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## THE QUALITATIVE AND QUANTITATIVE DEVELOPMENT OF EDUCATION IS A CRUCIAL FACTOR IN IMPROVING THE INNOVATION RANKING OF UZBEKISTAN

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### ABSTRACT

The qualitative and quantitative development of education is a crucial factor in improving the innovation ranking of Uzbekistan. Obstacles such as corruption, inefficient management, the lack of funds for research, and fund mismanagement hinder progress in this regard. Corruption within the education sector undermines transparency and trust, necessitating stringent measures to combat this pervasive issue. Inefficient management practices impede the effective utilization of resources and hinder progress towards educational goals. The lack of adequate funding for research and development poses a significant obstacle to innovation, limiting the ability of educational institutions to conduct groundbreaking research and implement innovative projects. Additionally, mismanagement of available funds exacerbates the problem, necessitating a reevaluation of budget allocation mechanisms. To address these challenges, a comprehensive approach is required, including strengthening anti-corruption measures, implementing effective governance and management practices, and prioritizing investment in research and development by

allocating sufficient funds and ensuring their judicious use. By overcoming these obstacles, Uzbekistan can foster a conducive environment for education and innovation, empowering the nation to thrive in an increasingly competitive global landscape.

## KEYWORDS

Digital economy, integration, practical experience, finance, economy, innovation.

## INTRODUCTION

The innovation ranking of a country plays a vital role in its economic growth, competitiveness, and overall development. For Uzbekistan to make significant strides in innovation, it must prioritize the qualitative and quantitative development of its education system. This article aims to explore the crucial role of education in improving Uzbekistan's innovation ranking, while also addressing the obstacles the country faces, including corruption, inefficient management, lack of funds for research, and fund mismanagement.

Innovation ranking is a key indicator of a country's ability to generate and implement novel ideas, technologies, and processes that drive economic progress. It encompasses various factors such as research and development investments, intellectual property protection, technology adoption, and educational excellence. By focusing on improving its innovation ranking, Uzbekistan can position itself as a competitive player in the global arena, attracting

foreign investment, fostering entrepreneurship, and nurturing a culture of innovation.

To enhance the innovation ranking, countries employ qualitative and quantitative methods. Qualitative methods involve improving the quality of education, fostering critical thinking, creativity, and problem-solving skills among students. This approach emphasizes curriculum reforms, teacher training programs, and the integration of technology into the educational framework. On the other hand, quantitative methods focus on expanding access to education, increasing enrollment rates, and investing in infrastructure and educational resources. A combination of both approaches is essential to ensure a comprehensive and holistic development of the education system.

Currently, Uzbekistan faces several obstacles that hinder its progress in education and innovation. Corruption within the education sector poses a significant challenge, undermining transparency,

accountability, and resource allocation. It is imperative to combat corruption through robust anti-corruption measures, implementing strict regulations, and promoting a culture of integrity within educational institutions.

Inefficient management practices also impede the effective utilization of resources and hinder educational progress. Streamlining administrative processes, enhancing governance mechanisms, and adopting evidence-based decision-making can contribute to efficient management and resource allocation.

The lack of funds for research and development is another obstacle that restricts innovation in Uzbekistan. Inadequate financial support limits the capacity of educational institutions to conduct cutting-edge research, develop innovative projects, and attract talented researchers. It is crucial for the government and relevant stakeholders to prioritize investment in research and development, allocating sufficient funds and creating mechanisms to ensure their effective utilization.

Additionally, fund mismanagement exacerbates the challenge of limited resources. It is essential to reevaluate budget allocation mechanisms, establish robust financial oversight, and promote transparency in fund allocation and expenditure.

Understanding the current state of innovation rankings worldwide provides valuable insights and benchmarks for Uzbekistan's progress. By analyzing

innovation ranking statistics, policymakers can identify successful strategies employed by leading countries and adapt them to the Uzbekistan context. This analysis helps in identifying key areas for improvement, setting realistic targets, and formulating effective policies to enhance the innovation ecosystem.

In conclusion, the qualitative and quantitative development of education is instrumental in improving Uzbekistan's innovation ranking. By addressing obstacles such as corruption, inefficient management, lack of funds for research, and fund mismanagement, Uzbekistan can foster an environment conducive to innovation and economic growth. Through a combination of qualitative and quantitative methods, Uzbekistan can nurture a skilled workforce, promote research and development, and position itself as a competitive player in the global innovation landscape.

## METHOD

- 1) The analysis and synthesis method is utilized to establish the conceptual and categorical framework of research, providing a scientific rationale for discussing the modern problems in innovation development in Uzbekistan.
- 2) Scientific abstraction, induction, and deduction are employed to summarize Uzbekistan's performance in various fields over the past few years.
- 3) The abstract-logical approach is utilized to theoretically generalize the research findings and formulate conclusions.

