INNOVATIVE DEVELOPMENT: GLOBAL LESSONS AND NATIONAL PRIORITIES

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Abstract: *In the context of globalization and rapid digital transformation, innovative development has become a decisive factor shaping the competitiveness and sustainable growth of national economies. Countries that successfully integrate innovation into their strategic management frameworks are able to maintain resilience, attract investment, and ensure long-term economic progress. However, many developing economies still face serious challenges that limit their innovative potential.*

The purpose of this article is to identify the main issues of innovative development and to analyze possible directions for strengthening strategic management of the economy through the adoption of international best practices. The research highlights a number of persistent problems, including insufficient investment in research and development (R&D), weak cooperation between science and business, institutional barriers, and the outflow of qualified human capital. These issues create a gap between innovative potential and actual performance, slowing down the pace of transformation.

The methodological basis of the study is a comparative analysis of international experiences, focusing on the cases of South Korea, Israel, and Estonia, which have achieved remarkable results in fostering innovation-oriented growth. Their models demonstrate how state policy, private sector initiatives, and academic research can be effectively combined within a unified strategy.

The results of the study show that for countries such as Armenia, integrating innovation policy with strategies of digital transformation and green growth is essential for achieving sustainable competitiveness. The findings suggest that national priorities should be reoriented toward creating favorable conditions for R&D investment, strengthening innovation ecosystems, and enhancing strategic coordination between key stakeholders.

Keywords: *innovation, strategic management, competitiveness, digital transformation, sustainable growth, science–business cooperation, national economy*

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Introduction

In the context of globalization and rapid digital transformation, innovative development has become a fundamental driver of economic growth and national competitiveness. Innovation

is no longer a matter of choice but a necessity for ensuring resilience, attracting investment, and improving the quality of life. Under these conditions, strategic management of the economy goes beyond traditional planning and resource allocation. It increasingly involves building institutional and structural frameworks that stimulate innovation and foster sustainable development.

Despite the growing importance of innovation, many developing economies, including Armenia and other post-Soviet states, continue to face significant challenges. The most pressing problems include:

- insufficient investment in research and development (R&D);
- weak cooperation between science, business, and government institutions;
- outflow of qualified human capital (brain drain);
- institutional inefficiencies and low effectiveness of strategic management mechanisms;
- limited adoption of digital and green technologies across key sectors of the economy.

These challenges create a substantial gap between innovative potential and its actual realization, slowing down the pace of transformation.

The purpose of this study is to identify the key issues hindering innovative development in Armenia and to outline possible directions for improving strategic economic management by integrating international experience with national priorities.

Literature Review

The relevance of this research lies in the urgent need to embed innovation policy into the broader framework of digital transformation and sustainable growth. The methodological approach is based on a comparative analysis of international practices, focusing on their applicability to developing economies, with a particular emphasis on Armenia. This allows the study to draw not only global lessons but also national priorities for designing an effective innovation strategy.

The issues of innovative development and strategic management of the economy have been the subject of significant academic debate for decades. The roots of the discussion can be traced back to Joseph Schumpeter [1], who conceptualized innovation as the "engine of economic development," emphasizing the role of entrepreneurship and creative destruction in driving economic dynamics. His ideas were further developed in the framework of evolutionary economics by Richard Nelson and Sidney Winter [2], who analyzed technological change as a path-dependent process, shaped by routines and institutional environments.

The role of innovation in shaping national competitiveness was systematized by Michael Porter [3] in The Competitive Advantage of Nations, where he highlighted clusters and innovation-driven strategies as critical factors for long-term success. Later, David Teece introduced the concept of dynamic capabilities, stressing the ability of organizations and economies to adapt and reconfigure resources in rapidly changing environments [4].

Contemporary scholars continue to focus on the relationship between innovation, strategic management, and sustainable development. Manuel Castells examined the rise of the network society and the transformative role of digital technologies. Martin Hilbert analyzed the digital divide as a dynamic phenomenon, underlining its impact on growth in developing countries [5]. Reports by the OECD and the World Bank highlight the necessity of integrating digital transformation and green growth policies to sustain competitiveness in a globalized economy [6][7].

In terms of practical lessons, countries such as South Korea, Israel, and Estonia are often cited as benchmarks of successful innovation-oriented strategies. Studies by Katz & Koutroumpis show how investment in digital infrastructure can foster inclusive growth and innovation ecosystems, while Mothobi & Grzybowski provide evidence from Africa on how infrastructure investment promotes digital service adoption [8][9].

For Armenia, recent international policy reviews reinforce the urgency to align national priorities with global innovation trends. The UNECE Innovation for Sustainable Development Review: Armenia maps the governance and ecosystem gaps and offers concrete recommendations [10]; the OECD report on the digital transformation of Armenian businesses focuses on SME digitalization levers and constraints [2]; WIPO's Global Innovation Index profiles Armenia's strengths and weaknesses across inputs/outputs [12]; and Armstat/SDG indicator 9.5.1 reports official metrics on R&D expenditure relative to GDP.

