RiHEI



Responsible and Impactful Universities as Sustainable Growth and Enterprise Catalysts in Georgia

Public-private investment in HEIs

Toolkit 3

Martin-Luther-Universitat Halle-Wittenberg

16 September

2024

Co-funded by the European Union

Project Number: 101125355 (ERASMUS-EDU-2023-CBHE)

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Introduction

This booklet is designed to empower higher education institutions (HEIs) in Georgia to become catalysts for sustainable growth, innovation, and enterprise through effective collaboration with the private sector. This booklet emphasizes the role of universities as pivotal actors in public-private investment, equipping participants with the knowledge, tools, and frameworks necessary to align institutional objectives with the demands of a dynamic and interconnected world.

The aim of this booklet is to provide higher education institutions (HEIs) in Georgia with the necessary tools, knowledge, and frameworks to effectively engage in public-private partnerships (PPPs) in key areas such as:

- Fostering Innovation: Helping HEIs create an environment conducive to research commercialization, technology transfer, and fostering entrepreneurial initiatives.
- Enhancing Workforce Readiness: Aligning curricula and educational programs with industry needs to better prepare students for the evolving job market.
- Driving Regional Economic Development: Encouraging partnerships that stimulate local economies through joint research, development projects, and community engagement.
- Sustainable Growth: Supporting HEIs in adopting sustainable practices through collaborations that address environmental, social, and economic challenges.
- Institutional Development: Strengthening the capacity of HEIs to modernize, improve infrastructure, and increase their global competitiveness through strategic partnerships.

The first unit provides foundational knowledge on PPPs, exploring their definitions, importance, and role in modernizing HEIs. It also delves into the challenges and risks specific to Georgia, examining how these partnerships can drive innovation and contribute to workforce readiness and regional development. Special attention is given to the Georgian context, exploring unique challenges and risks that HEIs may encounter when engaging in PPPs. Furthermore, participants will gain insight into the role of PPPs in fostering innovation, driving workforce readiness, and contributing to regional development, setting the stage for the more complex discussions to follow.

The second unit focuses on the strategic objectives behind public-private investments in HEIs. Participants will examine how PPPs can be aligned with national and regional development priorities, contributing to the modernization of higher education systems. The unit covers key strategies to integrate public-private investments into institutional planning, including the establishment of impact investment boards, which can guide research and curriculum design. Participants will also discuss barriers to successful implementation and explore practical

solutions to overcome these obstacles, ensuring that partnerships meet both institutional and societal goals.

The third unit delves into successful global case studies and best practices in the structuring and management of PPPs within higher education. By analyzing real-world examples from diverse international contexts, participants will gain insights into the commercialization of research, technology transfer, and financing innovation. The unit also explores how these successful models can be adapted to the Georgian context, offering practical guidelines on creating impactful, scalable, and sustainable partnerships that benefit both HEIs and private-sector partners.

The final unit addresses the importance of long-term sustainability in PPPs. It emphasizes how HEIs can maintain the effectiveness of partnerships through consistent communication, transparency, and visibility. This unit explores strategies for securing ongoing support from both public and private stakeholders, ensuring that partnerships continue to deliver value over time.

By attending the course, participants will:

- Understand the concept and significance of public-private partnerships (PPPs) in the context of higher education, particularly in Georgia.
- Identify the benefits and challenges associated with PPPs in HEIs and develop strategies to overcome these challenges.
- Gain insights into effective models and best practices for structuring and managing public-private investments in higher education.
- Learn how to foster innovation, promote workforce readiness, and drive regional economic development through strategic PPPs.
- Develop strategies for ensuring the sustainability and long-term impact of public-private partnerships in higher education institutions.

The publication offers both theoretical insights and practical guidance. It highlights how public-private partnerships can drive innovation, enhance workforce readiness, and support regional development, while showcasing best practices and solutions for successful, sustainable implementation.

Unit 1. Public-Private Partnership

Public Private Partnerships (PPPs) are defined as strategic alliances that leverage the strengths of both public and private sectors to achieve common goals, particularly in economic development (Plys, 2024). They facilitate the implementation of large-scale projects that may be unfeasible for governments alone, thus enhancing service delivery and infrastructure quality (Dugal and Tiwari, 2024). PPPs in higher education also refer to collaborative agreements between government institutions (public) and private entities to create, fund, and manage educational facilities, programs, or services. These partnerships can provide a range of benefits and can take various forms, each with its unique objectives and structures.

PPPs in HEIs are rapidly becoming a central mechanism for driving innovation, increasing the alignment of educational outcomes with labor market demands, and fostering economic development (Hassan and Ahmed, 2024). These partnerships create a synergistic relationship between academia and industry, facilitating a two-way flow of knowledge, resources, and innovation (Mensah and Gordon, 2020). In the context of Georgia's evolving educational landscape, public-private investment in HEIs is crucial for bridging the gap between academic output and the needs of an increasingly competitive global marketplace. This collaboration not only strengthens institutional capacities but also provides critical support for the creation of job opportunities and economic stability, which are essential for sustainable development.

The importance of public-private partnerships in higher education lies in their capacity to leverage the strengths of both sectors. On one hand, universities possess the intellectual capital, research expertise, and the capacity to produce skilled graduates. On the other hand, private industries offer practical insights, resources, and a deep understanding of market demands, making them invaluable partners in shaping higher education to meet economic challenges. By bringing these two sectors together, PPPs can create innovative ecosystems where universities become catalysts for technological advancements, entrepreneurship, and regional growth.

1.1. A Definition of Public-Private Partnership

PPPs are defined as strategic alliances that leverage the strengths of both public and private sectors to achieve common goals, particularly in economic development (Plys, 2024). World Bank defines PPPs as "*A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance*."

Most PPP projects present a contractual term between 20 and 30 years; others have shorter terms; and a few last longer than 30 years. The term should always be long enough for the private party to have an incentive to integrate service delivery cost considerations into the design phase of the project. This includes maintenance considerations as well, for the trade-offs between initial investment cost and future maintenance and operation costs to be

optimized. The precise length of the contract depends on the type of project and policy considerations. Policy makers need to satisfy themselves that the demand for the services delivered by the project will be sustained over the whole life of the contract; the private party should be able to accept responsibility for service delivery over its term; and the procuring authority should be able to commit to the project for its term. The availability of finance, and its conditions, may also influence the term of the PPP contract (WorldBank, 2019).

A central characteristic of a PPP contract is that it bundles together multiple project phases or functions. Nonetheless, the functions for which the private party is responsible vary and depend on the type of asset and service involved including design, Build, Finance, Maintain and Operate. As the *EPEC PPP Guide* stated, a PPP arrangement has the following features which all parties should be concerned about (European Investment Bank, 2021):

- A long-term contract (the PPP contract) between a public contracting authority (the contracting authority) and a private sector company (the project company) for the delivery of a public service;
- The allocation of specified risks to the project company, typically with regard to designing, building, operating and financing the infrastructure asset used to deliver the public service;
- A focus on the specification of service outputs rather than inputs, taking account of the whole life-cycle implications for the infrastructure asset;
- The application of private financing (often involves a project finance loan) to underpin the risks transferred to the private sector; and
- Performance-based payments to the project company, based on the level and quality of the public services delivered. The project company may be paid either by users through user fees (for example, motorway tolls); by the contracting authority (for example, availability payments or shadow tolls); or by a combination of both (for example, by having relatively low user fees combined with availability payments from the contracting authority).

1.1.1 Georgia as a promoter and supporter of Public-Private Partnership

The law of Georgia on public-private partnerships determines the objectives of public-private partnerships are to enhance the efficiency of projects, meet public interests by creating new public infrastructure and/or providing public services and/or improving existing public infrastructure and public services, attract private financing, enhance the efficiency of public finances, arrange the sharing of risks between the public and private sectors.

A public-private partnership project shall be implemented in Georgia in accordance with the procedure determined by this Law, which includes several stages, including the identification and initiation of the project, its preparation, the selection of a private partner, the implementation of the project and the follow-up assessment of the project.

Public-private partnerships shall not be less than five years and the minimum term of a project shall be determined by a legal act of the Government of Georgia, and shall be based on the following principles:

a) transparency - ensuring public access to information on the opportunities of public -private partnerships and public-private partnership projects;

b) foreseeability – the existence of clear and predictable rules;

c) the promotion of free competition and the prohibition of discrimination- equal treatment of the public and private entities of Georgia and other countries;

d) price-performance ratio – a public-private partnership as an optimal tool for achieving the planned objectives;

e) optimal distribution of risks- reasonable distribution of liability and risks between parties, taking into consideration the capacity and expediency over their control by the parties, public interests , and the characteristics of the public-private partnership in question;

f) fiscal liability - undertaking financial liability related to a public-private partnership without posing a threat to public finances;

g) environmental protection and social sustainability- the establishment of the compliance of the public-private partnership project with the requirements determined by the environmental legislation of Georgia and the assessment of its environmental and social impact in accordance with the legislation of Georgia (GoG, 2018)

Georgia has recognized the importance of the involvement of the private sector and has taken important steps to develop a respective PPP policy and to create a PPP-friendly environment. Significantly, the adopted legislation is in line with the UNCITRAL model law and relevant EU legislation (Javakhadze, 2021).

1.2. Public-Private Investment in the Context of Higher Education

The Public-Private Investment is a kind of PPP model in which a financial collaboration between government entities (public) and private organizations (including businesses, non-profits, and philanthropic foundations) to fund various projects and initiatives within educational institutions(Khallaf et al., 2022). The potential partners of HEIs are consisting but not limited to the followings:

- **Private Sector Companies (Industry)**: Corporations looking to invest in talent development, research, or branding opportunities through educational partnerships.
- **NGOs**: Organizations focused on education and community development that can offer funding or resources for specific projects.