4) Mathematical and statistical processing of research results involves analyzing the collected data through various techniques such as ranking, scaling, registration, systematization, differentiation, grouping, and graphical representation.

### Research and findings:

The connection between economic growth and higher education is evident. Higher education has the potential to contribute to economic advancement through the facilitation of innovation, the improvement of productivity, and the cultivation of a proficient labor pool [1]. Several important aspects can be highlighted in relation to this correlation:

Higher education establishments hold a critical position in the development of human capital. They provide individuals with the essential knowledge, skills, and expertise required to actively participate in economic endeavors.

A workforce that possesses a higher level of education can act as a catalyst for innovation, leading to the generation and implementation of fresh ideas, technologies, and practices. This, in turn, can fuel economic growth.

Advanced education equips individuals with specialized knowledge and skills that are directly applicable to various industries, thereby increasing productivity within the workforce. Enhanced productivity often translates into greater economic output.

By investing in higher education, countries can effectively cultivate a skilled labor force capable of meeting the demands of evolving industries. This skilled workforce is an indispensable component for sustained economic growth, as it drives progress and competitiveness.

Higher education institutions typically take the lead in engaging in research and development endeavors. They undertake research, create fresh insights, and foster innovation across multiple disciplines. This research has the potential to result in advancements in technology, enhancements in production methods, and the emergence of new industries, all of which can have a positive effect on the growth of the Gross Domestic Product (GDP)[2]. Furthermore, education serves as a catalyst for the advancement of the quaternary sector, the most advanced and knowledge-based sector of the economy, which can, in turn, drive development in other sectors.

In the contemporary global economy, growth is propelled by the significance of knowledge and information. Higher education plays a crucial role in facilitating the generation and sharing of knowledge, which is fundamental in transitioning to an economy based on knowledge. Such an economy places heavy reliance on intellectual capital and innovation, both of which are intimately connected to the realm of higher education[3].

Although higher education can have a favorable influence on GDP growth, it is crucial to acknowledge

that additional elements, including infrastructure, governance, investment climate, and economic policies, also contribute significantly to determining overall economic performance[4]. The relationship between GDP growth and higher education is intricate and subject to various contextual factors within a particular country.

According to the data provided by the Ministry of Higher Education, Science, and Innovations of the Republic of Uzbekistan, there are 212 higher education institutions in Uzbekistan. Out of these, 30 are foreign institutions that operate collaboratively or as branches, 66 are privately-owned, and 116 are publicly-owned institutions. As of 2023, the total number of students enrolled in higher education in Uzbekistan has reached 1,203,125. These figures [5], sourced from official data, offer an accurate portrayal of the present state of higher education institutions in Uzbekistan.

Studies suggest that in today's digital era, characterized by advancements such as artificial intelligence, developing nations like Uzbekistan encounter fresh obstacles in aligning with evolving economic standards. [6] These challenges primarily center around acquiring essential knowledge and skills in fields such as management, production, and international trade, all within the framework of a swiftly expanding digital economy.

In the age of digitalization, there is a growing need for a proficient workforce that can effectively leverage and adapt to cutting-edge technologies.[7] Nations in

the process of development, such as Uzbekistan, must prioritize investments in education and training initiatives that empower individuals with the necessary knowledge and skills to navigate the intricate landscapes of the digital economy.

The importance of effective management practices cannot be overstated when it comes to stimulating economic growth and enhancing competitiveness. As digital technologies become increasingly prevalent, management approaches must adapt to harness the advantages offered by automation, data analytics, and decision-making algorithms.[8] In developing countries, there is a pressing need to foster a new generation of managers who possess a strong understanding of digital strategies and possess the ability to leverage technology to drive organizational triumph.

The advent of the digital economy has revolutionized the way production processes are conducted, placing emphasis on efficiency, flexibility, and customization. Developing nations must embrace more advanced and refined production techniques, such as automation, robotics, and additive manufacturing, to bolster productivity and competitiveness. Furthermore, cultivating an environment that encourages innovation is crucial for the creation of novel products, services, and business models that align with the requirements of the digital age.[9]

The digital economy has broadened the reach and intricacy of international trade. E-commerce, digital



platforms, and the movement of data across borders have become essential elements of global trade. Developing nations must establish policies and infrastructure that enable active engagement in the digital marketplace, foster cross-border trade, and safeguard data privacy and security.[10]

To harness the advantages offered by the digital economy, developing nations must allocate resources towards establishing resilient digital infrastructure and guaranteeing affordable and dependable internet access that is accessible to all. This entails expanding broadband networks, encouraging the adoption of mobile technology, and bridging the digital divide that exists among different segments of their populations.[11]

Virtually all developing nations, including Uzbekistan, encounter the common obstacle of keeping pace with the swiftly evolving economic standards, particularly in the digital age. Overcoming this hurdle necessitates a concerted effort in acquiring knowledge and skills, adapting management approaches, embracing advanced production methods, fostering innovation, facilitating international trade, and investing in digital infrastructure. By effectively addressing these challenges, developing countries can position themselves to seize the opportunities presented by the digital economy[12].