Thus, the literature reveals a consensus that innovation is a cornerstone of sustainable economic growth, but its successful integration into strategic management depends on addressing structural challenges such as R&D investment, institutional efficiency, and science–business cooperation. These insights form the analytical foundation of the present study, linking global lessons to the national priorities of Armenia and other developing economies.

Methodology

This study applies a mixed-method approach that combines both quantitative and qualitative analysis. The comparative method was used to examine international best practices (Israel, South Korea, Estonia) and assess their applicability to the Armenian context. The analysis relied on data from the *World Bank (2023)*, *Armstat SDG 9.5.1*, and the *WIPO Global Innovation Index (2024)*, as well as policy reports by the *OECD (2024)* and *UNECE (2023)*. This approach made it possible to identify the main barriers to innovation in Armenia (low R&D expenditure, institutional fragmentation, and brain drain) and outline potential strategies for overcoming them. Despite certain limitations, such as the scarcity of national microdata and differences in international methodologies, the chosen research design allowed linking global lessons with national priorities.

In addition, the study introduces a conceptual model that illustrates the relationship between innovation policy and sustainable growth. According to the model, increasing investment in R&D provides the foundation for strengthening the innovation ecosystem, where government, academia, and business cooperate. This ecosystem is then integrated with processes of digital transformation and green growth, generating a multiplier effect. The final outcome is improved national competitiveness, higher positions in international rankings, and sustainable economic development.

Analysis

Innovation is increasingly recognized as a cornerstone of competitiveness and long-term sustainability. Countries that invest systematically in research, technology, and human capital demonstrate not only higher productivity but also stronger resilience to external shocks. For Armenia, the issue of innovation-driven development has become urgent: while the country has inherited strong STEM traditions and benefits from an active diaspora, structural barriers continue to constrain progress. Low investment in R&D, weak science–business cooperation, and persistent emigration of qualified professionals create a situation where available resources are

not fully transformed into sustainable growth. At the same time, examples such as Picsart and Krisp prove that Armenia's talent pool is capable of global success, provided that the right ecosystemic conditions are in place.

This analysis seeks to evaluate Armenia's innovation performance in comparison with both global leaders (Israel, South Korea) and a small but highly successful digital economy (Estonia). The countries were chosen deliberately: Israel demonstrates the power of state–business–venture collaboration; South Korea illustrates the effectiveness of massive state-led investment in technology; and Estonia provides evidence that even small states with limited resources can achieve global recognition through institutional reforms and digital governance. Armenia's current position, its strengths and weaknesses, as well as potential pathways for reform, will be assessed through quantitative and qualitative indicators.

Table 1

R&D Expenditure and Global Innovation Index (2023–2024), [13][14]

Country	R&D Expenditure (% of GDP, 2022)	GII Rank (2024)
Israel	5.4	3
South Korea	4.9	6
OECD Average	2.7	–
Estonia	1.8	16
Armenia	0.24	63

Armenia's expenditure on R&D stands at just 0.24% of GDP, more than 10 times lower than the OECD average and almost 20 times below Israel's level. This chronic underfunding explains Armenia's weak position in the Global Innovation Index (77th place in 2024). In contrast, Israel and South Korea have built innovation-oriented economies through consistent and large-scale investments. Estonia, despite its small size, allocates 1.8% of GDP to R&D, which, combined with institutional reforms, secures its place among the world's top 20 innovators.

Table 2

Armenia – Strengths and Barriers in Innovation, [15][16]

Dimension	Strengths	Barriers
Human capital	Strong STEM base, diaspora networks	Brain drain (~35% STEM graduates emigrate)
Innovation inputs	Emerging digital startups	Low R&D spending (0.24% GDP)
Governance & institutions	Innovation included in SDGs	Fragmented policy, weak coordination
Business sector	SMEs open to digital adoption	Limited finance, weak science–business links
Sustainability agenda	Potential in green energy & construction	Lack of funding and incentives

The dual nature of Armenia's innovation system is evident. On one side, the country benefits from solid foundations: highly skilled professionals, strong academic traditions, a globally dispersed but engaged diaspora, and the presence of digital startups. On the other side, systemic

weaknesses undermine these advantages. Emigration of skilled graduates reduces the available talent pool, while low R&D spending and weak institutional coordination prevent research results from being commercialized.

Table 3.