- **Government Agencies**: Local, regional, or national entities interested in fostering educational opportunities and workforce development.
- **International Organizations**: Entities involved in education funding, capacity building, or development programs.
- **Alumni Associations**: Graduates who may want to contribute to their alma mater through funding or mentorship.

With various stakeholders participating in these partnerships, investments can also take different forms, involving both hard investments and soft projects. Examples of hard investments can be infrastructure development and physical technology infrastructure. Soft Projects can be investments in educational programs, research initiatives, internship and job placement programs, and skill development programs.

1.2.1 Public-Private Partnership Models: Division of Tasks and Risks

PPPs rely on well-defined models to guarantee project success. Each model determines the division of tasks and allocation of risks between the public and private sectors, using the strengths of both partners while mitigating challenges.

Table1 provides a brief overview of common PPP models, detailing the division of tasks and risks between public and private partners. It highlights how responsibilities are allocated to leverage each partner's strengths. For example, private partners often take on roles requiring technical expertise and financial risk, such as design, construction, and operations, while public partners oversee strategic alignment and regulatory compliance. In table 1, the risk allocation outlines the specific challenges faced by each sector, ensuring clarity in partnership agreements and enabling effective project execution.

Table 1. Summary of PPP Models, Tasks, and Risk Allocation

PPP Model	**Tasks (Private Partner)**	**Tasks (Public Partner)**	**Risk Allocation (Private)**	**Risk Allocation (Public)**
Build-Operate-Transfer (BOT)	Design, construction, operation, and maintenance	Regulatory oversight, alignment with public needs	Construction risks, market demand uncertainties	Political and regulatory risks
Design-Build-Finance-Operate (DBFO)	Full lifecycle: design, build, finance, operate	Set performance standards, monitor compliance	Financial and technical risks	Approvals, environmental compliance
Lease-Develop-Operate (LDO)	Upgrade and operate existing public assets	Retain ownership, strategic control	Investment risks	Policy and regulatory adjustments
Joint Ventures	Share responsibilities: financing, operations, decisions	Share responsibilities: financing, operations, decisions	Proportional risks based on agreement	Proportional risks based on agreement

Table 2. highlights the key role of on-site staff and external consultants at each stage of the PPP project. During the preparation phase, staff focus on core activities such as feasibility studies and contract development, while external consultants with specialized expertise in financial structuring and market analysis collaborate. During the implementation phase, staff ensure compliance and performance management, while consultants conduct independent audits and resolve conflicts. Capacity-building efforts, such as training programs and the creation of dedicated units such as TTOs, are essential to maintain expertise and foster long-term success in PPPs.

Table 2. Role of Staff and External Advisors in PPPs

Phase	**Prepared staff responsibilities**	**Role of external advisors**
Preparation Phase	- Conduct feasibility studies - Draft contracts - Align public-private goals	- Provide market insights - Structure financial and legal agreements
Implementation Phase	- Monitor compliance - Evaluate performance metrics - Resolve challenges	- Conduct independent audits - Manage risk assessments - Facilitate conflict resolution
Capacity Building	- Develop in-house expertise - Establish TTOs - Train staff in risk management	- Organize workshops and certifications - Offer ongoing mentorship

1.2.2. Challenges and Risks of Implementing PPPs in the Georgian Context

Implementing PPPs in Georgia presents several challenges rooted in the country's regulatory, financial, and institutional landscapes. A primary challenge lies in the complex regulatory framework, which can delay project approvals and discourage private investment. Public procurement laws, while essential for transparency, often limit the flexibility needed for PPP agreements. Additionally, limited institutional capacity within HEIs poses a significant hurdle. Many HEIs lack dedicated personnel or units, such as TTOs, to manage the complexities of PPPs effectively. The absence of standardized frameworks for IP management and risk-sharing agreements further complicates collaborations between public and private stakeholders.

Another critical risk is investor hesitation due to perceived high risks associated with university-led projects. These include long timelines for returns on investment and uncertainties around commercializing academic innovations. Financially, many Georgian HEIs are reliant on public funding and struggle to co-finance projects, which can deter private sector partners. Cultural and operational differences between academia and industry also create barriers to communication and alignment, leading to misaligned objectives. Furthermore, external factors such as political and economic instability in the region can introduce uncertainties that impact long-term project viability. Addressing these challenges requires targeted interventions, such as capacity-building programs, regulatory reforms, and

the adoption of risk-sharing mechanisms that attract private investment while ensuring mutual benefits.

1.2.3 The Role of Public-Private Investment in HEI Modernization

Given the digitization of every economic landscape, PPPs are crucial for modernizing higher education institutions and acting on rapidly changing trends in our economy. HEIs, however, are often financially restricted and curricula moves far behind emergent technologies (Huba and Hrytsenko, 2023). Such public-private investments help to overcome some of these challenges, by providing funding, expertise and also infrastructure which HEIs will be unable to access otherwise (Tan and Zhao, 2019). This new wave of industry participation not only raises the level at which education is offered but also strengthens institutions to engage in meaningful research and development work that translates into real-world industrial innovation, feeding directly into national growth.

In the case of Georgia, a country in transition with an increasing focus on integrating into the European market, public-private investments in HEIs represent a strategic avenue to enhance the nation's human capital. Georgian HEIs have historically been under-resourced, leading to an education system that is often misaligned with industry needs, resulting in a mismatch between graduates' skills and labor market requirements. However, recent efforts to modernize the higher education sector through initiatives such as the RiHEI have highlighted the potential of PPPs to drive educational reform. Through such partnerships, Georgian universities can become more responsive to the demands of a knowledge-based economy, preparing graduates for jobs in sectors such as technology, engineering, and entrepreneurship, where there is significant growth potential.

1.2.4 Fostering Innovation through Public-Private Partnerships

A key advantage of PPPs is their ability to foster innovation within HEIs. By collaborating with private enterprises, universities gain access to cutting-edge technologies, market insights, and practical expertise that can enhance research outcomes. In contrast, private companies benefit from academic research and innovation that can lead to the development of new products, services, and technologies (Caloffi et al., 2017). This collaborative relationship is especially important in fields such as science, technology, engineering, and mathematics (STEM), where rapid technological advancements require universities to be agile and continuously updated with industry trends (Hafni et al., 2020).

For instance, in Georgia, the establishment of technology transfer offices and innovation hubs within universities can serve as the foundation for commercializing research outputs. PPPs in these areas can lead to the creation of university subsidiaries, start-ups and research-oriented companies that create employment and help the local economy. These startups, often founded by students and faculty, benefit from the mentorship, investment, and market access provided by private partners, while universities benefit from the revenue generated through these ventures and the enhancement of their research profiles.

In addition to fostering innovation, PPPs are also critical for expanding the role of universities in addressing societal challenges. Through responsible research and innovation (RRI), public-private collaborations can focus on solutions that not only drive economic growth but also contribute to social and environmental sustainability (Barton et al., 2019). HEIs, acting as hubs of knowledge, can work with private sector partners to develop technologies and business models that address critical issues such as climate change, health, and digital inclusion. By aligning their research agendas with public and private sector priorities, universities can ensure that their innovations have a lasting and positive impact on both the economy and society at large.

1.2.5 Enhancing Employment and Workforce Readiness

One of the most significant benefits of public-private partnerships in HEIs is their potential to enhance employment prospects for graduates. By collaborating with industry partners, universities can align their curricula with the skills and competencies required by the labor market (Damoc, 2017). This ensures that graduates are better prepared for the workforce, reducing the skills gap and improving employability. In fields such as information technology, engineering, and business, where the demand for skilled workers is high, public-private collaborations can ensure that students gain practical, hands-on experience through internships, co-op programs, and real-world projects integrated into their academic training (Okolie et al., 2019).

For Georgia, where youth unemployment remains a challenge, the role of HEIs in producing job-ready graduates is critical. Public-private investments can support the creation of career services, industry-driven mentorship programs, and job placement initiatives that directly connect students with employment opportunities. Furthermore, by fostering entrepreneurial skills and promoting innovation through public-private collaborations, universities can encourage students to pursue entrepreneurial ventures, thereby creating new jobs and contributing to economic growth.

1.2.6 Driving Sustainable Regional Economic Development

PPPs in HEIs are also critical for promoting sustainable regional development. Universities, as centers of knowledge and research, have a unique role in driving regional economic transformation. By partnering with local industries and public sector entities, universities can act as catalysts for regional innovation ecosystems that attract investment, create jobs, and stimulate economic growth. In rural and underdeveloped regions, where economic opportunities are often limited, HEIs can play an essential role in developing locally relevant solutions that address regional challenges (Lis, 2021).

In Georgia, where regional disparities remain a significant issue, public-private partnerships can help bridge the gap between urban and rural areas by fostering innovation and entrepreneurship in underserved communities. Universities can establish tailored programs that match the specific demands of local sectors by investing strategically in regional HEIs, thereby contributing to economic diversification and job creation outside of large urban

centres. This not only supports national economic growth but also contributes to more balanced and inclusive development across the country.

Public-private investments in HEIs are a transformative force that can reshape higher education to better meet the demands of a rapidly changing world. By fostering partnerships between universities and industries, these investments provide the financial resources, expertise, and innovation needed to modernize HEIs, enhance employability, and drive sustainable economic growth. For Georgia, public-private partnerships in HEIs represent a crucial strategy for improving educational outcomes, aligning academic training with labor market needs, and positioning the country as a hub of innovation and entrepreneurship. As these collaborations continue to evolve, they will play an increasingly important role in shaping the future of higher education and driving national development.

