

The effectiveness of innovation development reforms in Uzbekistan

Abdulaziz Abduvaliev^a

Abstract. The ongoing large-scale reforms implemented in all areas of the socio-economic, environmental and political spheres of Uzbekistan are directly related to the tasks defined by Sustainable Development Goals (SDGs). One of the key directions in the development of Uzbekistan involves the formation of an innovative economy. The aim of the study discussed in the article is the assessment of the effectiveness of ongoing reforms and the results achieved in the development of an innovative economy in the country. The conducted research is of an empirical character and based on the analysis of official statistics and data provided by a variety of international organisations for the years 2013–2022.

The study analyses the number of enterprises and organisations producing innovative goods and works and providing services of their own in the manufacturing industry, and the number of research specialists (also by specialisation) in Research & Development (R&D). The research shows that some positive results were achieved in this area, although a broader analysis of the innovation sphere reveals a need for more in-depth reforms. Special attention should be devoted to high technology, as the level of its development in the studied period remained the lowest.

Keywords: economy, innovation, research and development, R&D, industry, Sustainable Development Goals

JEL: F60, F63, O38

Skuteczność reform w zakresie rozwoju innowacyjności w Uzbekistanie

Streszczenie. We wszystkich obszarach sfery społeczno-gospodarczej, ochrony środowiska i politycznej Uzbekistanu na szeroką skalę wdrażane są reformy, które wynikają bezpośrednio z zadań określonych przez Cele Zrównoważonego Rozwoju (SDGs). Jeden z kluczowych kierunków rozwoju kraju jest związany z tworzeniem innowacyjnej gospodarki. Celem badania omawianego w artykule jest ocena skuteczności reform w zakresie rozwoju innowacyjnej gospodarki podejmowanych przez rząd Uzbekistanu. W badaniu wykorzystano dane za lata 2013–2022, publikowane przez centralny urząd statystyczny Uzbekistanu oraz udostępniane przez organizację międzynarodowe.

Przeanalizowano zmiany dotyczące liczby przedsiębiorstw i organizacji wytwarzających innowacyjne towary, wykonujących innowacyjne prace oraz świadczących usługi w przemyśle wytwórczym, a także liczbę pracowników naukowych (również według specjalności) zaangażowanych w działalność badawczo-rozwojową (B+R). Badanie pokazuje, że osiągnięto pewne pozytywne wyniki w tym zakresie, choć szersza analiza sfery innowacji ukazuje potrzebę

^a Institute for Advanced Training and Statistical Research under the Statistics Agency of the President of the Republic of Uzbekistan, Uzbekistan. ORCID: <https://orcid.org/0000-0001-8712-1902>.

E-mail: abduvaliev06051981@gmail.com.

przeprowadzenia bardziej dogłębnych reform. Szczególną uwagę należy poświęcić zaawansowanym technologiom, ponieważ ich rozwój w badanym okresie pozostawał na najniższym poziomie.

Słowa kluczowe: gospodarka, innowacje, działalność badawczo-rozwojowa, B+R, przemysł, Cele Zrównoważonego Rozwoju

1. Introduction

The purpose of this article is to analyse the reforms introduced in the process of the formation of an innovative economy, which ultimately cover all spheres of the socio-economic development of Uzbekistan.

Thus, the article analyses the most relevant areas reflecting the development of innovation in the country considering that the implemented reforms are directly based on the tasks defined by the Sustainable Development Goals (SDGs).

The 2023 'Technology and Innovation report' presented during the United Nations Conference on Trade and Development stated that innovations and advanced technologies should contribute to meeting the changing needs of humanity (United Nations [UN], 2023).

Innovation is central to supporting a sustainable and inclusive growth of an economy and is the main facilitator of the transition to a circular economy. By generating and effectively transferring knowledge and technologies, innovation can help reduce inequalities and encourage greater value creation for growth and employment, and overall prosperity (UN, 2022).