Researchers and Patents per Million Inhabitants (2022), [14]

Country	Researchers per 1M people	Patents per 1M people
Israel	8,250	1,200
South Korea	7,980	1,100
Estonia	4,100	220
Armenia	1,250	25

Quantitative indicators of human capital and patent activity highlight Armenia's weak position. With only 1,250 researchers per million inhabitants, the country has a research density far below even small economies like Estonia (4,100). Patent activity is alarmingly low: just 25 patents per million people, compared to over 1,000 in Israel and South Korea. These figures suggest two key problems: the research base is too small to generate the necessary scale of innovation, and existing research does not translate effectively into applied technologies due to weak intellectual property protection and low commercialization.
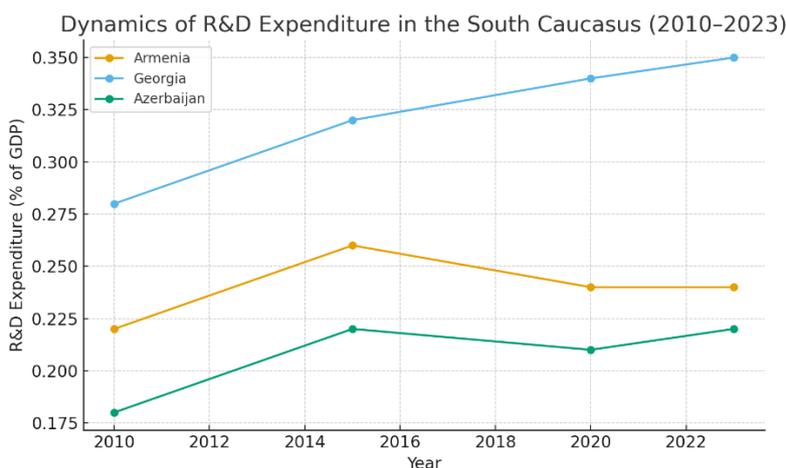

Figure 1. Dynamics of R&D Expenditure in the South Caucasus (% of GDP, 2010–2023)

The regional comparison reveals Armenia's stagnation (Figure 1). Over more than a decade, Armenia's R&D expenditure has hovered between 0.22–0.26% of GDP, showing no significant upward trend. Georgia, however, has gradually increased its investments, reaching 0.35% in 2023. Azerbaijan maintained stability around 0.22%, but even in this context Armenia risks falling behind, as its indicators show no dynamic growth. This stagnation reduces Armenia's ability to compete regionally and erodes its potential attractiveness for international investors.

Conceptual Model: Pathway for Armenia's Innovation-Driven Growth

In this study, the conceptual model is presented not as a mathematical formula but as an analytical framework that highlights the causal relationships between resources, processes, and outcomes in Armenia's innovation system. Its role is to explain the logic of transformation: how increased R&D spending and institutional reforms can be converted into higher competitiveness and sustainable economic growth. The model provides three main benefits:

- It offers a step-by-step roadmap for policymakers to prioritize actions.

- It links inputs (resources) with outputs (results), showing why partial reforms without adequate funding or coordination are ineffective.
- It aligns national priorities with global megatrends, ensuring that Armenia's innovation policy is relevant in the international context.

Thus, the model is not only a theoretical construct but also a practical tool for designing policy measures that can enhance Armenia's innovation capacity.
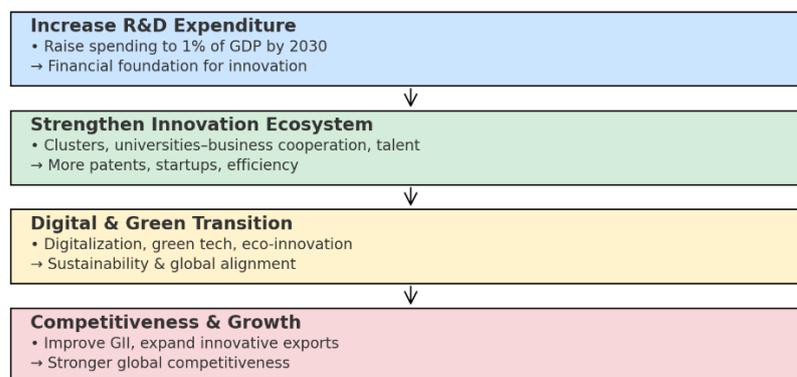

Increase R&D Expenditure
• Raise spending to 1% of GDP by 2030
→ Financial foundation for innovation

Strengthen Innovation Ecosystem
• Clusters, universities–business cooperation, talent
→ More patents, startups, efficiency

Digital & Green Transition
• Digitalization, green tech, eco-innovation
→ Sustainability & global alignment

Competitiveness & Growth
• Improve GII, expand innovative exports
→ Stronger global competitiveness

Figure 2: Conceptual Model of Armenia's Innovation-Driven Growth[4]

The model demonstrates that Armenia's current innovation stagnation is the result of insufficient investment and institutional inefficiencies. The **first step** emphasizes financial commitment: without reaching at least 1% of GDP in R&D expenditure, the country cannot expect a breakthrough. The **second step** highlights the ecosystem dimension — clusters and science–business collaboration are essential to convert research into economic outcomes. The **third step** underscores the need for alignment with international priorities, as competitiveness today depends on digitalization and sustainability. Finally, the **fourth step** projects the desired outcomes: higher positions in the *Global Innovation Index*, a stronger export base of innovative products, and greater economic resilience.