1.3. The Importance of Public-Private Partnerships in Education Ecosystems

PPPs have become a central mechanism in modernizing HEIs and promoting socio-economic development. In today's rapidly evolving educational landscape, collaboration between universities, government agencies, industry and civil society is essential to address complex societal challenges and drive innovation. This multi-stakeholder approach is embedded in the Quadruple Helix model, which integrates the four key sectors of academia, industry, government, and civil society to create a strong, innovation-driven ecosystem (Quartey and Oguntoye, 2021). This model, referred to in the RiHEI project, demonstrates the transformative power of intersectoral collaboration in advancing economic development and social well-being.

The Quadruple Helix model promotes the concept of co-creation, where knowledge, resources, and expertise from different sectors come together to foster innovation and enhance the impact of educational systems (Oliveira et al., 2024). This approach acknowledges that addressing modern challenges, such as economic growth, environmental sustainability, and social inclusion, requires input from multiple stakeholders.

The collaborative efforts between academia, industry, government, and civil society are key to driving innovation and regional development (Figure 1). Academia offers intellectual capital, research expertise, and a skilled workforce, forming the foundation for knowledge creation and dissemination. Industry brings market insights, technological advancements, and financial resources, ensuring that academic research aligns with real-world applications and commercial viability. Government plays a critical regulatory and strategic role, shaping policies that foster innovation, providing public funding, and ensuring that these partnerships are in line with national priorities. Civil society, meanwhile, promotes social responsibility and inclusivity, ensuring that innovation and educational outcomes address societal needs and benefit communities (Roman et al., 2020; Roman and Fellnhofer, 2022). By working together, these sectors enable higher education institutions (HEIs) to act as catalysts for sustainable and socially responsive innovation, contributing to long-term regional growth and development.

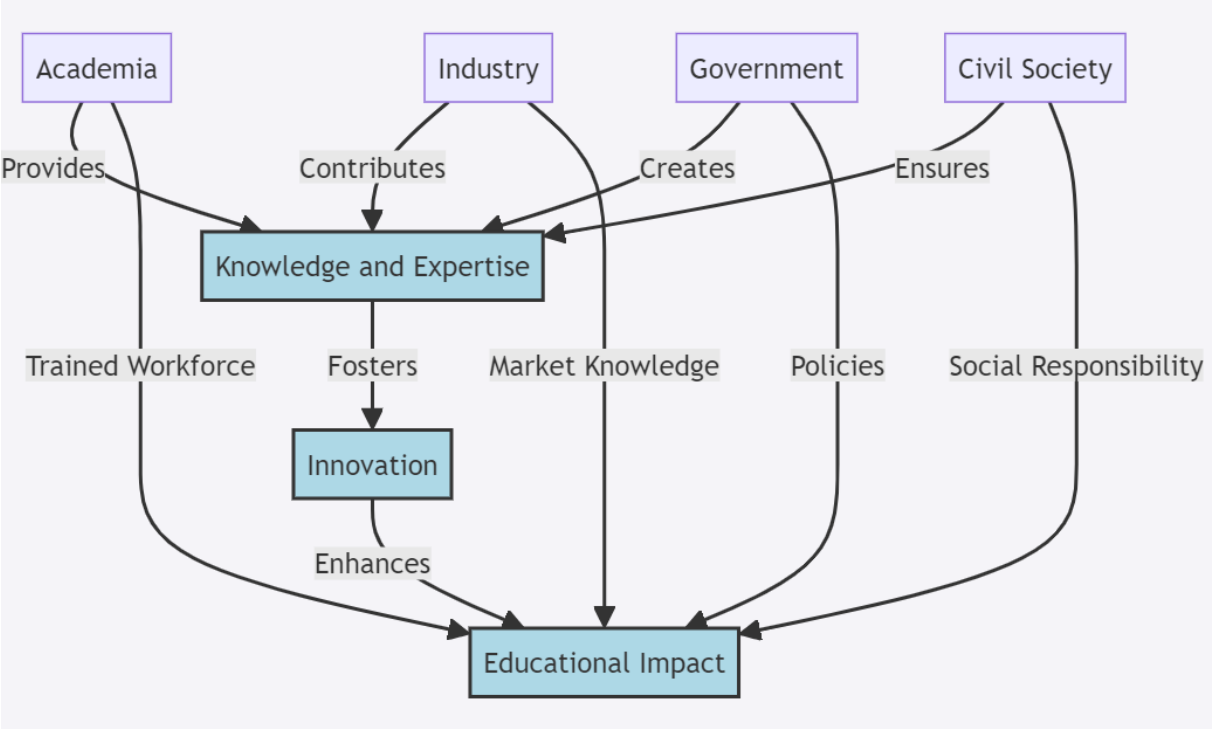


Figure 1 The Quadruple Helix model dimentiones in education ecosystems

1.3.1 Benefits of Public-Private Partnerships in HEIs

- **Enhancing Innovation and Research Impact**

PPPs allow HEIs to engage in applied research that directly addresses industrial and societal challenges (Liu et al., 2024). Through partnerships with private enterprises, universities can align their research agendas with industry needs, ensuring that innovations are market-ready and commercially viable . In fields such as science, technology, engineering, and mathematics (STEM), where rapid technological advancements are critical, PPPs facilitate the transfer of cutting-edge technologies from academic institutions to industry, boosting national competitiveness (Jeelani et al., 2021).

- **Bridging the Skills Gap and Fostering Workforce Readiness**

One of the major challenges for modern HEIs is aligning educational outcomes with labor market demands (Kharlamova et al., 2021). PPPs play a crucial role in developing curricula that respond to the skills required by industries, ensuring that students graduate with the practical competencies needed for the workforce. These partnerships also create opportunities for internships, apprenticeships, and co-op programs that provide students with hands-on experience, improving their employability (Aljuwaiber, 2024; Waqar, 2024).

- **Promoting Entrepreneurship and Economic Growth**

Through PPPs, universities can act as incubators for innovation and entrepreneurship, fostering the development of startups and spin-offs (Vardhan and Mahato, 2022). By providing

resources, mentorship, and investment from both public and private sectors, HEIs can help students and researchers commercialize their ideas, creating new businesses that contribute to job creation and economic growth (Aithal and Aithal, 2023). This is particularly important in regions such as Georgia, where entrepreneurship and innovation are key to driving sustainable development.

- **Strengthening Institutional Capacities and Financial Sustainability**

PPPs help HEIs diversify their funding sources, reducing reliance on government grants. By securing private investments, HEIs can develop new research centers, upgrade their infrastructure, and expand academic offerings. This financial stability enables universities to take on more ambitious research projects, attract high-quality faculty, and improve their overall competitiveness on a global scale (M.M Ansari, 2023).

1.3.2 The Role of Public-Private Partnerships in Addressing Societal Challenges

PPPs also play a crucial role in addressing broader societal challenges by promoting socially responsible research and innovation. The Quadruple Helix model encourages the integration of societal needs into the innovation process, ensuring that research outcomes are not only economically beneficial but also socially and environmentally sustainable. Through collaborative research initiatives, universities can develop solutions for pressing issues such as climate change, public health, and digital inclusion (M. M. Ansari, 2023).

The RiHEI project emphasizes the role of PPPs in advancing Responsible Research and Innovation (RRI), where HEIs, industries, governments, and communities work together to create socially impactful innovations. By aligning university research with societal priorities, these partnerships ensure that innovation benefits all stakeholders, particularly marginalized and underserved communities. This aligns with the broader goal of creating an inclusive, equitable educational ecosystem that supports social mobility and regional development (Tavana et al., 2022).

Unit 2. Objectives of public-private investment in HEIs and strategies for overcoming associated challenges

Public funding has long been the backbone of higher education, providing essential resources for faculty salaries, infrastructure, and research initiatives. Yet, with increasing financial constraints on government budgets, it is evident that relying solely on public funding is no longer a sustainable model. This is where private investment steps in, offering a complementary source of capital that can enhance the capabilities and reach of HEIs.

Engagement from the private sector not only augments financial resources but also fosters partnerships that can lead to innovative educational programs. Corporations can provide

valuable insights into the skills needed in the workforce, ensuring that curriculum development aligns more closely with industry demands. This collaboration creates a synergistic relationship where educators and employers work together to cultivate a skilled labor force, ultimately benefiting both students and the economy at large.

Furthermore, the role of Public-private investment in HEIs can be seen in ther modernization of HEIs, fostering innovation, workforce readiness and achieving sustainable regional economic development.

2.1 Objectives of Public-Private Investments in HEIs

PPPs in higher education are increasingly recognized as a powerful tool for transforming universities into engines of economic and social development. The primary goal of public-private investments in HEIs is to stimulate systemic changes by fostering a collaborative ecosystem where universities, industries, and government bodies work together to stimulate innovation, drive research commercialization, and address regional and national economic priorities. By bringing together the expertise and resources of both public and private sectors, these partnerships create opportunities for sustainable growth, employment, and entrepreneurial ventures, particularly through university spin-offs and industrial collaborations (Nawaz and Koç, 2020).