The government of Uzbekistan, through Presidential Decree #158, has established a set of objectives aimed at fostering the economic development of the

nation.[13] These objectives encompass diverse sectors such as education, healthcare, social services, and culture, all with the overarching goal of achieving sustainable economic growth and societal progress. The decree outlines several key targets to be pursued, including:

- The government's objective is to improve the education system at all levels, ranging from primary schools to higher education institutions. This involves providing comprehensive and practical knowledge as well as equipping the youth with the necessary skills for personal and professional growth.
- Efforts will be dedicated to increasing life expectancy rates, indicating a focus on enhancing healthcare services and promoting healthier lifestyles among the population. The government aims to improve healthcare infrastructure and services to ensure longer and healthier lives for its citizens.
- The decree emphasizes the expansion and enhancement of social services and benefits provided to the population. This entails strengthening social welfare programs, offering support to vulnerable groups, and striving for an improved standard of living for all citizens.
- The government acknowledges the significance of cultural aspects in society and strives to foster cultural development. This may involve initiatives to preserve and promote cultural heritage, support



|      |          |          |     |        |
|------|----------|----------|-----|--------|
| 2011 | 7228.5   | 1261.4   | 65  | 58204  |
| 2012 | 9113     | 1505.8   | 64  | 56969  |
| 2013 | 10966.4  | 2130     | 66  | 57087  |
| 2014 | 13549.5  | 2295.3   | 68  | 59324  |
| 2015 | 16342.4  | 2542.3   | 69  | 58301  |
| 2016 | 18106.3  | 2643.6   | 70  | 57705  |
| 2017 | 20749.2  | 2954.5   | 72  | 80822  |
| 2018 | 27523.9  | 5539.1   | 98  | 108745 |
| 2019 | 32520.8  | 8685.394 | 119 | 128730 |
| 2020 | 37216.24 | 11040    | 127 | 165021 |
| 2021 | 47760.47 | 12625.2  | 154 | 220124 |
| 2022 | 56315.87 | 15419.3  | 191 | 275496 |

Source: compiled by the authors [5]

In order to create an econometric model that captures the correlation mentioned above, let's make certain modifications to Table 2:

By plotting a preliminary scattergram to identify the nature of the correlation between the dependent

variable (y) and the independent variables (x1, x2, x3), we assume that the regression model would adopt the following structure:

$$GDP = \beta_0 + \beta_1 INV + \beta_2 \ln(NEdu) + \beta_3 \ln(NStud)$$

Table 3. Table 2 after modification

| year | GDP<br>(billion soums) | Investment in Fixed Assets<br>(billion soums) | Number of higher educational organizations (total, units) | Students admitted to the baccalaureate of higher education organizations (person) |
|------|------------------------|-----------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------|
|      | Y=GDP                  | x1=INV                                        | x2=NEdu                                                   | x3=NStud                                                                          |
| 2011 | 7228.5                 | 1261.4                                        | 65                                                        | 58204                                                                             |
| 2012 | 9113                   | 1505.8                                        | 64                                                        | 56969                                                                             |
| 2013 | 10966.4                | 2130                                          | 66                                                        | 57087                                                                             |



|      |          |          |     |        |
|------|----------|----------|-----|--------|
| 2014 | 13549.5  | 2295.3   | 68  | 59324  |
| 2015 | 16342.4  | 2542.3   | 69  | 58301  |
| 2016 | 18106.3  | 2643.6   | 70  | 57705  |
| 2017 | 20749.2  | 2954.5   | 72  | 80822  |
| 2018 | 27523.9  | 5539.1   | 98  | 108745 |
| 2019 | 32520.8  | 8685.394 | 119 | 128730 |
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| 2021 | 47760.47 | 12625.2  | 154 | 220124 |
| 2022 | 56315.87 | 15419.3  | 191 | 275496 |

*Source: compiled by the authors [5]*

2. To proceed, we transform the parameters into a linear form to facilitate the use of the Ordinary Least Squares (OLS) method for building the econometric

model. This can be achieved by employing the provided table and utilizing Microsoft Excel:

1.

