

## OPPORTUNITIES FOR THE FORMATION OF SCIENCE, TECHNOLOGY AND INNOVATION PARKS BASED ON INNOVATIVE INVESTMENTS

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<https://doi.org/10.5281/zenodo.18052550>

### ARTICLE INFO

Received: 21<sup>st</sup> December 2025

Accepted: 22<sup>nd</sup> December 2025

Published: 25<sup>th</sup> December 2025

### KEYWORDS

*innovations, innovative investments, technological parks, science and innovation parks, free economic zones.*

### ABSTRACT

*The article discusses the characteristics of science, technology and innovation parks as an innovation ecosystem of Uzbekistan, their formation factors and models. The international experience of science, technology and innovation parks and the possibilities of their application in our country are also studied.*

**Introduction.** In the modern global economy, innovation and investment are recognized as the main driving forces of economic development. In order to create a competitive national economy and strengthen their position in the international market, countries are trying to form an investment policy aimed at the development of innovations. In this case, scientific and technological innovations appear as an important factor of economic development, and investments directed at them serve the sustainable growth of the economy. World experience shows that countries that invest in the development of innovations achieve sustainable economic growth and strengthen their positions in the international market [1].

Uzbekistan's science, technology and innovative parks could play an increasingly important role in the country's economic growth by supporting innovation and commercializing research and innovation outcomes. This article examines the current state of these STI parks, while identifying challenges and opportunities, and recommend possible strategies and policies to strengthen their impact on technology and innovation-driven sustainable development.

**Material and methods.** The objective need for transitioning to economic growth and strategically shifting economic systems towards innovative development—primarily through enhanced investment activity—demands a fresh scientific perspective on the economic nature of investments and their effective utilization in the technological modernization of Uzbekistan's production sector during its market transformation. Numerous studies by both foreign and domestic scholars have addressed various aspects of the investment market, including financial support for investments, the development and evaluation of investment project effectiveness, primary investment sources, investment risks, the country's investment climate and regional conditions, management of financial investments, state regulation methods for investment activities, and investment communications in entrepreneurship.

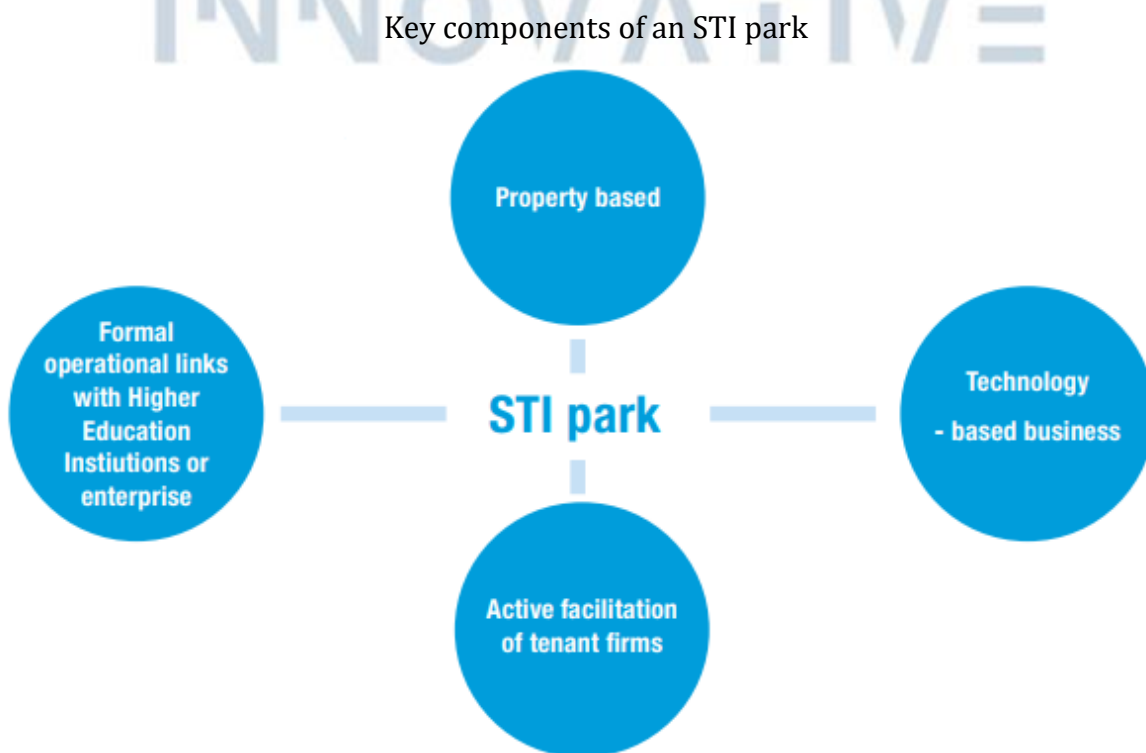
STI parks are a specific organizational form of Science–Business Linkages (SBL) in addition to contract research, which may range from joint development, collaboration or external support in commercializing new technologies to consultancy services in testing, certification and problem-solving. STI parks are just one type of what recent literature refers to as Organized Innovation Spaces (OIS) [2]. These should be distinguished from 'areas of innovation,' which encompass both virtual and physically unconstrained spaces.