In order to prevent various cataclysms, entailing negative socio-economic, political and environmental changes, on 25th September 2015 the UN adopted the Sustainable Development Goals 2030. This document defines 17 goals and outlines 169 tasks within the most important areas for humanity today. All 17 SDGs contain elements of relating to the development of innovation although Goal 9 is specifically dedicated to sustainable infrastructure, industrial development and the promotion of innovation. Goal 9.5.1 refers to the increase in research and development (R&D) spending, while Goal 9.5.2 to the increase in the number of researchers (Dutta et al., 2023).

2. Literature review

The theoretical foundations of the formation and development of innovation and its socio-economic importance have been researched by many scientists worldwide. Based on the study of numerous definitions of innovation, it should be noted that there is no single and generally accepted theoretical definition of the idea. This allows the conclusion that innovation is a multifaceted concept that covers all areas of socio-economic, environmental and humanitarian life.

The author of the concept of innovation in economics was an Austrian and American economist, Schumpeter (1962, pp. 81–85), who defined innovation and invention in his teachings.

Innovation, as defined by Cooke and Mayers (1996), is a full cycle of turning an idea into a finished product before its implementation on the market.

In the process of studying industry and commercialisation of technological processes, Maclaurin (1949) identified the factors influencing the technological development of the industry. Manzoor et al. (2023), describe innovation as the main force of economic well-being and study the internal mechanisms and measures of its impact on well-being.

In their research, Myers and Marquis (1969) divide innovation into several types, e.g.: including fast, slow, declining, stable, growth and changing innovation.

Gramma-Vigouroux et al. (2024) studied the driving forces and barriers in SDGs implementation in the context of national innovation ecosystems (NIEs). According to the authors, at the NIE level, the driving forces for the participants and institutions involved in the process, such as compliance, environmental innovation, intersectoral cooperation and human resources are hindered by certain barriers which include the lack of networking skills, institutional gaps, totalitarian power and academic rigidity.

Tu et al. (2023) attempted to explain how such economic activities as corporate social responsibility, eco-friendly supplier management, internal eco-friendly management and eco-friendly customer management affect reaching SDGs based on the analysis of data concerning seven developing countries. The results of the study showed a positive correlation between the above-mentioned economic activities and the achievement of the SDGs.

Guo et al. (2022), basing their research on the example of a Chinese province (within the framework of the provincial twinning programmes), proved that mutual support between provinces involving the flow of talent, capital and technological achievements is crucial for accelerating the process of poverty reduction. The study led the researchers to the conclusion that if a developed country, a major technological power or a large company supports and trains a less developed state to take full advantage of global public goods through this type of individual assistance programmes, then it could significantly contribute to global sustainable development.

Vatananan-Thesenvitz et al. (2019) used the scientific mapping method to evaluate 1,690 articles on innovations in the context of sustainable development, extracted from journals listed in the Scopus database. This way, the authors identified the size, growth trajectory and geographical distribution of the literature on sustainable development.

The research by Cordova and Celone (2019) reveals the relationship between innovation and SDGs in an industrial environment. SDGs are also analysed in terms of the reactions of the stakeholders involved, companies and citizens. The results of the study indicated companies' growing interest in SDGs.

3. Research method

The object of this study is the reforms carried out in Uzbekistan in the framework of the SDGs. The subject of the study is the trend of the development of innovation in Uzbekistan.

The analysed period covers the years 2013–2022 and the research is based on official and open data extracted from the Statistics Agency of the President of the Republic of Uzbekistan, as well as data from the Global Innovation Index.

The conducted research involves an empirical analysis, statistical analysis and indicators of scientific and innovation development of the Republic of Uzbekistan.

4. Results and discussion

As noted by the President of the Republic of Uzbekistan Shavkat Mirziyoyev (O'zbekiston Milliy axborot agentligi, n.d.): 'We have set ourselves the goal of joining a number of developed countries and will be able to achieve it only by carrying out accelerated reforms based on science, education and innovation.'

Today, reforms are being carried out in Uzbekistan to ensure the completion of the tasks defined by the SDGs, within the framework of which the regulatory, institutional and economic foundations are being developed. The proposal of the President Mirziyoyev, i.e. the resolution 'On strengthening the role of parliament in accelerating the achievement of the Sustainable Development Goals', introduced at the 75th Assembly of the UN (14th December 2022), was particularly important, as within the framework of this resolution, a special roadmap for the years 2023–2024 was adopted in order for Uzbekistan to achieve the set SDGs.