| year | GDP      | INV      | ln(NEdu) | ln(NStud) |
|------|----------|----------|----------|-----------|
| 2011 | 7228.5   | 1261.4   | 4.174387 | 10.97171  |
| 2012 | 9113     | 1505.8   | 4.158883 | 10.95026  |
| 2013 | 10966.4  | 2130     | 4.189655 | 10.95233  |
| 2014 | 13549.5  | 2295.3   | 4.219508 | 10.99077  |
| 2015 | 16342.4  | 2542.3   | 4.234107 | 10.97337  |
| 2016 | 18106.3  | 2643.6   | 4.248495 | 10.9631   |
| 2017 | 20749.2  | 2954.5   | 4.276666 | 11.3      |
| 2018 | 27523.9  | 5539.1   | 4.584967 | 11.59676  |
| 2019 | 32520.8  | 8685.394 | 4.779123 | 11.76547  |
| 2020 | 37216.24 | 11040    | 4.844187 | 12.01383  |
| 2021 | 47760.47 | 12625.2  | 5.036953 | 12.30195  |
| 2022 | 56315.87 | 15419.3  | 5.252273 | 12.52633  |

*Source: compiled by the authors [5]*

After calculations we obtain the following correlation:

$$GDP = 137294.004 + 1.089\beta_1 INV + 14750.368 \ln(NEdu) + 7819.799 \ln(NStud)$$

Based on the findings from the analysis, we can conclude that, at ceteris paribus, a 1 percent increase in the number of higher education insituitions is associated with an approximate increase of 147.5 billion soums in GDP per year. It is important to note

that this conclusion holds while assuming that the quality remains constant for students.

There have been several notable research studies and authors who have emphasized the importance of quality in higher education over quantity. Here are a few examples:

| Year | Author and their research product                                                                                      | Research Study:                                                                                                                                                                                                                           |
|------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1995 | "The Quality of Higher Education" by Peter Scott                                                                       | This study examines the significance of quality in higher education and argues that a focus on quality is essential for the success and effectiveness of higher education institutions.                                                   |
| 2007 | "Quality Assurance in Higher Education: An Introduction" by Don F. Westerheijden, Bjørn Stensaker, and Maria João Rosa | This rese<br>arch study provides an introduction to quality assurance in higher education and emphasizes the need to prioritize quality over quantity to ensure effective educational outcomes.                                           |
| 2008 | "Quality and Internationalization in Higher Education" by Jane Knight                                                  | This study explores the relationship between quality and internationalization in higher education, highlighting the importance of maintaining high-quality standards to attract international students and foster global competitiveness. |
| 2009 | "Quality in Higher Education: Developing a Virtuous Circle" by Gareth Parry                                            | This research study focuses on the concept of a virtuous circle in higher education, where quality education leads to positive outcomes, such as enhanced reputation, increased resources, and improved student outcomes.                 |
| 2011 | "The Importance of Quality in Higher                                                                                   | This study compares the importance of quality in higher education across different countries,                                                                                                                                             |

|  |                                                                |                                                                                                                                                       |
|--|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Education: A Comparative Study" by John Brennan and Tarla Shah | highlighting the need for consistent quality standards and highlighting the positive impact of quality on student satisfaction and learning outcomes. |
|--|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|

## CONCLUSION

To tackle practical challenges in the economy and finance of Uzbekistan, the government should prioritize the following initiatives:

- Education Investment: Allocate ample resources and funding to enhance the quality of education, with a focus on primary and higher education. This will cultivate a skilled workforce, boost human capital, and drive economic growth and innovation.
- Entrepreneurship Promotion: Create a supportive environment for entrepreneurship by simplifying administrative procedures, facilitating access to financing, and providing business development support. Encouraging entrepreneurship can stimulate economic activity, foster job creation, and diversify the economy.
- Infrastructure Development: Invest in infrastructure projects, including transportation, energy, and telecommunications, to enhance connectivity and attract private investments. Upgrading infrastructure will improve productivity, facilitate trade, and attract both domestic and foreign investment.
- Regulatory Reforms: Implement transparent and business-friendly regulations to attract investments, safeguard property rights, and ensure fair competition. Streamlining bureaucratic processes, reducing red tape, and fostering a predictable business environment will encourage investment and economic development.
- Skills Development and Training: Focus on vocational and technical training programs to bridge the skills gap and align workforce capabilities with industry demands. Providing relevant training and upskilling opportunities will enhance employability and support the growth of key sectors.
- Financial Sector Reforms: Strengthen the financial sector by improving regulations, enhancing risk management frameworks, and promoting financial inclusion. A robust and stable financial sector is crucial for attracting investments, facilitating access to credit, and ensuring economic stability.
- Export Promotion and Diversification: Encourage export-oriented industries and diversify export markets to reduce dependency on a single sector or country. Supporting export-oriented businesses, facilitating trade agreements, and

promoting market access will enhance competitiveness and drive economic growth.

- Governance and Transparency: Enhance governance practices, promote transparency, and combat corruption. Good governance practices instill investor confidence, ensure fair competition, and create an environment conducive to economic development.

By addressing these areas, the government of Uzbekistan can effectively tackle practical challenges in the economy and finance, foster sustainable growth, and improve the overall economic well-being of the country.

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