Public-private investments enable HEIs to modernize their operations, become more responsive to market demands, and contribute significantly to the development of knowledge-based economies. Through these collaborations, universities can align their educational programs with the needs of industries, create pathways for innovation-driven entrepreneurship, and ensure that the research conducted in academic institutions directly contributes to solving societal challenges. These partnerships also help HEIs diversify their funding sources, allowing them to reduce their dependency on government support and achieve long-term financial sustainability (Shaffi and Mohamed, 2023). The main objectives of public-private investments in HEIs are includes:

2.1.1 Fostering Public-Private Partnerships for Innovation and Spin-offs

One of the central objectives of public-private investments in HEIs is to foster partnerships that lead to the creation of innovative university spin-offs, industrial projects, and educational initiatives. HEIs are rich in intellectual capital and research potential, but often lack the resources and commercial expertise to bring their innovations to market. By collaborating with private enterprises, universities can bridge this gap, facilitating the commercialization of research through the development of spin-offs, startups, and other entrepreneurial ventures (Dabić et al., 2022). These partnerships allow HEIs to act as incubators for new ideas, where researchers and students can collaborate with industry experts to turn academic innovations into market-ready products and services. Spin-offs not only contribute to economic growth but also provide students and faculty with valuable entrepreneurial experience, enhancing

their employability and encouraging a culture of innovation within the university ecosystem. Examples of successful university spin-offs resulting from public-private partnerships include the development of new technologies in sectors such as biotechnology, information technology, and renewable energy. These innovations often have far-reaching economic and societal impacts, creating new industries, generating jobs, and contributing to regional development. In this way, public-private investments in HEIs help to establish universities as key players in national and global innovation ecosystems (Bock et al., 2018).

2.1.2 Aligning HEIs with Regional and National Priorities

Another critical objective of public-private investments in HEIs is to align universities with regional and national economic priorities. Higher education institutions can significantly contribute to regional development by addressing the specific needs of local industries and communities. Through partnerships with private companies and public organizations, universities can design their research and educational programs to align with regional development goals, such as increasing technological capacity, fostering entrepreneurship, or addressing skills shortages in key sectors. By aligning HEIs with these priorities, public-private partnerships can help attract investment from both public and private sources. Governments and regional bodies are more likely to support universities that contribute to national development goals, such as job creation, technological innovation, and environmental sustainability. Similarly, private companies are more inclined to invest in universities that are actively involved in solving industry-specific challenges or developing the workforce of the future. For example, universities can design academic programs that focus on emerging industries such as clean energy, artificial intelligence, or advanced manufacturing, directly aligning with government strategies for economic modernization. Public-private investments can also support the creation of research clusters that bring together universities, industries, and government bodies to address specific regional challenges, fostering innovation and creating new opportunities for economic growth (Dabić et al., 2022).

2.1.3 Establishing Impact Investment Boards for Guiding Research and Curriculum Design

To ensure that public-private investments are aligned with industry needs and produce tangible results, it is essential to establish impact investment boards within HEIs. These boards, composed of representatives from academia, industry, and government, can play a pivotal role in guiding the direction of research and the design of university curricula. By bringing together stakeholders with diverse expertise, impact investment boards can help universities better understand the needs of the market and ensure that academic research is focused on solving real-world problems. Impact investment boards can also help universities identify emerging trends and areas where innovation is most needed, allowing them to adjust their research priorities and academic offerings accordingly. This alignment ensures that students are equipped with the skills and knowledge necessary to meet the demands of a

rapidly evolving labor market. Furthermore, these boards can help secure additional funding by demonstrating that university research and educational programs are directly contributing to economic development and industry growth (Bolton et al., 2020). For example, an impact investment board in a university focused on biotechnology might prioritize research into medical devices or pharmaceuticals that address pressing health challenges. At the same time, the board could recommend updates to the university's curriculum to ensure that students are trained in the latest industry technologies and practices. This close collaboration between academia and industry helps universities remain relevant and responsive to the needs of the market, while also ensuring that private investments yield substantial returns in terms of innovation and workforce development (Hand, 2019).

Public-private investments in HEIs are a transformative force that can drive innovation, economic growth, and societal development (Mbithi et al., 2021). By fostering public-private partnerships, aligning university activities with regional and national priorities, and establishing impact investment boards, HEIs can become powerful engines of economic transformation. These partnerships provide universities with the resources and expertise needed to commercialize research, develop entrepreneurial ventures, and ensure that academic programs are aligned with the needs of the labor market. As a result, public-private investments in HEIs not only enhance the quality and relevance of higher education but also contribute to the creation of sustainable, innovation-driven economies (McCann et al., 2023).

2.2. Challenges in Public-Private Investment in HEIs

The successful establishment of PPPs in HEIs is crucial for fostering innovation, addressing labor market demands, and promoting regional economic growth. However, there are significant challenges that hinder the full potential of these partnerships. Identifying and addressing these challenges is critical for creating a conducive environment for investment and collaboration.

2.2.1 Key Barriers to Public-Private Partnerships

While the benefits of PPPs in higher education are well-documented, there are several key barriers that often inhibit effective collaboration between universities and private investors. These challenges include risk perception, regulatory issues, and structural inefficiencies within HEIs.

1. Risk Perception

Private investors frequently view university-led projects as high-risk ventures due to several factors, including:

- **Slow bureaucratic processes**: Academic institutions are often slower than the private sector in decision-making and implementation. Lengthy administrative procedures can delay projects, creating uncertainty for private investors (Fortin and Söderlund, 2023).
- **Intellectual Property (IP) complexities**: Negotiating ownership of IP generated from research can be a major point of contention. Universities may prioritize academic

freedom and research integrity, while private investors focus on profit-driven outcomes. This misalignment can result in prolonged negotiations, causing delays or breakdowns in partnerships (Mgobo, 2024).

- **Unclear commercialization paths**: Private companies may hesitate to invest in university research due to uncertainties about how innovations will be brought to market. The transition from academic research to commercially viable products is often fraught with challenges that can deter investment.

2. Regulatory and Legal Frameworks

Another significant barrier is the regulatory environment, which can be complex and fragmented (Figure 2). Issues include:

- **National and institutional regulations**: Different countries have varying regulations regarding PPPs, intellectual property rights, and funding mechanisms. These legal complexities can slow down negotiations and limit the scope of collaboration (Castaldi et al., 2024).
- **Public procurement laws**: Many HEIs are subject to public procurement regulations, which can limit their flexibility in selecting private partners and negotiating contracts. Strict adherence to these laws can make universities less agile in responding to market opportunities (Reis et al., 2024).
- **Compliance and ethical concerns**: Universities are typically bound by strict ethical standards and government regulations, which can conflict with the profit-driven motives of private companies, creating friction in how research is conducted and utilized (Neumann, 2021).

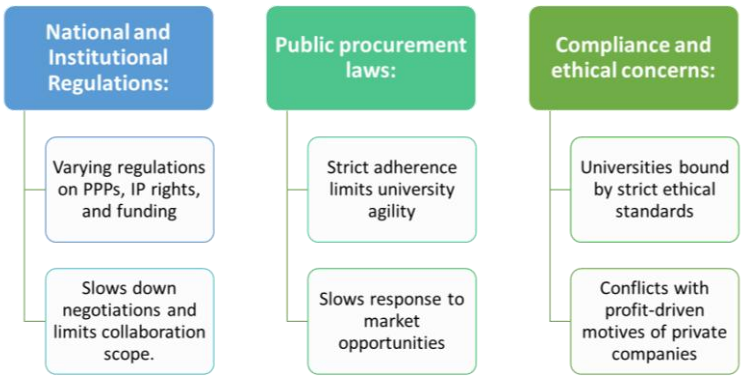


Figure 2. The regulatory environment as a key barrier to progress

3. Funding and Financial Sustainability

- **Limited financial resources**: Many universities rely heavily on government funding, which may be insufficient to engage in large-scale public-private collaborations. This

dependence limits their ability to co-invest or match private sector funding (Kang et al., 2019).

- **Uncertain return on investment (ROI)**: From an investor's perspective, the ROI in university projects can be uncertain due to the long timelines required for academic research and development. Additionally, the commercialization success of university-generated innovations can be unpredictable (Wagschal, 2024).

4. Structural Inefficiencies

- **Misaligned Objectives**: Public institutions often prioritize broad social goals such as accessibility and equity, while private investors may focus on profitability and return on investment, leading to conflicting objectives that can disturb the partnership even during the preparation and implementation step (Todorovski & Atanasoska, 2014).
- **Inexperienced staff**: A lack of adequately trained administrative and academic personnel can hinder the effective implementation of investment strategies, leading to suboptimal outcomes. Unprepared staff in public-private investment can hinder effective collaboration, limit innovation, and reduce operational efficiency, ultimately obstructing the development and success of higher education institutions (Todorovski & Atanasoska, 2014). This is especially through a lack of understanding of PPP frameworks, inefficient project management, and ineffective communication.
- **Cultural Clashes**: Public and private sectors have different cultures and operating procedures, which can lead to friction in partnership arrangements, affecting collaboration and overall efficiency (Todorovski & Atanasoska, 2014).

2.2.2 Understanding the Current Situation and Challenges

Public-Private Partnerships in Georgia are recognized as a strategic avenue to bridge the gap between academic capabilities and industry needs. Figure 2 shows the current situation and challenges facing PPPs in HEIs in Georgia. It demonstrates three key challenges which include risk perception, where private investors view university-led projects as high-risk due to bureaucratic delays and unclear commercialization pathways; regulatory hurdles, which involve complex legal frameworks and public procurement laws that can hinder collaboration; and structural inefficiencies, characterized by inexperienced staff and misaligned objectives between public and private partners. These challenges emphasize the need for targeted interventions to foster a more supportive environment for PPPs in Georgian HEIs.

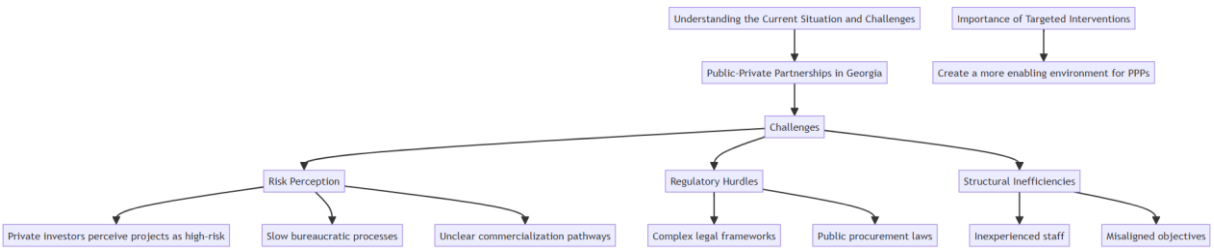


Figure 3. Challenges Facing Public-Private Partnerships in Higher Education Institutions in Georgia.