In particular, in order to implement certain SDG tasks, the Cabinet of Ministers of Uzbekistan adopted the Resolution No. 841 of 20th October 2018 'On measures to implement national goals and objectives in the field of sustainable development until 2030', which defined the SDGs-related assignments to be completed by the relevant organisations and ministries.

It is important to note that the foundations of Uzbekistan's innovation development are laid down in such strategic documents as:

- Decree of the President of the Republic of Uzbekistan No. UP-158 of 11th September 2023 'On the Strategy Uzbekistan-2030' (further referred to as 'Uzbekistan-2030' strategy);
- 'Strategy of Actions on five priority areas of development of the Republic of Uzbekistan in 2017–2021' (Decree of the President of the Republic of Uzbekistan No. PF-4947 of 7th February 2017 'On the Strategy of Actions for the further development of the Republic of Uzbekistan');

- Decree of the President of the Republic of Uzbekistan No. PF-5264 of 29th November 2017 ‘On the establishment of the Ministry of Innovative Development of the Republic of Uzbekistan’;
- strategies for innovation development of Uzbekistan for 2019–2021 (Decree of the President of the Republic of Uzbekistan No. PF-5544 of 21st September 2018 ‘On approval of the innovative development strategy of the Republic of Uzbekistan in 2019–2021’) and 2022–2026 (Decree of the President of the Republic of Uzbekistan No. PF-60 of 28th January 2022 ‘On the development strategy of New Uzbekistan for 2022–2026’),
and more.

In order to ensure the regulatory framework for the development of science and innovation in the years 2018–2022, 88 documents were adopted in the country, including 2 laws, 34 decrees and resolutions of the President, and 52 resolutions and orders of the Cabinet of Ministers.

The implementation of the tasks defined in the above-listed documents served as the basis for large-scale reforms in this area. Thus, in order to improve the system of financing innovation activities, the Fund for Financing Science and Innovation Support was created in the structures of the Ministry of Innovative Development. These funds aimed to:

- finance the creation and implementation of innovations on a competitive basis by subjects involved in innovative activity;
- finance research, innovation, development and start-up projects on a competitive basis;
- finance the commercialisation of the results of scientific and scientific-technical activities;
- finance equipping scientific laboratories with modern high-tech equipment;
- cover the costs of registration abroad and maintenance of intellectual property rights (patents), created within the framework of state programmes of scientific activity;
- cover the expenses of ensuring the free use of leading electronic databases of scientific data by research and higher educational institutions, as well as prepare scientific results to be issued in international publications;
- finance the creation of scientific and innovative accelerators and business incubators;
- ensure advanced training of gifted young people in prestigious research centres, universities, technology parks and industrial organisations in developed countries;

- conduct scientific and practical events (symposiums, conferences, seminars, trainings, round tables, master classes and others), as well as assure young scientists' participation in international events;
- finance internships of young researchers in leading foreign scientific organisations (centres, universities, and others);
- cover expenses (wages, transportation and other expenses) of highly-qualified specialists from foreign countries attracted by the Ministry of Innovative Development of the Republic of Uzbekistan, etc.

In order to introduce venture financing and attract financial resources from business entities for the implementation of innovative projects, the UzVC National Venture Fund was established by Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 684 of 3rd November 2020 'On measures to organise the activities of the national venture fund UzVC'; the purpose of the resolution is to create the infrastructure necessary to support innovative ideas and a start-up ecosystem. The aim of the Fund is to finance venture projects of legal entities and individuals, also those carried out in partnership with foreign entities.

Relevant steps have been taken to develop innovative activities in the country's regions. Innovation centres are located in territorial centres; together with the regional administration, joint competitions are held to finance scientific and innovative projects. The winning projects are financed in equal parts from the state budget and the local budgets. As a result, 137 projects were implemented until December 2021, upon the completion of which 1,290 new jobs were to be created. To date, as part of the implementation of these projects, 80 companies have produced 230 types of products.