Explanation of the Conceptual Model

1. **Increase R&D Expenditure to 1% of GDP by 2030.**
   Financial resources form the foundation of the innovation system. Armenia's current spending is critically low; scaling it up is necessary to fund laboratories, support researchers, and attract international projects.

2. **Strengthen the Innovation Ecosystem.**
   Investment alone cannot produce innovation without supportive structures. Clusters that unite universities, businesses, and startups can accelerate knowledge transfer. Policies must also address brain drain by creating incentives for skilled professionals to stay in or return to Armenia.

3. **Integrate with Digital Transformation and Green Growth.** Global economic dynamics are shaped by digitalization and sustainability. Armenia must embed innovation into these

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[4] Composed by the authors.

megatrends by promoting e-government, SME digitalization, and renewable energy solutions. This ensures long-term relevance and competitiveness.

4. **Achieve Higher Competitiveness and Sustainable Growth.** The ultimate effect of the model is systemic: a stronger position in the Global Innovation Index, increased exports of high-tech goods, and overall resilience of the national economy. Armenia's progress will be measured not only by internal reforms but also by its ability to compete globally.

The analysis confirms that Armenia's innovation system is characterized by chronic underfunding, weak institutions, and high levels of emigration, yet it also has significant untapped potential in STEM education, diaspora engagement, digital startups, and green development. Comparative lessons from Israel, South Korea, and Estonia demonstrate that different models of innovation policy can succeed if properly adapted to national contexts. For Armenia, the key priorities should be to scale up R&D funding, reform governance, and integrate innovation policy with digitalization and sustainability strategies. Without these changes, Armenia risks remaining on the periphery of global innovation; with them, it has the potential to transform into a competitive and resilient economy.

Conclusion

The conducted study has demonstrated that Armenia's innovation system is characterized by structural weaknesses such as chronic underfunding of R&D, weak institutional capacity, and continuous emigration of highly skilled professionals. At the same time, the country possesses significant untapped potential, rooted in its STEM traditions, diaspora engagement, digital startups, and opportunities for green development. Comparative analysis of Israel, South Korea, and Estonia proves that different models of innovation policy (venture-driven, state-led, or digitally focused) can all succeed when properly adapted to national conditions. Based on the findings, the study proposes a set of priority measures to strengthen Armenia's innovation-driven growth:

- Increase and Stabilize R&D Financing
  - Raise R&D expenditure to at least 1% of GDP by 2030, ensuring predictable, multiyear funding for scientific research, applied development, and high-tech commercialization.
  - Introduce diversified financing mechanisms through the Ministry of Finance, Ministry of High-Tech Industry, Science Committee, and state development funds (e.g., The Enterprise Armenia Investment Fund).
  - Expand competitive grants, innovation vouchers, and co-funding schemes for universities and firms.
  - Potential risk: limited fiscal resources and macroeconomic volatility may hinder sustained funding, while inefficient allocation could reduce impact.
- Strengthen the National Innovation Ecosystem
  - Develop sector-specific innovation clusters (ICT, biotechnology, engineering, creative industries) supported by the Ministry of Economy and regional development programs.
  - Incentivize science–business cooperation, including joint laboratories, technology transfer offices, and intellectual-property support mechanisms.

- Implement policies to retain and attract talent, such as career-development grants, post-doctoral programs, diaspora scientist engagement schemes, and startup-friendly migration policies.
- Potential risk: persistent brain drains, limited institutional coordination, and weak commercialization channels may undermine ecosystem efficiency.
- Integrate Innovation with Digital Transformation and Green Growth
  - Support digitalization of public and private sectors, promote the adoption of AI, big data, cybersecurity, and automation solutions, and expand e-governance platforms.
  - Encourage green technologies through incentives managed by the Ministry of Environment, including renewable-energy innovation, circular-economy solutions, and climate-tech startups.
  - Align national strategies with global innovation megatrends to enhance competitiveness, sustainability, and resilience.
  - Potential risk: insufficient regulatory frameworks for emerging technologies, slow adoption by traditional sectors, and limited green-finance instruments.

In conclusion, Armenia is at a crossroads: maintaining the current trajectory of stagnation or undertaking comprehensive reforms. The proposed conceptual model offers a realistic roadmap for transforming Armenia into a competitive and resilient innovation-driven economy.

Conflict of Interest

Funding Statement

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