2.2.3. Solutions to Overcome Challenges

To effectively overcome these barriers, HEIs and their partners must adopt targeted solutions. These strategies involve improving institutional processes, developing clear IP frameworks, fostering transparency, and utilizing risk-sharing models.

1. Streamlining Institutional Processes

- **Agile project management**: Universities can implement more agile management structures to align better with the pace of private sector innovation. This involves reducing bureaucratic hurdles and adopting streamlined decision-making processes that allow for faster approvals and adaptability during project execution (Zasa et al., 2020).
- **Dedicated partnership offices**: Establishing specialized offices within HEIs, such as Technology Transfer Offices (TTOs), can facilitate smoother communication and collaboration with private companies. These offices can handle negotiations, oversee project timelines, and ensure regulatory compliance, making partnerships more efficient (Katzman and Azziz, 2021).

2. Intellectual Property (IP) Management

- **Standardized IP agreements**: Universities can adopt standardized intellectual property policies that clearly define ownership rights, licensing agreements, and revenue-sharing mechanisms upfront. This can help avoid prolonged negotiations and provide clarity to both parties from the outset (Raskovich et al., 2023).
- **IP-sharing frameworks**: HEIs and private investors can agree on co-ownership models, where both the university and the private partner share ownership of IP. In such models, universities may retain a share of future royalties while the private sector takes the lead in commercialization efforts. This arrangement helps mitigate risks for both parties (Rimmer, 2022).

3. Public-Private Risk-Sharing Models

- **Co-investment and venture capital models**: To reduce the perceived financial risks, universities can explore co-investment models where both the public and private sectors share the financial burden of innovation projects. Governments or development banks can offer matching funds, grants, or low-interest loans to encourage private sector investment (Lenihan et al., 2020).
- **Public guarantees and incentives**: Governments can play a significant role by providing public guarantees for university-led projects, which reduces the financial risk for private investors. Additionally, tax incentives and other fiscal benefits can be offered to companies that invest in HEI-driven research and innovation (Rangongo, 2023).

- **Milestone-based funding**: Investors can reduce risk by committing funding in phases, based on the achievement of specific milestones in the research or product development process. This ensures accountability and aligns university projects with market-driven timelines (Mas and Hsueh, 2017).

4. Enhancing Collaboration through Governance

- **Supervisory Boards**: Establishing supervisory boards comprising representatives from academia, industry, and government can guide the strategic direction of public-private partnerships. These boards ensure that the needs of all stakeholders are met, helping to mitigate risks and align research priorities with market opportunities (Leblanc, 2020).
- **Transparent governance structures**: Clear governance frameworks can enhance trust between partners, ensuring that both academic and commercial interests are protected (Eweje et al., 2021).

5. Prepared Staff and External Advisors

- **Capacity-Building Initiatives**: To mitigate the challenges posed by unprepared staff in PPPs, HEIs must prioritize training and capacity-building initiatives. This includes equipping staff with the necessary knowledge and skills to navigate the complexities of PPPs, fostering a collaborative culture, and enhancing communication strategies.
- **Consulting External Advisors**: This expertise assists in creating a realistic framework for the partnership in the preparation phase. External advisors can also assist in training the institution's staff to manage the partnership effectively, covering areas such as project management, financial oversight, and stakeholder engagement.

Unit 3. Public-Private Investment Models for HEIs

3.1 Best Practices for Structuring Partnerships

PPPs in higher education have the potential to significantly enhance the innovation capacity, financial sustainability, and societal impact of universities. By using private sector resources and expertise, HEIs can drive technological advancements, boost research commercialization, and align academic programs with market demands (Morawska-Jancelewicz, 2022). However, to maximize the effectiveness of these partnerships, universities must adopt models that address the specific needs and risks faced by both HEIs and private investors. In the following, several models discuss for public-private investment that can be introduced to facilitate these collaborations: Tracking Mechanisms, Innovation Commercialization, and Supervisory Boards.

3.1.1 Tracking Mechanisms: Reducing Investment Risks

One of the primary barriers to private sector investment in HEIs is the perceived risk of university-led projects. Academic institutions often operate slower than private businesses due to complex bureaucratic processes and IP challenges. To address these issues, HEIs can adopt tracking mechanisms to streamline processes and enhance responsiveness to market needs.

- **Streamlining Institutional Processes**: Simplifying administrative procedures and creating more agile governance structures help HEIs align their project timelines with the fast-paced private sector. Universities can adopt lean management practices to reduce bureaucratic hurdles and enable faster decision-making (Mahoe, 2024).
- **Public-Private Risk Sharing**: Developing risk-sharing models where public entities provide guarantees or co-investment options reduces financial risks for private investors. Governments can offer tax incentives, grants, or low-interest loans to encourage private investment in university-led research projects (Bourreau et al., 2020).
- **Clearer IP Management**: Establishing dedicated IP management offices ensures intellectual property rights are clearly defined. These offices facilitate negotiations between universities and private companies, allowing for standardized agreements on IP ownership, royalties, and commercialization (Trequattrini et al., 2022).

3.1.2. Commercialization of Research through Technology Transfer Offices (TTOs)

The commercialization of research is one of the most significant outcomes of public-private partnerships. TTOs act as intermediaries between universities and the private sector, managing the commercialization of research and facilitating smoother collaboration.

- **Managing Innovation Projects**: TTOs oversee innovation from inception to commercialization, ensuring university research aligns with market demands and is ready for commercial application. TTOs facilitate the creation of university spin-offs, which contribute to local economic growth and job creation (Brantnell and Baraldi, 2022).
- **Collaboration with Industry**: By fostering joint research initiatives and sponsored research agreements, TTOs help align university innovations with industry needs. This collaboration enables universities to capitalize on their research outputs while providing private companies with cutting-edge technologies (Compagnucci and Spigarelli, 2024).

3.1.3. Best Practices for Structuring Public-Private Partnerships

For public-private partnerships in HEIs to thrive, a clear framework and mutual understanding of goals are essential. The following best practices ensure sustainable and effective partnerships:

- **Clear and Shared Objectives**: Both universities and private sector partners must establish a shared vision and outcome-oriented key performance indicators (KPIs). These include patents, research publications, innovations, and spin-off creation to ensure both sides benefit from the collaboration (Mosimege and Masiya, 2022).
- **Transparent IP Frameworks**: Pre-established IP agreements should define ownership, licensing, and commercialization pathways to avoid conflicts. Dedicated TTOs can manage this process to ensure transparency and efficiency.
- **Flexible Funding Models**: Co-investment models and phased investments tied to research milestones can mitigate risks for private investors. Government grants or venture capital can reduce the financial burden on both parties (Hossinger et al., 2020).
- **Agile Project Management**: HEIs should adopt agile project management structures to align with private sector timelines. Designating project liaisons ensures efficient communication and quick decision-making during the partnership (Senabre Hidalgo and Fuster Morell, 2019).
- **Long-term Commitment and Trust Building**: Successful partnerships require long-term agreements with shared risks and rewards. Continuous engagement through regular check-ins and collaborative decision-making fosters mutual trust and commitment (Walters and Helman, 2023).

3.1.4. Supervisory Boards: Guiding HEI Strategies

To ensure strategic alignment with market demands and institutional goals, HEIs can establish supervisory boards comprising representatives from academia, industry, and government. These boards provide oversight and guidance on research priorities and curriculum design, ensuring that academic programs remain relevant to industry needs (Damásio et al., 2024; Gryaznova, 2018).

- **Guiding Research and Curriculum**: Supervisory boards help universities focus their research on high-potential projects with commercial viability. By working closely with industry, they also shape academic curricula to equip students with skills required in modern industries.
- **Long-term Strategic Planning**: These boards advise universities on institutional growth, identifying potential revenue streams, and ensuring partnerships align with national economic priorities.

3.1.5. Innovation Financing: Public and Private Investment Boards

Securing financial resources is a major challenge in commercializing research. Public-private investment boards can help overcome funding issues by facilitating long-term investment in university-led innovations. These boards include representatives from government, industry, academia, and the financial sector, ensuring that research is aligned with economic priorities (Young, 2024).

- **Strategic Investment Allocation**: Investment boards oversee fund allocation to research areas with high commercialization potential and societal impact.
- **Risk Mitigation**: Public grants or co-investment models reduce financial risk for private investors, encouraging long-term commitment to university-led research projects.
- **Phased Investment**: Funding can be released in stages, contingent on the achievement of research milestones, which ensures accountability and reduces risk for both HEIs and private partners.

3.2 . Success Cases of Public-Private Investments in Higher Education

PPPs have emerged as a transformative model in higher education, driving innovation, research commercialization, and regional economic development. These partnerships have been instrumental in bridging the gap between academia and industry, providing universities with the financial resources, expertise, and market access needed to commercialize research and foster entrepreneurship. One of the most compelling examples of successful public-private investments in higher education is the RiEcoLab Project, which implemented public-private investment boards to support university-led startups and foster innovation ecosystems. This section highlights the RiEcoLab Project and other notable cases that illustrate the potential of public-private investments to reshape the landscape of higher education.

