

Biomedical entrepreneurship: from research laboratories to global markets

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Abstract. *Biomedical entrepreneurship represents a crucial intersection between scientific innovation, health technology, and global economic growth. Over the last two decades, the transformation of biomedical discoveries into viable commercial ventures has reshaped healthcare delivery and generated new drivers of international competitiveness. This paper explores the mechanisms through which research-based biomedical innovations evolve into globally scalable enterprises. The study employs a qualitative synthesis of peer-reviewed literature, global case studies, and innovation ecosystem data to identify the critical factors influencing this transition. The results reveal that successful biomedical entrepreneurship depends on three interlinked pillars: translational research capability, ecosystem support structures (including funding, incubators, and regulation), and integration into international markets. The paper contributes to the field of study by developing a conceptual framework - the Biomedical Entrepreneurship Globalization (BEG) Model - linking local research ecosystems with global commercialization outcomes. This framework underscores the way biomedical entrepreneurship not only accelerates technological progress but also strengthens public health resilience and global economic stability.*

Keywords: biomedical entrepreneurship, innovation ecosystems, translational research, technology transfer, global health economy, startup scaling, economic growth

How to cite: Damian, T.-G. Biomedical Entrepreneurship: From Research Laboratories to Global Markets. *International Conference of Management and Industrial Engineering*, 12. <https://doi.org/10.56177/12icmie2025.200>

Introduction

The biomedical sector is rapidly emerging as one of the defining engines of 21st-century innovation. With global health systems facing challenges such as aging populations, chronic diseases, and escalating healthcare costs, the translation of biomedical research into market-ready solutions has become both an economic and a social imperative. Biomedical entrepreneurship - defined as the process of transforming scientific discoveries in life sciences and medicine into commercially viable products or services - stands at the core of this transformation [1].

Biomedical startups have demonstrated the capacity to reshape healthcare markets, accelerate technology adoption, and create high-value employment. For instance, the global biotechnology market was valued at USD 1.76 trillion in 2024, with an expected compound annual growth rate of more than 13% through 2030 [2]. This surge reflects not only technological progress but also a systemic evolution in how nations convert scientific knowledge into economic output.

However, despite immense progress, the path from laboratory research to global commercialization remains fraught with numerous barriers. Many biomedical innovations fail to exit the academic stage due to funding limitations, regulatory complexity, or lack of entrepreneurial expertise [3]. Moreover, disparities in innovation ecosystems across regions hinder the equitable global diffusion of biomedical technologies. The ability to scale biomedical startups internationally thus depends on structural factors such as government policy, venture capital maturity, intellectual property frameworks, and the presence of translational research hubs [4].

This paper seeks to address the following research question: How does biomedical entrepreneurship evolve from laboratory research to global market penetration, and what factors drive its success in contributing to global economic stability.

The main hypothesis is that successful biomedical entrepreneurship relies on the integration of translational research capacity, supportive innovation ecosystems, and cross-border commercialization strategies.

This paper contributes to academic discourse by proposing a conceptual model that links biomedical innovation ecosystems with global market integration. By synthesizing evidence from multiple countries and analyzing the mechanisms that underlie successful biomedical entrepreneurship, the paper aims to clarify the way biomedical innovation serves not only as a source of technological progress but also as a stabilizing force in the global economy.

Literature review

1. Defining Biomedical Entrepreneurship

Biomedical entrepreneurship lies at the intersection of scientific discovery, technological innovation, and commercial strategy. It refers to the process by which research findings in the biomedical sciences are transformed into viable products, services, or technologies that address medical or health-related needs [5]. Unlike traditional business ventures, biomedical startups are typically knowledge-intensive, capital-demanding, and highly regulated. They require long development timelines, complex intellectual property management, and sustained collaboration between academia, industry, and government [6].

At its core, biomedical entrepreneurship depends on the translation of scientific research into market applications. This translational process - often referred to as the “bench-to-bedside” journey - links laboratory discovery to clinical practice and, eventually, global adoption. The capacity to execute this translation efficiently distinguishes regions with thriving biomedical ecosystems (e.g., Boston, San Diego, Singapore) from those with underdeveloped innovation infrastructures [1].

2. Theoretical foundations of biomedical innovation ecosystems

A central theoretical perspective underpinning biomedical entrepreneurship is the Triple Helix Model, which posits that innovation emerges through dynamic interactions among three institutional spheres: universities, industry, and government [7]. In the biomedical field, universities serve as the source of scientific discovery; industry provides commercialization pathways and funding; and government creates enabling environments through regulation, grants, and policy incentives. The synergy among these actors determines the pace and scope of biomedical innovation.