Organized Innovation Spaces (OIS) encompass various areas dedicated to fostering innovation. These include six main physical forms: Science and Technology Parks (STPs), Innovation Districts (IDs), Industrial Innovation Campuses, Areas of Innovation (AOIs), Incubators and Living Labs (LLs). The distinction between an industrial coinnovation campus and a science park lies in their primary actors. While a science park is typically centred around a university, an industrial co-innovation campus is often led by a large company, which may also be its initiator. At the core of these campuses, innovation centres are physical spaces or teams set up by organizations within global tech hubs, aiming to capitalize on the STI parks are catalysts for technology flow and innovation Science, technology and innovation parks in Uzbekistan Assessment and policy issues startup, industry and academic ecosystems these hubs offer.

A recent classification of OIS by Galan Muros et al. (2021) distinguishes between industrial parks, business parks, science parks, technology parks and IDs. IASP does not differentiate between terms such as ‘technology park,’ ‘technopole,’ ‘research park’ and ‘science park,’ instead using the acronym STP (science and technology park) to refer to all these types [3]. This study will use the term ‘Science, Technology and Innovation (STI) park.’ In this article, the term will include science parks, incubators, accelerators, innovation hubs, innovation centres and technology transfer offices.

Discussion and results. STI parks support economic growth by linking science and business, enhancing knowledge flows and driving technological advancements. In Uzbekistan, they hold the potential to transform the economy by boosting R&D and fostering collaboration between academia, industry and government. Uzbekistan’s innovation ecosystem is diverse, focusing on production over research and development. Existing STI parks fall into several models, from standalone entities to university-linked and corporate venturing parks, each catering to different aspects of the country’s innovation needs.

Figure 1.



Source: Science, technology and innovation parks in Uzbekistan Assessment and policy issues. 2024, United Nations Conference on Trade and Development.

Uzbekistan's innovation ecosystem reflects the import-substituting nature of its recent economic development trajectory. The economy's growth has been relatively good, but the downsides of Uzbekistan's growth model have also become more pronounced. The fundamental weakness is that growth has been jobless so far and the challenge is how to combine job creation with increased productivity and technology upgrading. Data indicates that only 1.2 per cent of innovations were developed in collaboration with the R&D sector, including PROs and universities. Of all innovations, 92 per cent are introduced independently, with only 8 per cent involving partnerships with other organizations [4]. This pattern is consistent across both medium/large and small/micro firms. The only exception is the information and communication sector, where external organizations, resumably IT services firms, are developing innovations.

Uzbekistan would need to develop its startup ecosystem to diversify the economy and generate sources of endogenous growth. The analysis by the German Corporation for International Cooperation (GIZ) shows that Uzbekistan currently lacks a specific policy for startups[5]. Efforts to promote startups are divided among various government ministries, including the Ministry of Innovative Development, the Ministry for the Development of Information Technologies and Communications, the National Agency of Project Management and their affiliated organizations such as the Center for Advanced Technologies, Yashnabad Innovative Technopark, IT Park and the Mirzo Innovation Center. Uzbekistan's STI ecosystem is not fully able to accommodate women and other vulnerable groups of population, including people with disabilities.

The country's efforts to promote gender equality to help unleash Uzbekistan's full economic potential helped the country make it to the list of the top five improvers in gender equality in 2024 (according to the annually produced Women, Business, and the Law Index by the World Bank) [6]. Despite some positive developments in legislation and human capital, only around 25 per cent of startups in Uzbekistan are founded by women [7], suggesting there are still gender inequalities when it comes to access to education, finance and societal attitudes. Funding (including access to angel investment and venture capital) is a challenge that affects female founders to a greater extent (ibid).

The World Bank's 'Country Gender Assessment Report' confirms the significant progress on gender equality made from 2017, but suggests that there are persistent gaps, including in areas associated with economic activities and entrepreneurship. The World Bank's "Country Gender Assessment Report" for Uzbekistan provides a comprehensive overview of gender issues across various sectors, noting the progress made in recent years but also the persistent gaps, particularly in economic activities and entrepreneurship.

However, traditional stereotypes continue to discourage girls and women from taking up careers associated with tech or entrepreneurship as just 36 per cent of men and 23 per cent of women in Uzbekistan believe that girls and women are suited for studying sciences or technical professions [8].

According to the World Bank, persons with disabilities in Uzbekistan are about four times less likely to find a job than those without disabilities [9]. In fact, over 25 percent of all registered persons with disabilities in Uzbekistan are recognized as capable of performing certain types of work, yet only roughly 6 percent are officially employed.

