Uzbekistan's Path to Knowledge-Driven Economic Growth

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Abstract: This article presents a comprehensive review of research exploring the intricate interplay between science, innovation, and the economic advancement of a state. It underscores the imperative for state backing and investment in fundamental scientific research and development, as substantiated by an analysis of the prevailing landscape. Drawing upon these insights, the article advocates for enhancements in the state's scientific and technological policy. By aligning with the findings, it proposes strategies to bolster the efficacy of such policies. Through this, it aims to foster an environment conducive to sustained scientific progress and technological innovation, ultimately driving economic growth and prosperity.

1 INTRODUCTION

Trends in the development of the global economy show that science and innovation have long become the most effective productive forces ensuring the competitiveness of the state. The factor that increases the ability to generate new value and competitiveness of the economy is its knowledge intensity. As many researchers characterize the general line of evolution of the world economy: "At first there was an economy based on physical labor and agriculture. It was replaced by an industrial economy based on the use of natural resources. The latter is gradually being replaced by a knowledge-based economy" (Kabanov et al 2012). Back at the beginning of the new millennium, the participants of the regular meeting of the European Council held in Lisbon on March 23-24, 2000 recognized a qualitative leap in the global economy, the source of which is globalization and the transition to knowledge-based economic activity. This definition was recognized at the Lisbon Summit of the European Union as a strategic priority for both developed and developing countries. The Recommendations on the Collection and Analysis of Innovation Data (The Oslo Manual, 3rd ed.) state: "The expression "knowledge-based economy" is intended to emphasize the movement of developed countries towards a greater reliance on knowledge, information and high qualifications, as well as the growing need for direct access to all this from the sides of the state and business" (item 71 of Chapter 2 "Theory of innovation and the need for measurements"). Paragraph 72 states that the study of innovation processes and policy discussions have shown the importance of studying innovation from a broad perspective. The UNESCO World Report "Towards Knowledge Societies" for 2005 states: "Today it is generally recognized that knowledge has become a subject of colossal economic, political and cultural interests so much that it can serve to determine the qualitative state of society, the contours of which are just beginning to loom before us". The relationship of science and research with economic growth has been considered by many researchers, such as Bautin et al 2014, Zavarukhin et al 2023, Petrenko et al 2007, Kabanov et al 2012, Kaneva et al 2017, Kadyrova et al 2021, Makarova et al 2022, Moldabekova et al. 2020. In their work, they have shown that there is a close correlation between investments in science, research and education and economic growth. The size of the knowledge-intensive sector and the scale of the use of high technologies characterize the scientific, technical and economic potential of the country, determine the share of high-value-added products in the country's GDP. Thus, it can be concluded that innovation is a decisive factor in economic growth.

2 RESEARCH METHODOLOGY

In the preparation of this article, methods of analysis, synthesis, qualitative comparison, and statistical analysis were used. Data collection and analysis were

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carried out using a systematic approach, which takes into account all elements of the system being studied and their interrelations. The paper draws on theoretical research conducted by foreign researchers. It also analyzes materials from domestic and international news sites, newspapers, and business blog reviews. Methods such as logical analysis and the identification of causal relationships between factors are employed.

3 RESULT AND ANALYSIS

The concept adopted in 2020 for the development of science in the Republic of Uzbekistan until 2030 has defined the main directions for the development of this sphere in the medium and long term, which is based on a plan for the phased development of science according to such indicators as:

- increase in funds allocated to science in relation to GDP with balanced participation of the public and private sectors (from 0.2 to 2% of GDP); Creating the necessary conditions for attracting private capital to R&D;
- training of highly qualified scientific and engineering personnel and their stimulation to research activities;
- bringing the average age of scientists to 39 years due to the greater involvement of young specialists in science and increasing the number of young scientific specialists of the highest category from 11 to 30% of the total number of applicants under the age of 39;
- increasing the publication and patent activity of domestic scientists in the country and abroad, increasing the share of Uzbekistan in the total number of articles published in international scientific journals indexed in the international scientific database Scopus and Web of Science, from 0.008 to 0.2%;
- functioning of national scientific laboratories, implementation of GSP and GLP standards;
- structural transformations in favor of the production of knowledge-intensive and high-tech products with high added value.

According to the Decree of the President of the Republic of Uzbekistan "On improving the public administration system for the development of scientific and innovative activities" PF-6198 dated April 1, 2021, the Fund for Support of Innovative Development and Innovative Ideas was reorganized into the Scientific Fund for Support of Science and Innovation by joining the Presidential Fund and the Fund for Support of Gifted Youth of the Academy of Youth under the Ministry of Innovative Development.

The main activities of the fund include:

1. Financing the creation and implementation of innovative projects by subjects of innovative activity, on a competitive basis.
2. Financing research, innovation, development, and startup projects, also on a competitive basis.
3. Financing the commercialization of scientific and technical results.
4. Financing measures to equip (additional equip) scientific laboratories with high-tech equipment.
5. Covering the costs of registering and maintaining intellectual property abroad, including patents created within state programs.
6. Payment of expenses to ensure free access to leading electronic databases for research and educational institutions.
7. Preparation for publication of scientific results in international journals.
8. Financing of scientific internships for young scientists in leading foreign research organizations (centres, universities, etc.).