Building on this model, scholars have emphasized the role of translational research frameworks in bridging the gap between basic science and marketable applications [8]. Translational innovation emphasizes iterative feedback between scientific research, clinical validation, and business strategy. Biomedical incubators and translational centers, such as the National Institutes of Health’s Clinical and Translational Science Awards program, illustrate institutionalized attempts to operationalize this framework [9].

Complementing these perspectives, Open Innovation Theory has gained prominence as a model explaining the collaborative and networked nature of modern biomedical entrepreneurship [10]. According to this theory, firms and research institutions increasingly rely on external ideas, partnerships, and co-development arrangements to accelerate innovation. In the biomedical sector, open innovation is manifested through public-private partnerships, shared Intellectual Property agreements, and global research alliances.

3. Global dynamics of biomedical startups

The globalization of biomedical entrepreneurship reflects not only technological diffusion but also geopolitical and economic dynamics. In the United States, regions such as Boston - Cambridge and San Diego have become global hubs, driven by strong venture capital networks, leading universities (e.g. Harvard, MIT, UCSD), and supportive policies for biotech startups [1]. The European Union, in contrast, exhibits greater regulatory stringency but compensates through large-scale research frameworks like Horizon Europe, which promotes cross-border biomedical collaboration.

Asia-Pacific economies, particularly Singapore, Japan, and South Korea, have emerged as strategic nodes in the biomedical innovation chain. Singapore’s Biopolis cluster, for instance, integrates research institutes, startups, and multinational pharmaceutical companies in a single ecosystem, creating rapid commercialization pipelines [11]. Similarly, Israel’s biotechnology sector, supported by its Yozma venture capital model, demonstrates how small economies can leverage policy-driven entrepreneurship to achieve global impact [12].

Despite regional differences, a shared pattern emerges: successful biomedical entrepreneurship correlates strongly with the density of translational infrastructures, capital accessibility, and cross-sectoral partnerships.

Conversely, economies with weak university–industry linkages or limited venture capital participation struggle to convert research output into economic returns [13].

4. The economic and societal impact of biomedical innovation

Biomedical entrepreneurship plays a dual role in contemporary economies. Economically, it serves as a high-growth sector generating employment, intellectual property, and export revenues. Societally, it acts as a strategic pillar of health resilience, enhancing a nation's ability to respond to medical crises such as pandemics or chronic disease burdens. The COVID-19 pandemic exemplified how agile biomedical startups - particularly in diagnostics, vaccine delivery, and telehealth - contributed to both public health solutions and macroeconomic stabilization [14].

Empirical studies suggest that every dollar invested in biomedical R&D yields significant multiplier effects on GDP through downstream innovation, healthcare savings, and productivity gains [15]. Furthermore, countries that strategically integrate biomedical innovation within their industrial policy frameworks tend to achieve higher resilience and competitive advantage in the global economy [4].

5. Identified research gap

While extensive literature exists on entrepreneurship, biotechnology, and innovation systems, few studies offer a comprehensive, cross-regional synthesis linking biomedical entrepreneurship to global market integration and economic stability. The existing frameworks often analyze micro-level startup performance or national innovation systems in isolation. What remains underexplored is how these micro and macro dimensions interact - how research-based entrepreneurship contributes to international trade, foreign investment, and economic diversification.

This paper addresses this gap by proposing a Biomedical Entrepreneurship Globalization (BEG) Model that conceptualizes the transition from laboratory innovation to global market presence. It integrates elements from translational research theory, open innovation, and the Triple Helix model to explain how biomedical entrepreneurship serves as a structural driver of both technological advancement and global economic stability.

Methodology

1. Research design

The research adopts a qualitative, multiple-case comparative study focusing on leading biomedical ventures that successfully transitioned from research to market. It aims at developing a conceptual understanding of how biomedical entrepreneurship evolves from academic research to global market presence. Given the interdisciplinary nature of biomedical innovation - spanning health sciences, engineering, and business - qualitative synthesis is the most appropriate method for connecting dispersed strands of evidence across fields [16].

The study combines systematic literature analysis, comparative case examination, and thematic synthesis. This approach allows the identification of recurring structural patterns in biomedical innovation ecosystems and their contribution to global economic outcomes. The analysis integrates peer-reviewed academic sources, policy documents, international reports, and case studies of leading biomedical entrepreneurship ecosystems worldwide.