A system of the commercialisation of scientific developments has been created thanks to the Decision of the President of the Republic of Uzbekistan No. PQ-3855 of 14th July 2018 'On additional measures to increase the efficiency of commercialisation of the results of scientific and scientific and technical activities'. This system aims to ensure an accelerated implementation of domestic scientific, applied and innovative projects and developments, increasing the contribution of science to strengthening the competitiveness of the country's economy; additionally, the purpose of the system is to create effective mechanisms for promoting promising domestic achievements in scientific and innovative activities.

Special attention is paid to attracting young people to the field of science and innovation. In accordance with Decree of the President of the Republic of Uzbekistan No. PQ-4433 of 30th August 2019 'On measures to improve the system of attracting young people to the field of science and supporting their initiatives', the Youth Academy was established under the Ministry of Innovative Development.

The Youth Academy promotes the initiatives of gifted young people, strengthens the potential of the existing scientific schools, as well as the development of their innovative potential.

To support and stimulate the scientific and creative potential of the members of the Youth Academy four platforms were created:

- Idea Generators – for teams having their own innovative ideas, aimed at solving a specific problem corresponding to the main directions of the Youth Academy;
- Start-ups – for teams developing their own ideas and start-up projects aimed at implementing real ideas based on a specific plan for their realisation;
- Business Representatives – for teams applying scientific and innovative achievements in their activities, showing at least one year of experience in the relevant field;
- Future Academics – a platform of scientists with a high scientific potential who actively participate in the above-mentioned platforms, making a great contribution to the development of science in the country.

As part of the activities of the Youth Academy, a total of six major competitions were organised, 115 projects were implemented, upon the completion of which 567 new jobs were created.

By Resolution of the Cabinet of Ministers of the Republic of Uzbekistan, No. 133 of 9th March 2020 ‘On measures to further improve the regulatory framework for the development of scientific research and innovative activities’, the regulation ‘On the procedure for approving, financing and implementing start-up projects’ was adopted. It defines the basic concepts and principles of their realisation. The start-up projects approved in accordance with this regulation are financed through the Fund for Support of Innovative Development and Innovative Ideas, as well as from funds allocated to the Ministry from the state budget.

In order to strengthen the achieved results and define new goals for the development of scientific and innovative activities, the ‘Uzbekistan-2030’ strategy was issued. One of the goals of the decree was for Uzbekistan to join the group of countries with an above-average income through sustainable economic development. As part of the implementation of this goal, the scientific and innovation development tasks were also listed in the Table.

Table. Scientific and innovation development goals outlined in the reform of the education system of the ‘Uzbekistan-2030’ strategy

Goal	Performance indicators of the goals to be achieved by 2030
Supplementing fundamental research with new directions based on modern requirements	<ul style="list-style-type: none"> • conducting basic research • establishing cooperation with eight leading foreign scientific schools in the field of fundamental research • allocation of funds for scientific programmes in the fields of language and literature, history, archaeology, culture and art
Strengthening applied research in the most rapidly developing sectors of the economy, the introduction of the ‘enterprise – university – scientific organisation’ cluster system	<ul style="list-style-type: none"> • setting the direction of the state budget-funded expenses associated with applied research • production of 850 types of innovative products in areas driving the economy • creation of over 2,500 new scientific developments based on the results of applied research • creation of eight scientific and production clusters in such areas as transport and logistics, agricultural productivity, energy, biotechnology, geology and metalworking, mechanical engineering and electronics
Increasing the proportion of young researchers, supporting their scientific research	<ul style="list-style-type: none"> • bringing the proportion of researchers under the age of 40 to at least 60%, at least doubling the salaries of employees of scientific organisations, on average • bringing to 20 the number of annual competitions for financing scientific, applied, innovative and start-up projects • bringing the number of quotas for research interns, basic doctoral studies, doctoral studies and targeted doctoral studies to 5,200
Widespread implementation of innovative activities in all directions, providing support for scientific research and innovative initiatives	<ul style="list-style-type: none"> • ensuring the inclusion of Uzbekistan in the list of top 50 countries in the Global Innovation Index ranking • bringing the number of researchers for every million people to 2,000 • a two-fold increase in the number of new innovation developments created as a result of commercialisation in the domestic and foreign markets