Table 1

Types of STI Parks Models in Uzbekistan

	Property	Operational links with universities or enterprises	Technology based businesses	Active facilitation of tenants	Overall profile
Stand-alone STI park	Key to financial sustainability	Secondary or as space for MSc and PhD research	Lacking true technology-based businesses	Basic assistance in legal matters	Designed as a driven model but significant constraint in low supply of technology-based firms. A strong sustainability vs technology upgrading trade-off.
STI parks with a strong focus on enhancing university-industry linkages	Secondary issue	Key rationale	A focus is less on incubating and more on collaborating with enterprises in the industry.	Secondary issue due to focus on collaboration	Various approaches to improve linkages with industry. When well-designed, this could be a significant contributor to the industry's technology upgrading.
Virtual IT Park	The issue is present only in the case of access to IT infrastructure (5G network)	Still secondary in R&D: Significant in training and education	Key focus but significant financial hurdles	Weak mentoring system	Numerous coordination challenges in enhancing the IT innovation ecosystem.
STI parks as corporate venturing	A secondary issue	Not developed	Essential as a component of the corporate venturing programme	Active through equity stake or complete control	It is a promising route of technology diversification but confined only to a few entrepreneurially driven large firms.
FEZ and Technopark-driven Free Economic Zones	Key issue for FEZ as they become financially independent	Non-existent in the case of FEZ but significant in the shift towards TP-driven FEZ	Reduced to selection in the case of FEZ; Key future challenge for TP-driven FEZ	Reduced to non-technology support (in the case of FEZ); Essential to technology upgrading of TP-driven FEZ	TP-driven FEZ is a significant step forward but requires good coordination among stakeholders.

Source: Science, technology and innovation parks in Uzbekistan Assessment and policy issues. 2024, United Nations Conference on Trade and Development

Table 1 synthesizes a discussion of different STI park models in Uzbekistan. The overview shows that Uzbekistan is actively experimenting with various forms of STI parks as part of its industrial innovation policy. The country has moved beyond the traditional model of standalone STI parks designed to foster the growth of innovation-based companies through incubation and acceleration. The new direction includes the establishment of a virtual IT park to develop an innovation ecosystem in IT services, as well as transforming Free Economic Zones (FEZ) into technology park-driven FEZ.

Uzbekistan has established a virtual IT Park, managed by the Ministry of Information Technologies and Communications (MITC). Benefits provided to its residents, based on the principle of extraterritoriality, extend until 2028. These include reduced income taxes (7.5 per cent), exemptions from corporate and social taxes (0 per cent) and customs payments on the import of goods and services (0 per cent) [10]. According to the same source, the IT Park serves as a key hub, attracting organizations involved in Information and Communication Technology (ICT) education, hardware development, robotics, internet service exports, data storage and processing, online commerce, fintech, digital education, e-governance, Internet of Things, MedTech and agrotech. Furthermore, the IT Park hosts initiatives like 'Smart City' and 'Safe City,' events such as the Hack4Region hackathons, and is engaged in conducting 5G trials with UCELL in Tashkent and other regions. The IT Park also supports startups through incubation and acceleration services and fosters IT skill development. It oversees programmes like the IT Academy, One Million Coders and Digital University.

In 2020, the Uzbek Venture Capital Association (VCA) reported<sup>6</sup> that fintech, e-commerce, e-marketplaces and EdTech make up most of the country's startup scene, with most businesses focused on the national market (TUZ Ventures, 2021). The StartupBlink Global Startup Ecosystem Index 2023 ranks Tashkent's startup ecosystem at 561st globally, a significant improvement of 165 places from 2022, though still relatively low. According to UZ VCA (2020), the main challenge for Uzbek startups is closing the gap between early-stage startups and venture capital funds that typically prioritize more established startups.

Conclusion. Uzbekistan's STI parks are still emerging, facing the challenge of balancing commercial goals with fostering R&D. Their success hinges on closer university-industry ties, more robust policies and fostering an innovation culture to unlock the potential of the parks as engines of economic growth. All STI parks in Uzbekistan share a common characteristic: they have been established within the last five years, a period that includes the COVID-19 pandemic. As a result, these parks are still in the early stages of their development. The managers are relatively young and have limited experience in industry or STI park management.

This leads to the following analytical conclusions:

- Each STI park model functions within its own innovation ecosystem, so evaluating its activities using external metrics could be somewhat complicated and challenging. The evaluation process should include a set of indicators relevant to the ecosystem the STI Park is designed to enhance.
- The standalone STI park model has its challenges due to the innovation ecosystem (particularly in R&D activities) being somewhat weak across the country.
- STI parks that emphasize strengthening university-industry linkages should be seen as part of a broader science industry policy, rather than being treated solely as standalone entities.

To further strengthen the innovation ecosystem in which standalone and university-focused STI parks operate, it is crucial to consider the following recommendations:

- Aim to increase the overall quality of higher education by putting in place a separate agency for quality assurance in higher education or modernizing the existing State Inspectorate for quality control of education;
- Increase research activity among university teaching staff by integrating Higher Education Institutions (HEIs) with Public Research Organizations (PROs) to inform teaching practices;
- Restructure PROs to meet the demand for innovation-related services;
- Establish R&D commercialization grants to support collaboration within the innovation system;
- Introduce a programme that would match grants for R&D projects in partnership with the private sector

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