3.2.1 RiEcoLab Project: Public-Private Investment Boards and University Startups

The RiEcoLab Project is an exemplary case of how public-private investments can be leveraged to support university innovation and entrepreneurship. Funded by the European Institute of EIT, the project aimed to transform universities into key players in regional innovation ecosystems by establishing public-private investment boards. These boards brought together representatives from academia, industry, and government to guide the commercialization of research and the development of university-led startups.

- *Public-Private Investment Boards*

The core innovation of the RiEcoLab Project was the creation of public-private investment boards, which acted as advisory bodies that connected universities with private investors and industry experts. These boards provided strategic guidance on research priorities, helped to identify commercialization opportunities, and facilitated the flow of capital into university-led ventures. By involving stakeholders from both the public and private sectors, the investment

boards ensured that university research was aligned with market needs and that startups emerging from university research had access to the financial and technical resources required for success.

- *Support for University Startups*

RiEcoLab also focused on supporting university-led startups, providing students and faculty with the tools and resources needed to transform research innovations into commercial ventures. The project established incubators and accelerators within universities, offering mentoring, business development support, and access to funding. These startups, often built around cutting-edge technologies developed in academic research labs, were able to scale quickly thanks to the combination of university resources and private investment.

One notable success story from the RiEcoLab Project is the launch of several biotech and clean energy startups, which were able to attract significant private investment and make substantial contributions to regional economic growth. These startups not only created new jobs but also helped to commercialize technologies that addressed critical societal challenges, such as renewable energy solutions and healthcare innovations. The public-private investment boards played a crucial role in guiding these startups through the early stages of development, ensuring that they had the necessary resources and market insights to succeed.

3.2.2 Technology Transfer Frameworks: Promoting Public-Private Equity Models for Innovation

Another successful approach to public-private investments in higher education is the development of technology transfer frameworks that promote public-private equity models for innovation. These frameworks facilitate the commercialization of university research by creating mechanisms through which private investors can co-invest in university-led innovation projects. This model has been successfully implemented in several universities worldwide, resulting in the commercialization of breakthrough technologies and the creation of high-growth startups (Meissner, 2020).

- *Stanford University: Technology Transfer and Commercialization*

Stanford University is a prime example of how public-private investment can drive the commercialization of academic research. Through its Office of Technology Licensing (OTL), Stanford has developed a robust technology transfer framework that allows private companies to license university-developed technologies. The OTL facilitates collaborations between university researchers and industry partners, helping to bring innovations from the lab to the marketplace.

One of Stanford's most significant success stories is the commercialization of technologies related to Google. The initial research that led to the development of Google's search algorithms was conducted at Stanford, and the university's technology transfer office played a critical role in licensing the technology to the startup founders, who went on to build one of

the most successful companies in history. The Google case illustrates how effective public-private partnerships can generate significant economic and societal impacts, while also providing universities with valuable revenue streams (Liang et al., 2022).

- *University of Cambridge: Cambridge Enterprise and Public-Private Partnerships*

The University of Cambridge has also been highly successful in leveraging public-private partnerships to drive innovation. Through Cambridge Enterprise, the university has developed a comprehensive technology transfer framework that promotes public-private equity models for innovation. Cambridge Enterprise works with private investors, venture capital firms, and industry partners to commercialize university research and support the creation of startups.

One of the most notable outcomes of this model is the development of the Cambridge Cluster, a technology and innovation hub that has attracted billions of dollars in private investment. The cluster includes startups in fields such as biotechnology, information technology, and clean energy, many of which originated from university research. Public-private partnerships have been central to the success of the Cambridge Cluster, providing the financial backing and industry expertise needed to scale university-led innovations (Chon et al., 2018).

3.2.3 The Fraunhofer Model: Industry Collaboration and Research Commercialization

The Fraunhofer Society in Germany is another compelling example of how public-private partnerships can drive research commercialization and technological innovation. Fraunhofer operates as a network of research institutes that collaborate with universities, private companies, and government agencies to conduct applied research with direct commercial applications. The organization's model emphasizes industry collaboration and the co-investment of public and private funds in research projects that are closely aligned with the needs of industry (Kang, 2021).

- *Industry Co-Investment*

Fraunhofer's success lies in its ability to secure co-investment from both public and private sources. By aligning research projects with the strategic interests of industry partners, Fraunhofer ensures that private companies are willing to invest in research that has a clear path to commercialization. This co-investment model reduces the financial risk for both parties, while also ensuring that research is relevant to market needs.

- *Commercialization of Research*

Fraunhofer's research has led to the commercialization of numerous technologies, particularly in fields such as automotive engineering, advanced manufacturing, and renewable energy. For example, Fraunhofer has been instrumental in the development of solar panel technology, working closely with industry partners to bring cutting-edge innovations to market. These collaborations have not only resulted in significant financial returns but have also contributed to the global transition to clean energy.

The Fraunhofer model demonstrates the importance of aligning university research with industry needs and securing co-investment from private partners. By doing so, public-private partnerships can drive technological innovation, support regional economic development, and contribute to solving global challenges.

3.2.4 The University of California (UC) System: Innovation and Venture Capital

The University of California (UC) system has also pioneered successful public-private investment models through its UC Ventures initiative, which invests in university-led innovations with the potential for commercialization. UC Ventures is a venture capital fund that focuses on supporting startups and spin-offs based on research conducted within the UC system (Casper and West, 2024).

- *Venture Capital for University Startups*

UC Ventures provides early-stage funding to university startups, helping them navigate the challenges of scaling their innovations. By providing both capital and access to a network of industry experts, UC Ventures ensures that startups have the resources they need to succeed in competitive markets. One success story from UC Ventures is Zymergen, a biotechnology startup that uses advanced data analytics and machine learning to develop new materials. Zymergen has attracted significant private investment and is considered one of the leading companies in its field, demonstrating the potential of public-private partnerships to drive innovation in emerging industries.

Public-private investments in higher education have proven to be highly effective in driving research commercialization, fostering innovation, and supporting the creation of university-led startups. Successful cases such as the RiEcoLab Project, Stanford University's technology transfer framework, the University of Cambridge's public-private equity models, and the Fraunhofer Society demonstrate the transformative impact that these partnerships can have on universities, industries, and regional economies. By implementing similar models, HEIs can unlock their full potential as engines of innovation and economic growth, contributing to both local and global development.

Table 2 highlights how public-private partnerships in higher education are a catalyst for innovation, economic development, and societal progress. By addressing both academic and market needs, these collaborations provide long-term benefits for all stakeholders involved.

Table 2. Overview of Public-Private Investment Benefits

Benefit	**Description**	**Examples and Outcomes**
Risk Reduction	Public-private partnerships offer mechanisms such as co-investment, government-backed guarantees, and	• Government grants and tax incentives for R&D investments.

	streamlined processes to reduce the perceived risks for private investors.	• Co-investment models where both public and private sectors share project risks, lowering barriers for private participation.
Innovation Commercialization	Partnerships enable HEIs to translate academic research into market-ready products through technology transfer offices and commercialization frameworks, helping to drive technological advancement.	• University of Cambridge's Cambridge Enterprise and the commercialization of biotechnology and IT research. • Stanford University's technology licensing office facilitating Google's development.
Talent Development	Collaborations align academic curricula with industry needs, ensuring that graduates are equipped with relevant skills. Universities also provide practical training through internships and co-op programs.	• Industry-driven curriculum updates in engineering and IT. • Internships and mentorship programs with companies such as Microsoft or Siemens, providing real-world training to students.
Job Creation and Economic Growth	Public-private investments lead to the creation of startups, spinoffs, and innovative ventures, driving local job creation and contributing to regional economic development.	• RiEcoLab-supported university startups in clean energy and biotech. • UC Ventures-backed startups like Zymergen creating jobs in biotechnology and advanced materials.
Sustainable Growth	These partnerships enable HEIs to align their research with long-term national and regional priorities, promoting sustainability in industries such as clean energy, healthcare, and manufacturing.	• Fraunhofer Society's collaboration with industry on renewable energy and automotive technologies. • Public-private collaboration on sustainable urban development projects.
Access to Cutting-Edge Technology	Private companies provide universities with state-of-the-art technology and equipment, enhancing the research and development capabilities of HEIs.	• Partnerships with tech companies to provide AI labs, data analytics platforms, or robotics equipment in university research centers. • Joint R&D projects in high-tech sectors.
Diversified Funding Streams	By engaging private investors and industry partners, HEIs can reduce their reliance on government funding and create new revenue streams through research commercialization and consulting.	• University consulting services for corporate partners. • Licensing revenues from patented technologies developed

		within university labs, as seen at Stanford University.
Enhanced Regional Development	Universities, through public-private partnerships, play a vital role in driving regional economic transformation, particularly in underdeveloped or rural areas.	• University of Cambridge's role in the development of the Cambridge Cluster, attracting billions in private investment. • Partnerships that help develop innovation hubs in rural regions.

Figure 3 illustrates the public-private investment process in HEIs, highlighting the critical stages of public-private partnerships. This process begins with university-led research, where academic institutions conduct cutting-edge research to address societal challenges. This research leads to private sector partnerships, fostering collaboration between universities and businesses to secure funding and develop innovative projects. The next stage, innovation commercialization, focuses on transforming research findings into market-ready products and services, thereby bridging the gap between academia and industry. Ultimately, these efforts culminate in regional and national impact, which emphasizes the significant contributions of public-private investments to economic growth and job creation, particularly in Georgia. This process not only modernizes HEIs but also enhances educational quality and community development, showcasing the multifaceted benefits of such collaborations.