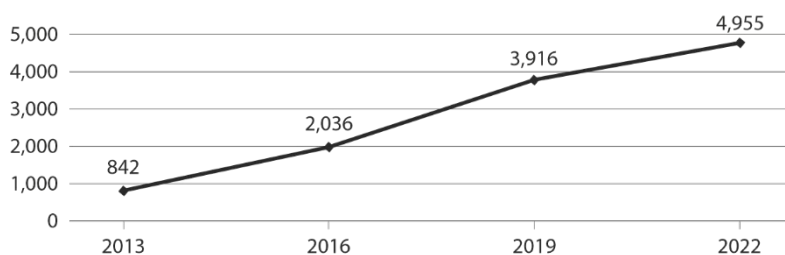
Source: author’s work based on a literature review.

The goals and performance indicators listed in the ‘Uzbekistan-2030’ strategy are complex in nature and determine the priority directions for the development of the innovation infrastructure in Uzbekistan.

The effectiveness of the reforms carried out in the recent years in the field of scientific and innovation development allows the identification of positive trends in the key indicators, including the number of enterprises and organisations producing innovative goods and services, also in industry, as well as the number of specialists and researchers working in R&D.

For example, in the period of 2013–2022, the number of enterprises and organisations producing innovative goods and works and providing services of their own increased by 4,113 units (Figure 1).

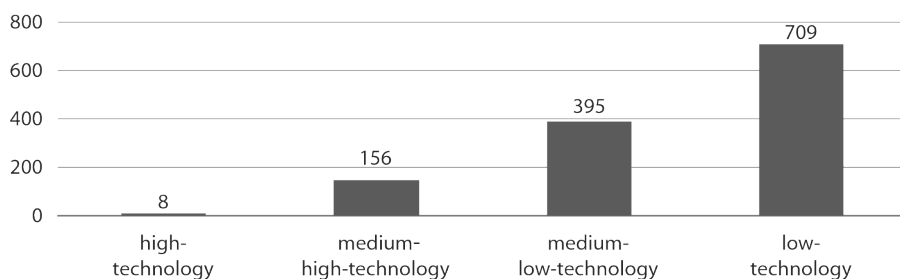
Figure 1. Number of enterprises and organisations that produced innovative goods and works and provided services of their own



Source: author's work.

Moreover, during the analysed period, there was a quantitative growth of enterprises and organisations in the manufacturing industry, which produced goods and works and provided services of their own. Their number increased by 1,268 units (Figure 2).

Figure 2. Increase in the number of enterprises and organisations that produced innovative goods and works and provided services of their own in the manufacturing industry in 2013–2022

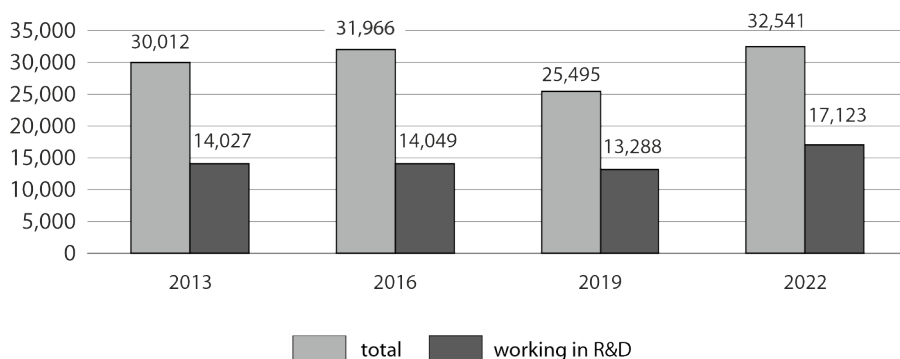


Source: author's work.