By the end of 2022, 1.79 trillion soms worth of research and development (R&D) projects were carried out in the Republic of Uzbekistan. Although the volume of R&D has increased by almost 4 times compared to 2017, it is still not enough and there is great potential for growth in this area that needs to be explored. It is especially important to find ways to further enhance state support for fundamental research, as this forms the basis for scientific and technological advancement.

In 2023, 1.8 trillion soums were allocated for science and innovation, and the allocated funds were used to create a scientific and theoretical basis in energy, agriculture, geology, and construction. It should be noted that the salaries of scientists have increased by almost fivefold in recent years. According to the Ministry of Higher Education, Science, and Innovation, in January-November 2022, 511.9 billion soums were allocated for 929 scientific projects under state programs. Applied initiatives were mainly funded (63%), followed by innovative projects (15%), and fundamental research (11%). Tashkent, the Tashkent Region, and Karakalpakstan

Table 1: Diverse Approaches in Scientific Work: Classifying R&D Projects.

Indicators	2017	2018	2019	2020	2021	2022
The volume of completed research and development projects, million soums	449905.4	680038	853404.4	992029.1	1069676.5	1788300.9
scientific research works	300254.5	336482.5	535208.9	663152.8	744693.2	1379718.3
of them fundamental	82276.3	89254.2	162804	178052.6	233194.6	224 896.6
design and technological	36888.4	38714	97641.2	74346.7	85624.4	186 437.3
production of prototypes, batches, products (products)	4025.6	7677.9	6318.8	3975.8	5071.9	7524.5
design work for construction	31166	77687.2	54628.9	68252.7	90481	105218.6
scientific and technical	77570.9	221205.1	160512.1	182301.1	143806	109402.1

drew the most investment in science over the 11-month period. The worst outcomes were in the Jizzakh, Syrkhandarya, and Khorezm Regions. In 2022, the number of women engaged in scientific research in Uzbekistan reached 12.5 thousand, which is a decrease of 1.9 thousand compared to 2021. According to the State Statistics Committee of the Republic of Uzbekistan, the total expenditures on research and development (R&D) in 2022 increased by 34% compared to the previous year, amounting to 1.4 trillion soums. The cost of maintaining research institutions alone was 628 billion soums, while other expenses, including transfers to the Science Financing and Innovation Support Fund, amounted to 819 billion soums. As can be seen from the data, research and development costs and their effectiveness continue to be a major issue in the development of an innovative economy. It is essential to increase the funding for both basic and applied research and to use the mechanism of public-private partnerships in financing research projects. In Uzbekistan, the share of funding for the scientific field in the country's gross domestic product (GDP) is expected to increase by 6 times by 2025 and by 10 times by 2030. This was announced by President Shavkat Mirziyoyev during a congratulatory speech on the occasion of the 80th anniversary of the founding of the Academy of Sciences. There is an obvious connection between funding science and innovation, and sustainable economic growth. The greater the investment in research and development, the greater the potential for long-term economic growth and a better quality of life for the people.

4 CONCLUSION

Measures to Support and Finance Science and Research in the Context of Innovative Development Measures to support and finance scientific research and innovation can be categorized into several groups:

- Government Funding: Government agencies are key players in supporting scientific research and development (R&D). They can fund R&D through national research programs, grants, and scholarships, as well as by providing grants to academic institutions and industries.
- Private Sector Funding: The private sector can also play a significant role in funding R&D. Companies and individuals can make donations to organizations that conduct research, or they can invest in start-ups that are developing innovative products and services.
- Crowdfunding: Crowdfunding platforms allow individuals and small groups to pool their funds together to support specific projects. This can include funding for research projects, product development, and other innovative initiatives.
- Tax Incentives: Governments may offer tax incentives to encourage investment in R&D, such as reduced tax rates or accelerated depreciation for equipment used in research.
- Public-Private Partnerships: Public-private partnerships can be formed to co-fund innovative projects, with the public sector providing funding and the private sector contributing expertise or resources. These measures can help to create a supportive

environment for scientific innovation and contribute to the development of new technologies and products.

- Private sector funding: The private sector plays an important role in funding scientific research. Corporations and foundations can provide support through grants, research and development contracts, and investment in research institutions.
- International collaboration: International collaboration is an essential tool for supporting scientific research, particularly in areas that require significant investment. Countries can collaborate on international research projects, student and scientist exchange programs, and joint scientific projects.
- Innovation Clusters and Technology Parks: The creation of innovation clusters and technology parks can contribute to the development of science and innovation. These organizations provide scientists and researchers access to specialized services, equipment, and help companies identify new technologies and solutions.
- Infrastructure Development: Developed infrastructure is also crucial for the advancement of science and technology. This includes the establishment of scientific laboratories and research centers, as well as the creation of networks and the provision of access to information.
- Support for Young Scientists and Students: Supporting young scientists and students in the early stages of their career is essential for stimulating innovative development. This could include providing scholarships, grants, and internship and exchange programs.
- Education and Training: Developing the education and training system is another important aspect of promoting science and innovation. Developing skills and competencies in science, technology, and innovation through educational programs, as well as supporting higher education institutions and research organizations, are crucial tools for achieving this goal.
- Creating an Enabling Environment for Innovation: Creating an enabling environment for innovation involves measures such as reducing bureaucratic obstacles, simplifying regulatory processes, and creating a competitive environment that stimulates innovation.

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