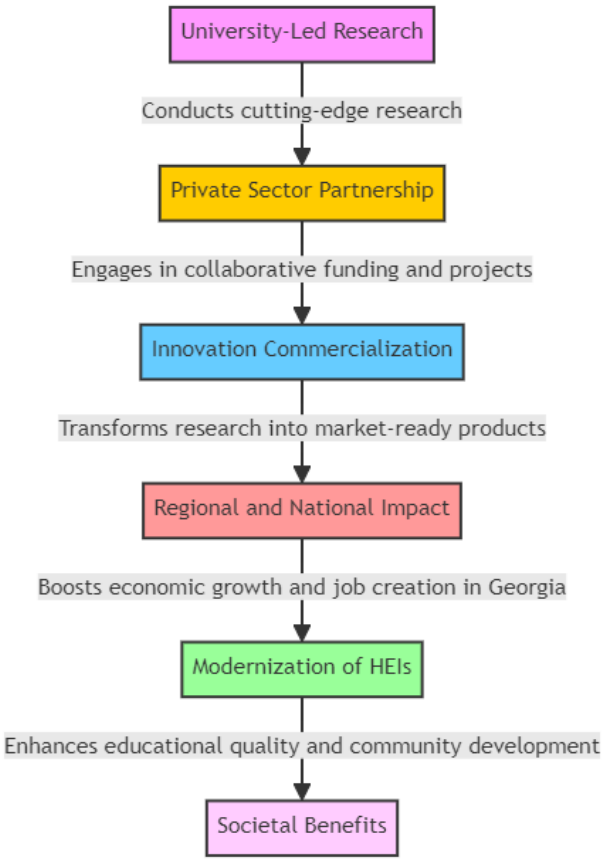


Figure 3. Public-Private Investment Process in HEIs

Unit 4. Ensuring PPPs Effectiveness and sustainability

Creating inclusive PPPs ensures that partnerships serve the needs of diverse stakeholders, including marginalized communities, underrepresented groups, and economically disadvantaged regions. Inclusivity can be achieved by aligning PPP goals with broader social objectives, such as reducing inequality and promoting regional equity. For example, HEIs can establish partnerships with local industries to deliver training programs and research facilities in rural areas, fostering balanced development. Engaging civil society organizations (CSOs) and community representatives during project design can help tailor initiatives to local needs. Embedding inclusivity metrics, such as regional outreach requirements or representation quotas, into PPP contracts further strengthens their equity-oriented approach.

Innovative and incubator-focused PPPs require the creation of ecosystems where HEIs, industry, and government collaborate to support entrepreneurship and research commercialization. Establishing innovation hubs and incubators within universities enables these partnerships to thrive. These hubs can provide access to funding, mentorship, and cutting-edge facilities for startups, empowering students and researchers to translate their ideas into market-ready solutions. By integrating private sector expertise in commercialization strategies and product development, incubators ensure alignment with industry needs. Governments can bolster these efforts by offering tax incentives or grants to private partners supporting incubators. Virtual incubation platforms can further democratize access to these resources, allowing broader participation across underserved regions. Through inclusive governance, collaborative innovation, and strategic investments, HEIs can transform into engines of equitable and sustainable development.

4.1. Ensuring PPPs Effectiveness through Communication, Dissemination, and Visibility

Effective communication and dissemination strategies are essential for HEIs to increase their visibility, showcase their impact, and engage with key stakeholders, including industries, governments, and society at large (Hübscher et al., 2021). In the context of PPPs, strong communication practices also help foster collaboration, build trust, and drive innovation. This section outlines best practices for HEIs in communication, the role of digital platforms in supporting partnerships, and how HEIs can enhance their visibility in regional development (Maiya and Aithal, 2023).

4.1.1. Effective Communication Strategies for HEIs

For HEIs to maximize the impact of their work, clear and strategic communication is essential. This involves engaging diverse audiences such as students, faculty, industry partners, policymakers, and the public (Sutton et al., 2018). A well-structured communication strategy can help HEIs to:

- Promote their research achievements.
- Highlight successful public-private partnerships.
- Build stronger connections with the community.
- Attract funding, students, and collaboration opportunities.

Key Components of an Effective Communication Strategy:

1. **Target Audience Identification:**
   - Internal stakeholders: Faculty, researchers, and students.
   - External stakeholders: Industry partners, government agencies, potential investors, local communities, and the general public.
   - Identifying these groups helps tailor communication messages and channels to ensure relevance and impact.
2. **Messaging Consistency:**

HEIs need to develop clear, consistent messaging that aligns with their mission and goals. This could include:

- Highlighting achievements in research and innovation.
- Showcasing partnerships with industry and government.
- Promoting the university's contribution to societal challenges (e.g., climate change, healthcare innovation).

3. **Diverse Communication Channels:**

HEIs should use a mix of communication channels to reach their various audiences. These can include:

- Traditional media: Press releases, academic publications, conferences, and brochures.
- Digital media: Social media, university websites, webinars, and email newsletters.
- Face-to-face engagement: Public lectures, industry meetups, and community outreach programs.

4. **Storytelling and Impact Narratives:**

Presenting research and projects in the form of stories can make complex information more accessible and engaging for broader audiences. HEIs should communicate not only their academic success but also the tangible impact their work has on communities and the economy (Kompella, 2024). For example, sharing success stories of student startups or public-private partnerships that have driven regional economic growth.

5. **Feedback and Engagement:**

Communication should be a two-way street. Engaging with stakeholders through surveys, public consultations, and social media interaction allows HEIs to understand the needs of their community and partners, refining their messaging and approach accordingly.

4.1.2. Utilizing Digital Platforms for PPP Collaboration

In today's digital age, leveraging online platforms is critical for fostering collaboration between HEIs, industry partners, and government agencies. Digital platforms offer a convenient way to streamline communication, share resources, and manage collaborative projects in real-time (Onyia and Nwankwo, 2024). The RiHEI proposal highlights the importance of a digital platform to enhance collaboration and promote PPPs.

Key Benefits of Digital Platforms for PPP Collaboration:

1. **Centralized Information Hub**:

Digital platforms provide a centralized space for HEIs and their partners to share information, track project progress, and communicate efficiently (Zabalawi et al., 2024). These platforms facilitate:

- **Document sharing**: Contracts, research papers, and collaborative materials can be stored and accessed securely.
- **Project management tools**: These platforms can be integrated with tools like timelines, milestones, and task lists to monitor project progress.
- **Real-time communication**: Messaging and video conferencing capabilities allow instant interaction between partners, improving collaboration efficiency.

2. **Engaging Stakeholders**:

Platforms can be used to engage stakeholders such as investors, government officials, and civil society by offering access to ongoing project updates, funding opportunities, and public reports. Stakeholders can also use these platforms to provide feedback or suggest potential areas for partnership (Serafini et al., 2022).

3. **Data-Driven Decision Making**:

Digital platforms can track data related to partnerships, such as project outcomes, investment returns, or societal impact metrics. This data can then be analyzed to make informed decisions about where to allocate resources, which partnerships to pursue, and how to improve future collaborations (Marra, 2022).

The RiHEI project plans to establish a digital platform to serve as an education-as-a-service hub for Georgian HEIs. This platform will offer:

- Tools for collaboration between university researchers and private industry.
- A repository of resources from past Erasmus+, Horizon Europe, and EIT projects.

- Mentorship opportunities through online engagement with EU partners.

This platform will ensure transparency, improve communication, and foster stronger partnerships by making resources and opportunities easily accessible to all partners involved.

4.1.3. Enhancing Visibility of HEIs' Impact in Regional Development

As universities increasingly play a role in regional innovation ecosystems, enhancing their visibility is critical to attracting investment, forming partnerships, and showcasing their contribution to economic and social development. HEIs can enhance their visibility by adopting proactive strategies that highlight their impact on regional development, particularly in PPPs and entrepreneurship.

Strategies for Enhancing HEI Visibility in Regional Development:

1. Showcasing Economic Impact:

HEIs can highlight their role in fostering economic growth by sharing tangible metrics and success stories, such as:

- Job creation: Demonstrating how university research and spin-offs have led to the creation of new jobs in the region.
- Innovation and startups: Publicizing the number of startups, patents, or research breakthroughs that have originated from the university and their positive effects on the local economy.
- Regional collaboration: Promoting partnerships with local industries, government, and community organizations that have contributed to regional development.

2. Public Engagement and Community Outreach:

Visibility can also be enhanced through direct engagement with local communities and industries. HEIs should actively participate in local economic forums, public lectures, and regional development councils. By positioning themselves as active contributors to solving regional challenges (such as employment, environmental sustainability, and technology development), HEIs build trust and enhance their reputation as regional innovators (Thomas et al., 2021).

3. Partnership with Local Media:

Engaging local media to cover university achievements, research projects, and collaborations with industry is an effective way to raise public awareness of the university's role in regional development. Press releases, interviews, and success stories published in local newspapers or broadcast on radio and television can reach a wide audience (Shyiramunda and van den Bersselaar, 2024).

4. Hosting Industry and Innovation Events:

HEIs can organize or sponsor industry conferences, innovation fairs, and public seminars that bring together government officials, business leaders, students, and academics. These events create opportunities for networking and partnership-building while highlighting the university's leadership in driving regional innovation.

5. Promoting Success Stories through Digital Media:

Universities should use their social media platforms, websites, and blogs to regularly share updates about their contributions to regional development. This could include profiles of successful alumni, industry partnerships, research outcomes, and the university's role in regional policy-making. Interactive content such as webinars, podcasts, and online forums also provide opportunities to engage a broader audience.

4.2. Sustainability of Public-Private Investments in Higher Education

For PPPs in HEIs to achieve lasting impact, it is critical to adopt sustainability models that extend beyond initial project lifecycles. Sustainable PPPs ensure long-term collaboration, promote social responsibility, contribute to the achievement of Sustainable Development Goals (SDGs), and maintain momentum after initial funding phases. This section discusses sustainability models for PPPs, the role of HEIs in promoting social responsibility, and strategies for ensuring the continuity of public-private collaborations post-project funding (Akomea-Frimpong et al., 2023).