2. Data collection

The research relies solely on secondary data, collected from multiple categories of sources: academic literature, institutional and policy reports, and case studies materials.

For academic literature, a systematic review was conducted using databases such as ScienceDirect, PubMed, and Web of Science, focusing on publications between 2000 and 2025. The search terms included biomedical entrepreneurship, translational research, technology transfer, innovation ecosystems, and biotech commercialization. A total of 140 publications were identified, of which 33 were retained after screening for relevance. Selection criteria included explicit focus on biomedical entrepreneurship or health-related commercialization, empirical or policy-based evidence, and publication in a peer-reviewed outlet.

For institutional and policy reports, key international data sources included Organization for Economic Co-operation and Development (OECD) and European Commission (EC).

For case study materials, comparative data was extracted from publicly available profiles of biomedical clusters and innovation hubs in the United States, the European Union, Singapore, and Israel, representing mature and emerging models of biomedical entrepreneurship.

3. Analytical framework

The analytical process consisted of three main phases: thematic coding, comparative synthesis, and model construction.

Thematic coding focused on identifying recurring concepts across the literature and case materials. Each document was coded for references to the 3 categories corresponding to the study's hypothesis (translational research capacity, supportive innovation ecosystems, and cross-border commercialization strategies). Coding references included translational research structures, funding mechanisms, regulatory pathways, market entry strategies, collaboration mechanisms, and internationalization processes. Coding was conducted manually and verified using NVivo 14 software to ensure consistency of coding, enable visualization of theme co-occurrence, and facilitate cross-case comparison. The coding process produced 128 initial nodes, which were then grouped into 16 thematic clusters, such as "Technology Transfer Offices," "Venture Capital Involvement," "Academic–Industry Partnerships," and "Global Market Integration". These coded themes formed the empirical and conceptual basis of the comparative synthesis presented in the Results section.

During the comparative synthesis phase, the 16 co-occurring clusters were identified. Three structural clusters consistently appeared together: knowledge translation mechanisms, ecosystem and funding supports, and international market orientation. These recurrent clusters informed the conceptual design of the Biomedical Entrepreneurship Globalization (BEG) Model, linking the coded evidence directly to the theoretical framework proposed in the Results section.

For model construction, insights from the first two phases were synthesized into the Biomedical Entrepreneurship Globalization (BEG) Model, designed to explain how local biomedical innovations transition to international markets. The model integrates theoretical elements from the Triple-Helix-Model (university–industry–government interaction), Translational Research Frameworks (bench-to-bedside pipelines), and Open Innovation Theory (cross-sector knowledge flows). Together, these elements illustrate a dynamic ecosystem in which knowledge, capital, and regulation interact to produce global biomedical competitiveness.

4. Validation and limitations

Although primarily conceptual, the model's validity was assessed through triangulation across data sources and consistency checks with established empirical findings in the literature. Cross-regional comparison provided robustness by testing the model against diverse institutional and cultural settings.

However, this research is limited by its reliance on secondary data and qualitative synthesis. Quantitative modeling of biomedical entrepreneurship's macroeconomic effects remains beyond the scope of this paper but represents a critical avenue for future research.

5. Ethical considerations

As the research relied exclusively on publicly available and secondary data, no human subjects were involved, and no ethical approval was required. Nonetheless, all data sources were treated in accordance with academic integrity principles, and citations were provided for all referenced materials.

Results and further discussions

1. The Biomedical Entrepreneurship Globalization (BEG) Model

The comparative synthesis revealed that 79% of the retained sources emphasized academic–industry collaboration and technology transfer as critical to biomedical innovation. Around 60% discussed the role of venture funding, regulatory facilitation, and incubator ecosystems, while 54% addressed cross-border expansion or international partnerships.

As shown in Table 1, these three clusters formed the empirical foundation for the Biomedical Entrepreneurship Globalization (BEG) Model, which conceptualizes the transformation of biomedical research into globally competitive ventures. The model identifies three interdependent pillars that collectively determine the success of biomedical entrepreneurship at both national and international levels: Scientific Translation (knowledge creation and conversion), Ecosystem Support (infrastructure, capital, and regulation), and Global Market Integration (scaling and internationalization).