Figure 2 indicates an increase in the number of enterprises and organisations that produced innovative goods and works and provided services of their own in all areas of the manufacturing industry. Nevertheless, the experience of developed and developing countries shows that the effectiveness of innovative reforms is mainly reflected in the effectiveness of high-technology enterprises and organisations. In this regard, Uzbekistan recorded the lowest growth during the analysed period (eight units); therefore, the country's priority should be to increase the number of high-technology enterprises and organisations to the largest possible extent.

The overall number of research specialists increased by 2,529 people, reaching 32,541 in 2022, which was more than 1% of the total population of the country (Figure 3).

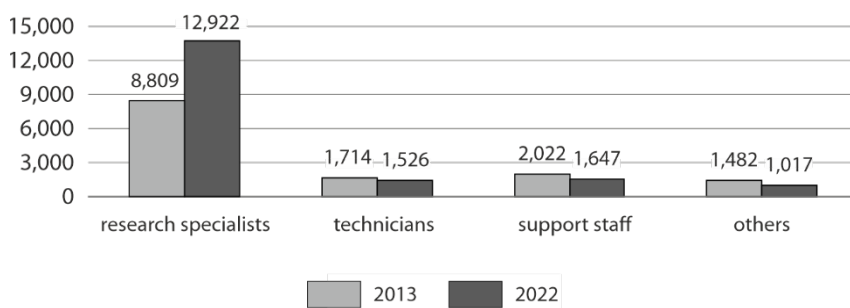
Figure 3. Number of research specialists (excluding part-time workers) in R&D compared to the total number of scientists



Source: author's work.

It is important to note that while the total number of research specialists increased by 2,529 people, the number of researchers in R&D grew by 3,096, which confirms that the share of research specialists in R&D in Uzbekistan increased. Thus, if in 2013 the share of R&D specialists in the total number of researchers was 46.7%, then in 2022 this figure rose to 52.6%. A change also occurred in favour of research specialists in R&D, whose number increased by 4,113 (Figure 4).

Figure 4. Number of people working in R&D, by specialisation



Source: author's work.

According to the indicators in Figure 4, a relative decrease is observed in the number of technicians (by 188 people), support staff (by 375 people) and other specialists (by 465 people) compared to the number of researchers.

5. Conclusions

An analysis of the effectiveness of the reforms carried out in Uzbekistan in the recent years in the field of science and innovation allows us to draw the conclusions below and consider the some important suggestions as to the further developments in this area. First of all, the formation and enhancement of innovative activities is based on the socio-economic and strategic development of the national economy of the country itself, as the construction of the innovation system is based primarily on strong and priority-oriented structures of the national economy. Moreover, reforms in the field of higher education, science and field of science and innovation development indicate the complexity and social orientation of the emerging innovation in the country. What is also important, is that a stable regulatory and legal innovation of Uzbekistan is being created, which forms the necessary elements and mechanisms for creating an effective innovative economy.

References

- Cooke, I., & Mayes, P. (1996). *Introduction to Innovation and Technology Transfer*. Artech House.
- Cordova, M. F., & Celone, A. (2019). SDGs and Innovation in the Business Context Literature Review. *Sustainability*, 11(24), 1–14. <https://doi.org/10.3390/su11247043>.
- Decision of the President of the Republic of Uzbekistan No. PQ-3855 of 14th July 2018 ‘On additional measures to increase the efficiency of commercialisation of the results of scientific and scientific and technical activities’. <https://lex.uz/docs/3823583>.
- Decree of the President of the Republic of Uzbekistan No. PF-60 of 28th January 2022 ‘On the development strategy of New Uzbekistan for 2022–2026’. <https://lex.uz/docs/5841063>.
- Decree of the President of the Republic of Uzbekistan No. PF-4947 of 7th February 2017 ‘On the Strategy of Actions for the further development of the Republic of Uzbekistan’. <https://lex.uz/docs/3107036>.
- Decree of the President of the Republic of Uzbekistan No. PF-5264 of 29th November 2017 ‘On the establishment of the Ministry of Innovative Development of the Republic of Uzbekistan’. <https://lex.uz/docs/3431985>.
- Decree of the President of the Republic of Uzbekistan No. PF-5544 of 21st September 2018 ‘On approval of the innovative development strategy of the Republic of Uzbekistan in 2019–2021’. <https://lex.uz/docs/3913188>.
- Decree of the President of the Republic of Uzbekistan No. PQ-4433 of 30th August 2019 ‘On measures to improve the system of attracting young people to the field of science and supporting their initiatives’. <https://lex.uz/docs/4494504>.
- Decree of the President of the Republic of Uzbekistan No. UP-158 of 11th September 2023 ‘On the Strategy Uzbekistan-2030’. <https://lex.uz/docs/6600404>.
- Dutta, S., Lanvin, B., León, L. R., & Wunsch-Vincent, S. (Eds.). (2023). *Global Innovation Index 2023. Innovation in the face of uncertainty*. WIPO. <https://doi.org/10.34667/tind.48220>.
- Gramma-Vigouroux, S., Saidi, S., Uvarova, I., Cirule, I., & Sellami, M. (2024). Drivers and Barriers of National Innovation Ecosystems for Implementing Sustainable Development Goals:

- A Latvian Case Study. *IEEE Transactions on Engineering Management*, 71, 4188–4204. <https://doi.org/10.1109/TEM.2022.3233859>.
- Guo, H., Huang, L., & Liang, D. (2022). Further promotion of sustainable development goals using science, technology, and innovation. *The Innovation*, 3(6), 1–2. <https://doi.org/10.1016/j.xinn.2022.100325>.
- Maclaurin, W. R. (1949). *Invention and Innovation in the Radio Industry*. Macmillan.
- Manzoor, F., Wei, L., Subhan, Q. A., & Siraj, M. (2023). Sustainability-oriented innovation system and economic stability of the innovative countries. *Frontiers in Public Health*, 11, 1–9. <https://doi.org/10.3389/fpubh.2023.1138034>.
- Myers, S., & Marquis, D. G. (1969). *Successful Industrial Innovations: A Study of Factors Underlying Innovation in Selected Firms*. National Science Foundation.
- O‘zbekiston Milliy axborot agentligi. (n.d.). *Poslanie Prezidenta Respubliki Uzbekistan Shavkata Mirziyeev 25.01.2020*. Retrieved March, 10, 2024, from <https://uza.uz/ru/posts>.
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 133 of 9th March 2020 ‘On measures to further improve the regulatory framework for the development of scientific research and innovative activities’. <https://lex.uz/docs/4759202>.
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 684 of 3rd November 2020 ‘On measures to organise the activities of the national venture fund UzVC’. <https://lex.uz/docs/5077677>.
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 841 of 20th October 2018 ‘On measures to implement national goals and objectives in the field of sustainable development until 2030’. <https://lex.uz/docs/4013356>.
- Schumpeter, J. A. (1962). *Capitalism, Socialism and Democracy*. Harper. <https://msuweb.montclair.edu/~lebelp/SchumpeterChapter7.pdf>.
- Tu, Y.-T., Aljumah, A. I., Nguyen, S. V., Cheng, Ch.-F., Taie, T. D., & Qiu, R. (2023). Achieving sustainable development goals through a sharing economy: Empirical evidence from developing economies. *Journal of Innovation & Knowledge*, 8(1), 1–10. <https://doi.org/10.1016/j.jik.2022.100299>.
- United Nations. (2022). *Innovation for Sustainable Development. Review of Uzbekistan*. https://unece.org/sites/default/files/2022-06/9789211172966_I4SDR_UZBEKISTAN_2022_web_full%2Bcover.pdf.
- United Nations. (2023). *Technology and Innovation report. Opening green windows. Technological opportunities for a low-carbon world*. https://unctad.org/system/files/official-document/tir2023overview_en.pdf.
- Vatananan-Thesenvitz, R. V., Schaller, A.-A., & Shannon, R. (2019). A Bibliometric Review of the Knowledge Base for Innovation in Sustainable Development. *Sustainability*, 11(20), 1–22. <https://doi.org/10.3390/su11205783>.