4.2.1. Sustainability Models for Long-term Collaboration

Ensuring the sustainability of public-private investments in HEIs requires models that foster ongoing engagement, financial viability, and continuous value creation for all stakeholders. Long-term sustainability is not only about financial resources but also about institutional commitment, knowledge transfer, and the alignment of objectives (Gómez-Marín et al., 2022).

Key Sustainability Models for Long-term Collaboration:

1. **Revenue-Generating Ventures**:
    - **Spin-offs and startups**: University-generated startups and spin-offs, nurtured through public-private collaborations, can become self-sustaining by generating revenue through product commercialization, services, or royalties. Once these ventures gain market traction, they provide a return on investment for both the university and private sector partners, creating an ongoing financial model for reinvestment.
    - **Licensing and royalties**: IP developed through research collaborations can be licensed to industry partners, generating long-term royalty streams that support future research and development.
2. **Co-investment and Public Funding Mechanisms**:

- **Public and private co-investment models**: These models, where both the public sector and private investors commit resources, can extend beyond initial projects. By establishing funds or foundations dedicated to university research and innovation, future projects can tap into pooled resources. For example, government grants or subsidies can be structured to attract matching private-sector funds, ensuring shared financial responsibility.
- **Endowment funds**: Establishing endowment funds specifically for public-private research initiatives can provide a stable source of income to fund future projects. These funds can be built through initial contributions from government, industry partners, and philanthropists.

3. **Institutional Capacity Building**:
   - **TTOs**: Strengthening TTOs ensures that the commercialization of university research continues beyond the project lifecycle. TTOs provide the necessary infrastructure to support innovation and entrepreneurship, acting as a bridge between academia and industry.
   - **Training and skill development**: Long-term sustainability depends on building the capacity of university staff, students, and private partners to manage and advance partnerships independently. Continuous professional development, workshops, and knowledge-sharing platforms contribute to the self-sustaining growth of these collaborations.
4. **Networked Collaboration Models**:
   - **Innovation ecosystems**: Universities can embed themselves into regional innovation ecosystems, where collaboration with industry, government, and civil society becomes a continuous, self-sustaining process. These ecosystems encourage an ongoing exchange of knowledge, resources, and investment, ensuring that partnerships evolve and remain relevant over time.

The Stanford Biodesign Program[1] exemplifies long-term sustainability through revenue generation. Initially supported by public and private investments, the program now sustains itself through licensing revenues from medical innovations, continued alumni engagement, and partnerships with industry, creating a perpetual cycle of innovation and commercialization.

[1] https://www.gsb.stanford.edu/alumni/volunteering/act/projects/stanford-biodesign

4.2.2. Role of HEIs in Promoting Social Responsibility and Sustainability

HEIs have a vital role to play in promoting social responsibility and sustainability. As institutions of knowledge creation, they influence societal norms and values, and their partnerships with private entities can help foster sustainable business practices and social impact.

HEIs as Catalysts for Social Responsibility:

1. **Responsible Research and Innovation (RRI)**:
    - HEIs are increasingly integrating the principles of RRI into their projects, ensuring that research outputs are not only commercially viable but also socially and environmentally responsible. RRI encourages inclusive innovation, ethical research practices, and a focus on addressing societal challenges such as poverty, inequality, and climate change.
2. **Sustainable Business Practices**:
    - HEIs can work with industry partners to promote sustainability practices, such as reducing environmental impact, enhancing corporate social responsibility (CSR), and developing products and services that contribute to social well-being. For example, universities can influence private companies to adopt green technologies and practices through collaborative research and innovation projects.
3. **Educating for Sustainability**:
    - HEIs are well-positioned to educate future generations about sustainability and social responsibility. By embedding sustainability principles in the curriculum, universities can produce graduates who are equipped to lead businesses and industries with a commitment to ethical practices and sustainable growth.

The University of Cambridge Institute for Sustainability Leadership (CISL)[2] exemplifies how universities can drive sustainability in partnership with businesses. Through educational programs, research collaborations, and advisory services, CISL helps organizations implement sustainability strategies and promotes leadership that aligns with global sustainability goals.

4.2.3. Impact of PPPs on Sustainable Development Goals (SDGs)

Public-private partnerships in HEIs can play a critical role in achieving the United Nations SDGs by fostering innovation and collaboration across sectors. PPPs provide the resources, expertise, and infrastructure needed to address global challenges related to poverty, inequality, education, health, climate action, and economic growth.

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[2] https://www.cam.ac.uk/research/news/cambridge-partners-with-industry-leaders-to-fund-research-on-global-sustainability-challenges

How PPPs Support the SDGs:

1. **SDG 4 – Quality Education**:
    - Partnerships between HEIs and the private sector help enhance the quality of education by integrating industry-relevant skills and knowledge into academic programs. For example, internships, co-op programs, and research collaborations ensure that students are better prepared for the workforce, addressing the global challenge of youth unemployment.
2. **SDG 9 – Industry, Innovation, and Infrastructure**:
    - Public-private partnerships in HEIs drive technological innovation, improve infrastructure, and support the development of resilient industries. Through collaborative research, universities and private partners can develop new technologies, such as renewable energy solutions or healthcare innovations, that contribute to sustainable industrial growth.
3. **SDG 13 – Climate Action**:
    - HEIs, through partnerships with the private sector, can develop sustainable technologies and practices that reduce environmental impact. Collaborative research in areas such as renewable energy, sustainable agriculture, and environmental conservation helps mitigate the effects of climate change.
4. **SDG 17 – Partnerships for the Goals**:
    - PPPs in HEIs exemplify the collaborative approach needed to achieve the SDGs. By bringing together academia, industry, government, and civil society, PPPs create a framework for joint action on global challenges, promoting innovation and sustainable solutions.

4.2.4. Continuing Public-Private Partnerships Post-Project Funding

One of the key challenges in public-private partnerships is ensuring their continuity after the conclusion of the initial project and funding period. For partnerships to remain viable, HEIs and private sector partners must adopt strategies that allow for sustained collaboration and ongoing impact.

Strategies for Continuing PPPs Post-Project Funding:

1. **Establishing Long-term Relationships**:
    - Rather than viewing PPPs as one-off projects, HEIs should cultivate long-term relationships with private sector partners. These relationships can be formalized through multi-year agreements, collaborative research agendas, or strategic alliances. Continuous engagement ensures that partnerships evolve with changing industry and societal needs.

2. **Diversifying Funding Sources**:
    - Post-project sustainability can be achieved by diversifying funding sources. HEIs should seek multiple streams of income, such as government grants, private sector investments, philanthropic donations, and international funding programs (e.g., Erasmus+, Horizon Europe). By leveraging a mix of funding sources, universities can maintain financial stability and continue research and innovation initiatives.
3. **Alumni and Industry Networks**:
    - Engaging alumni and industry networks is an effective way to sustain partnerships. Graduates who have participated in successful PPPs may later become industry leaders or investors, providing financial support or collaborative opportunities for future university projects.
4. **Establishing Innovation and Research Hubs**:
    - Creating dedicated innovation and research hubs or centers of excellence can serve as permanent platforms for collaboration between universities and private companies. These hubs can focus on specific areas of expertise, such as renewable energy, digital technologies, or healthcare innovation, providing ongoing opportunities for public-private collaboration.
5. **Performance-based Funding Models**:
    - Performance-based funding models can help sustain PPPs by ensuring that future investments are tied to clear, measurable outcomes. This model encourages continuous improvement and accountability, as funding is contingent on achieving specific research milestones, societal impacts, or commercial success.

Conclusion

Public-private investments in HEIs underscore the pivotal role that PPPs play in transforming higher education into a driver of innovation, workforce readiness, and economic development. These partnerships offer a powerful synergy where universities contribute intellectual capital, research capabilities, and talent development, while private industries provide funding, practical insights, and market expertise. The alignment of educational outcomes with market needs through PPPs ensures that HEIs remain relevant and responsive to the rapidly changing demands of the global economy.

One of the most significant advantages of PPPs in HEIs is their ability to foster innovation through research commercialization. By leveraging the expertise of both academic researchers and industry practitioners, these partnerships accelerate the translation of cutting-edge research into practical, market-ready solutions. TTOs play a central role in this

process, ensuring that intellectual property is protected and that innovations are effectively brought to market. Furthermore, PPPs help align university curricula with regional and national economic priorities, making academic programs more relevant to industry needs and improving the employability of graduates.

In addition to enhancing employment prospects for students, PPPs contribute to sustainable regional development by creating university spin-offs and startups that drive local economic growth. These ventures often focus on solving region-specific challenges, such as advancing renewable energy, improving healthcare technologies, or promoting digital transformation in local industries. The creation of innovation hubs and supervisory boards ensures that these efforts are well-coordinated and that they continue to produce societal benefits long after initial projects have ended.

Moreover, public-private partnerships enable HEIs to diversify their funding sources, reducing reliance on government grants and opening up new avenues for financial sustainability. This diversification strengthens universities' roles as innovation hubs, allowing them to engage in more ambitious research, attract top talent, and foster long-term collaborations with both national and international partners.

Ultimately, public-private investments are critical in positioning HEIs as engines of economic development, innovation, and societal progress. By creating lasting, impactful partnerships, universities can contribute meaningfully to both local and global development, helping to achieve the SDGs and ensuring that education continues to play a transformative role in shaping the future of societies and economies. Through these collaborations, HEIs not only enhance their own institutional capacity but also empower future generations to lead, innovate, and address the pressing challenges of the modern world.

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Co-funded by the European Union

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Project Number: 101125355 (ERASMUS-EDU-2023-CBHE)

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.