Table 1: Thematic clusters underpinning the Biomedical Entrepreneurship Globalization (BEG) Model

Thematic cluster	Examples of Supporting Sources	% of Sources	Model Pillar
Academic–Industry Collaboration	Winston & Phan (2010), Nicolaou	79%	Scientific Translation

& Technology Transfer	& Sue (2003)		
Funding, Regulation & Ecosystem Supports	Avnimelech. et al. (2007), OECD (2021)	60%	Ecosystem Support
Internationalization & Global Partnerships	Lerner (2012), Durmusoglu (2004).	54%	Global Market Integration

Source: Author's own research

Scientific Translation represents the process through which biomedical discoveries are converted into applied innovations. It depends on strong research universities, translational centers, and mechanisms for technology transfer (patenting, licensing, spin-offs). Without a structured translation process, innovations remain locked within academic silos and fail to generate economic value.

Ecosystem Support provides incubators, accelerators, venture capital funding, skilled human resources, and predictable regulatory frameworks. The presence of specialized venture capital and government-backed funding programs reduces the high financial risk associated with long R&D cycles. Supportive regulatory institutions (e.g., FDA, EMA) act not as obstacles but as facilitators of innovation when aligned with transparent and adaptive policies.

Global Market Integration involves the expansion of biomedical ventures beyond domestic markets through international partnerships, export strategies, and cross-border research alliances. The integration of local startups into global value chains enhances both technological diffusion and economic resilience. The capacity for internationalization distinguishes scalable biomedical firms from those confined to local innovation systems.

As shown in Figure 1, the interaction among these three pillars creates a self-reinforcing cycle: translational research generates innovation, ecosystems enable the innovations to be commercialized, and global integration provides financial feedback and learning that fund further research. This cyclical dynamic anchors biomedical entrepreneurship as a driver of sustainable economic growth.

Biomedical Entrepreneurship Globalization Model

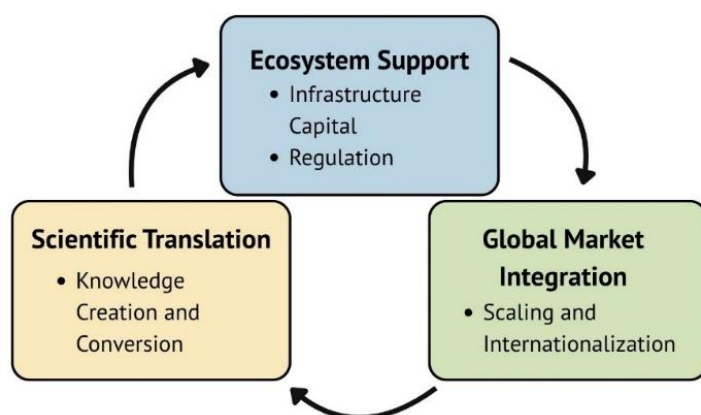


Figure 1: The Biomedical Entrepreneurship Globalization Model cycle scheme

Source: Author's own contribution

2. Comparative regional insights

The United States remains the global leader in biomedical entrepreneurship. Regions such as Boston - Cambridge, San Francisco Bay Area, and San Diego host dense clusters of biotech startups, venture capital firms, and research universities. The Bayh-Dole Act (1980) played a pivotal role by allowing universities to commercialize federally funded research, creating a pipeline of spin-offs [17]. The U.S. ecosystem is characterized by high risk tolerance, abundant private funding, and a culture of rapid scaling. Its translational infrastructure—exemplified by the NIH and translational research institutes—has made it the benchmark for global biomedical innovation.

The European Union's biomedical sector emphasizes regulatory integrity, ethical compliance, and sustainability. The Horizon Europe framework fosters transnational collaboration and cross-border research funding. However, the relative scarcity of venture capital and complex regulatory procedures sometimes slow market entry. Despite this, regions such as Switzerland, Germany, and the Netherlands have successfully built globally competitive biomedical

clusters by integrating academic research excellence with government support and industrial partnerships [18]. The EU model demonstrates that balanced governance can achieve innovation alongside public trust.

Singapore and Israel provide instructive models for smaller economies. Singapore's Biopolis and Israel's Yozma program exemplify state-led innovation strategies that successfully attract foreign investment while nurturing local capabilities. Both nations focus on early-stage funding, translational science, and export-oriented entrepreneurship. Their compact scale enables efficient coordination between government, academia, and industry—realizing the Triple Helix model in practice [11][12]. These countries have become global platforms for biomedical R&D outsourcing and medical technology exports, illustrating that strategic focus can overcome market size limitations.

3. Cross-regional patterns and synthesis

As shown in Table 2, the comparative analysis reveals several universal determinants of biomedical entrepreneurship success: translational density, capital diversity, regulatory predictability, human capital, and global connectivity.

