high-impact and low-effort, meaning it can yield quick, positive results with minimal resource allocation, positioning it as a **strategic priority**. Tackling issues like **brain drain**—where highly skilled researchers leave

the country for better opportunities—requires significant effort but is vital for sustaining Greece's talent pool and innovation capabilities.

Medium-impact areas, such as **improving resources within TTOs** or **promoting startups**, involve more complexity and may take longer to implement but remain important for long-term ecosystem health. Finally, actions like **increasing patent output** are lower-impact and can be deprioritized for later stages, when foundational structures are solidified.

This matrix ensures that high-impact, critical activities are addressed first, optimizing Greece's approach to enhancing its technology transfer ecosystem while balancing the effort and urgency required.

In conclusion, the SWOT analysis of Greece's technology transfer ecosystem underscores both the potential and the challenges that must be addressed to foster innovation and economic growth. The system benefits from a strong research base and emerging success stories in specific institutions, but it is hindered by inconsistent performance and limited commercialization across the board. Opportunities, such as increased EU funding and the potential for stronger university-industry collaboration, can be leveraged to overcome weaknesses, including resource gaps and underdeveloped regulatory frameworks. However, threats like brain drain, economic instability, and global competition need to be mitigated through strategic reforms and enhanced support for technology transfer offices. By addressing these key factors, Greece can improve its tech transfer capacity and strengthen its position within the global innovation landscape.

5 Conclusion

Recap of Main Findings

This comprehensive study of Greece's technology transfer ecosystem reveals a landscape rich in academic excellence and research potential but hindered by significant challenges in translating innovation into commercial success. Key findings include:

- **Strengths**: A strong academic and research base, emerging innovation hubs, supportive government policies, and access to European funding programs.
- **Weaknesses**: Inconsistent performance among institutions, underdeveloped regulatory frameworks, limited commercialization of research, lack of dedicated resources in TTOs, and a fragmented innovation ecosystem.
- **Opportunities**: Increased government and EU funding, potential for stronger university-industry collaborations, growth of startups and innovation hubs, and a societal shift towards embracing innovation and entrepreneurship.
- **Threats**: Brain drain, economic instability, global competition, and limited awareness of IP rights among researchers and industry partners.

The PESTEL and SWOT analyses underscore the urgent need for strategic interventions to address these challenges and harness the opportunities for growth.

Recommendations for Improvement

To strengthen Greece's technology transfer ecosystem, the following recommendations are proposed:

1. **Develop Robust Institutional Policies and Regulatory Frameworks**
    - **Action**: Establish clear, standardized policies and procedures for technology transfer across all institutions.
    - **Impact**: Provides a consistent framework that facilitates smoother IP management and commercialization processes.
2. **Strengthen Collaboration with Industry**
    - **Action**: Create platforms and incentives for universities and research centers to partner with industry. Promote Open Innovation.
    - **Impact**: Enhances practical application of research, increases funding opportunities, and aligns academic output with market needs.
3. **Leverage EU and Government Funding**
    - **Action**: Actively pursue funding from EU programs like Horizon Europe and national initiatives to support TT activities.
    - **Impact**: Provides necessary financial resources to build capacity within TTOs and support commercialization efforts.
4. **Improve Human and Financial Resources in TTOs**
    - **Action**: Allocate dedicated budgets and invest in training for TTO staff to enhance expertise in IP law, business development, and technology marketing.
    - **Impact**: Increases the effectiveness of TTOs in managing technology transfer processes.
5. **Address Brain Drain by Retaining Talent**
    - **Action**: Offer competitive salaries, career development opportunities, and a supportive research environment to retain skilled researchers.

- **Impact**: Maintains a strong talent pool essential for innovation and reduces loss of intellectual capital.

6. **Promote Entrepreneurship and Spin-off Creation**
   - **Action**: Provide incubation services, mentorship programs, and access to venture capital for startups emerging from research institutions.
   - **Impact**: Stimulates economic growth and job creation through the commercialization of research.
7. **Increase visibility of TTOs**
   - **Action**: Support the further development and role of the National Technology Transfer Network to perform networking and advocating in favor of TTOs at operational and policy levels
   - **Impact**: increased interaction with innovation stakeholders and policy makers, nurturing of collaboration mindset, attraction of professionals to work in the field of technology transfer, attraction of the interest of innovation financing entities.
8. **Development of synergies and economies of scale in the TT ecosystem**
   - **Action**: Support of the creation of TT hubs, for sharing among multiple TTOs high overhead operations like training and networking activities, and make use of complementary expertise.
   - **Impact:** Enhances efficiency of TTOs, reduces duplication of efforts, and strengthens the overall ecosystem.
9. **Enhance Monitoring and Impact Assessment**
   - **Action**: Implement standardized metrics to evaluate TT activities and outcomes.
   - **Impact**: Provides data-driven insights for continuous improvement and accountability.

Internationalization of Technology Transfer

Recognizing that many valuable processes and projects remain confined nationally, internationalization is crucial for amplifying the impact of Greece's TT ecosystem. Recommendations include:

1. **Promote International Collaborations**
   - **Action**: Encourage participation in international research projects and consortia.
   - **Impact**: Increases exposure to global best practices and opens up new markets for commercialization.
2. **Align with International Standards**
   - **Action**: Adopt international IP management and technology transfer standards.
   - **Impact**: Facilitates cross-border collaborations and enhances credibility with international partners.
3. **Facilitate Cross-Border Licensing and Commercialization**
   - **Action**: Simplify legal and administrative processes for international technology licensing.
   - **Impact**: Reduces barriers for Greek innovations to enter global markets.
4. **Support Startups in Global Expansion**
   - **Action**: Provide resources and guidance for startups to navigate international regulations and cultural differences.
   - **Impact**: Accelerates growth and increases competitiveness on a global scale.

5. **Participate in Global Innovation Networks**
    - **Action**: Engage with international technology transfer associations and attend global conferences.
    - **Impact**: Builds networks, attracts foreign investment, and raises the profile of Greek research and innovation.

Closing Remarks

While Greece's technology transfer ecosystem has made notable progress, particularly through initiatives like Elevate Greece and the establishment of new TTOs, significant work remains to fully capitalize on the country's research potential. Addressing the identified challenges requires coordinated efforts among government agencies, academic and research institutions, industry partners, and funding bodies.

By implementing these recommendations, Greece can enhance its TT processes, foster a more vibrant innovation ecosystem, and contribute more significantly to the global knowledge economy. Internationalization of technology transfer is not just beneficial but essential in ensuring that Greek innovations have a broader impact, driving economic growth and establishing Greece as a competitive player on the international stage.

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