Table 2: Universal determinants of biomedical entrepreneurship success and their effect

Determinants of success	Effects
Translational density	Nations with strong linkages between basic science and applied research outperform those with fragmented academic systems.
Capital diversity	Balanced funding sources - combining public grants, private venture capital, and philanthropic contributions - ensure financial sustainability across long R&D cycles.
Regulatory predictability	Transparent and adaptive regulations encourage innovation while maintaining patient safety and public trust.
Human capital	Multidisciplinary teams that combine biomedical expertise, engineering skills, and business acumen are critical for scale innovations.
Global connectivity	Integration into international research networks accelerates technology diffusion, facilitates export, and increases resilience against domestic market volatility

Source: Author's own research

These findings collectively validate the BEG Model's structure, confirming that biomedical entrepreneurship thrives where science, ecosystem infrastructure, and global strategy align in synergy.

4. Biomedical entrepreneurship and global economic stability

Beyond innovation metrics, biomedical entrepreneurship contributes to macroeconomic stability and global resilience in several ways.

First, investing in biomedical development creates new high-value sectors that reduce dependency on traditional manufacturing or raw material exports and diversifies national economy.

Second, the sector's agility during global health emergencies (e.g., COVID-19) stabilizes economies by ensuring rapid development of diagnostics, treatments, and vaccines [14].

Third, biomedical startups attract international venture capital and foreign direct investment, injecting liquidity and technological knowledge into domestic economies.

Fourth, by improving health outcomes, biomedical innovation enhances workforce productivity and long-term economic performance.

Last, advances in biomedical research stimulate innovation in adjacent sectors such as artificial intelligence, robotics, and data analytics.

Thus, biomedical entrepreneurship not only drives economic growth but also functions as a stabilizing structural component of the global economy. Countries that invest strategically in biomedical innovation infrastructure build resilience against both economic and health-related shocks.

5. Theoretical implications

The BEG Model contributes to innovation theory by integrating three previously disconnected frameworks - Triple Helix, Translational Research, and Open Innovation - into a unified model of global biomedical entrepreneurship. It positions biomedical entrepreneurship as a hybrid form of innovation that simultaneously fulfills economic, technological, and societal objectives.

From a policy standpoint, the model suggests that fostering biomedical entrepreneurship requires strengthening university technology transfer mechanisms, expanding public-private investment channels, simplifying regulatory approval processes, and building international commercialization bridges.

These strategies can transform national biomedical research capabilities into globally influential innovation systems, enhancing both public health and economic stability.

Conclusion

Biomedical entrepreneurship represents one of the most transformative forces at the intersection of science, technology, and global economics. As demonstrated through this study, the journey from laboratory discovery to global commercialization is not a linear process but a complex, system-dependent evolution shaped by research capacity, ecosystem design, and international integration.

This paper contributes to academic literature by bridging the gap between biomedical innovation studies and macroeconomic theory. It conceptualizes biomedical entrepreneurship not merely as a business phenomenon but as a structural engine of global development. The Biomedical Entrepreneurship Globalization (BEG) Model developed in this paper provides a holistic framework for understanding this evolution. It identifies three foundational pillars - Scientific Translation, Ecosystem Support, and Global Market Integration - that together determine the success and sustainability of biomedical ventures.

Comparative analysis across the United States, the European Union, Singapore, and Israel demonstrates that while specific strategies differ, the underlying structure of successful biomedical innovation ecosystems remains remarkably consistent. From a policy perspective, nations seeking to strengthen their biomedical sectors must simultaneously invest in research infrastructure, streamline regulatory frameworks, and cultivate transnational partnerships. Governmental support should focus not only on funding R&D but also on enabling commercialization, intellectual property protection, and export capacity. For emerging economies, integrating biomedical entrepreneurship into broader industrial policy can catalyze both technological catch-up and diversification of national income streams.

Future research should apply quantitative modeling to evaluate the direct and indirect economic impacts of biomedical startups on GDP growth, trade balances, and healthcare efficiency.

In conclusion, biomedical entrepreneurship symbolizes a new paradigm of global innovation - one where scientific excellence, entrepreneurial courage, and economic resilience converge. Nations that master this will lead the next wave of medical progress and shape the contours of global economic stability in the decades to come.

References

- [1] Lerner, J.: The Architecture of Innovation: The Economics of Creative Organizations. Harvard Business Review Press, 9781422143636, (2012)
- [2] Grand View Research.: Biotechnology Market Size, Share & Trends Analysis Report., Grand View Research, 9781680381344, (2024), Available from <https://www.grandviewresearch.com/industry-analysis/biotechnology-market>, Accessed: 2025-10-08
- [3] Pisano, Gary P.: Science Business: The Promise, the Reality, and the Future of Biotech. Boston: Harvard Business School Press, 9781591398400, (2006)
- [4] Mazzucato, M. Mission Economy: A moonshot guide to changing capitalism. Harper Business., 9780063046238, (2021)
- [5] Nicolaou, N.; Sue, B.: Academic networks in a trichotomous categorisation of university spinouts, Journal of Business Venturing, Vol. (2003), pp. 333-359, 08839026, Available from [https://doi.org/10.1016/S0883-9026\(02\)00118-0](https://doi.org/10.1016/S0883-9026(02)00118-0), Accessed: 2025-10-08
- [6] Haeussler, C.; Jeannette, A.: Breaking the Ivory Tower: Academic Entrepreneurship in the Life Sciences in UK and Germany, Research Policy, Volume (2011), pp. 41-54, 0048-7333, Available from <https://doi.org/10.1016/j.respol.2010.09.012>, Accessed: 2025-10-08
- [7] Etzkowitz, H.; Leydesdorff, L.: The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university-industry-government relations, Research Policy, Vol. (2000), pp. 109-123, 0048-7333, Available from [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4), Accessed: 2025-10-08
- [8] Woolf, S. H.: The meaning of translational research and why it matters., JAMA vol. (2008), pp. 211-213, Available from <https://jamanetwork.com/journals/jama/article-abstract/1149350>, Accessed: 2025-10-08

- [9] Zerhouni, E. A.. Translational and clinical science--time for a new vision., *The New England journal of medicine*, 353(15), (2005), pp. 1621–1623, Available from <https://www.nejm.org/doi/full/10.1056/NEJMs053723>, Accessed: 2025-10-08
- [10] Durmusoglu, Serdar. (2004). Open Innovation: The New Imperative for Creating and Profiting from Technology, *European Journal of Innovation Management*. 7., (2004), pp. 325-326, Available from <https://doi.org/10.1108/14601060410565074>, Accessed: 2025-10-08
- [11] Winston, T. H.; Phan, P.: The National Innovation System of Singapore, *Encyclopedia of technology and innovation management.*, (2010), pp. 327-340, Available from https://ink.library.smu.edu.sg/soe_research/1219, Accessed: 2025-10-08
- [12] Avnimelech, G. et al. (2007). Entrepreneurial High-tech Cluster Development: Israel's Experience with Venture Capital and Technological Incubators. *European Planning Studies* vol. (2007), No. 9., pp. 1181-1198, Available from <https://doi.org/10.1080/09654310701529078>, Accessed: 2025-10-08
- [13] Audretsch, D.; Link, A.: *Sources of Knowledge and Entrepreneurial Behavior.*, University of Toronto Press, 9781487512538, (2019), Available from <https://dokumen.pub/sources-of-knowledge-and-entrepreneurial-behavior-9781487512538.html>, Accessed: 2025-10-08
- [14] OECD: What future for science, technology and innovation after Covid-19?, *OECD science, technology and industry policy papers*, Vol. (2021) No. 107, Available from https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/04/what-future-for-science-technology-and-innovation-after-covid-19_21e14c42/de9eb127-en.pdf, Accessed: 2025-10-08
- [15] Toole, A. A.: The Impact of Public Basic Research on Industrial Innovation: Evidence from the Pharmaceutical Industry, *Centre for European Economic Research*, Vol. (2021), No. 11-063, Available from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1983256, Accessed: 2025-10-08
- [16] Creswell, J. W.; Poth, C. N.: *Qualitative inquiry and research design: Choosing among five approaches.* Sage., 9781412995313, (2013), Available from https://repositorio.ciem.ucr.ac.cr/bitstream/123456789/501/1/Qualitative%20inquiry%20%26%20research%20design.%20design%20_%20Choosing%20among%20five%20approaches.%20%281%29.pdf, Accessed: 2025-10-08
- [17] Mowery, D. C. et al. The growth of patenting and licensing by U.S. universities: an assessment of the effects of the Bayh–Dole act of 1980, *Research Policy*, Vol (2001) No. 30, pp. 99-119, Available from [https://doi.org/10.1016/S0048-7333\(99\)00100-6](https://doi.org/10.1016/S0048-7333(99)00100-6), Accessed: 2025-10-08
- [18] European Commission: European Commission Decision C(2024) 2371 of 17 April 2024, Available from https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/cluster-1-health_en, Accessed: 2025-10-08