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MODERN APPROACHES ON THE RELATIONSHIP BETWEEN EDUCATION AND ECONOMIC GROWTH

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Abstract
In the modern world, the economic justification of any choice is quite common. This is mainly due to the fact that participants in economic processes expect to make a profit from their investments. But it is not always possible to calculate the effectiveness, which is often associated with a long wait for results, their destruction against the background of other investments, the lack of a direct relationship, etc. All this concerns the education system.
Thus, the purpose of this study is to identify the relationship between education and economic growth and to assess this interaction. To do this, the theoretical developments of domestic and foreign researchers on this issue were analyzed, as well as methods for assessing the impact of education on economic growth.
The disadvantages due to which the considered approaches lose relevance in the conditions of digitalization of the economy are also studied, forms of changing the evaluation method are developed. An attempt was made to combine quantitative and qualitative assessment to obtain an objective evaluation result.

Keywords: higher education, economics, innovations, distance education, gross domestic product, gross regional product, economic growth, education index, endogenous factor, exogenous factor

Анотация
В современном мире экономическое обоснование любого выбора является достаточно распространенным явлением. Это связано в большей степени с тем, что участники экономических процессов рассчитывают получить прибыль от своих вложений. Но не всегда удается рассчитать эффективность, что часто связано с длительным ожиданием результатов, их разрушением на фоне других вложений, отсутствием прямой взаимосвязи и т.д. Все это касается системы образования.

Таким образом, целью настоящего исследования является выявление связи между образованием и экономическим ростом и оценка этого взаимодействия. Для этого были проанализированы теоретические разработки отечественных и зарубежных исследователей по данному вопросу, а также методы оценки влияния образования на экономический рост.
Изучены также недостатки, из-за которых рассматриваемые подходы теряют актуальность в условиях цифровизации экономики, разработаны формы изменения метода оценки. Была предпринята попытка объединить количественную и качественную оценку для получения объективного результата оценки.

Ключевые слова: высшее образование, экономика, инновации, дистанционное образование, валовой внутренний продукт, валовой региональный продукт, экономический рост, индекс образования, эндогенный фактор, экзогенный фактор

Introduction

In recent years, the educational system in most countries has had to change several times, which is associated with various socio-economic phenomena. The emphasis on the restoration of lost positions in the sectors of the economy, modern calls, economic crises, sanctions, pandemics arising in the format of "Industry 4.0" of the economy – all this only exacerbated the need for quality education. Also, the main goal of such transformational changes is to form such an educational environment in which students are focused on the demand of the labor market, actively participate in the life of the whole society, region, country, strengthen human potential and thereby contribute to the economic growth of the country.

The purpose of this study is to evaluate the impact of the education system on economic growth using quantitative and qualitative characteristics.

The scientific novelty of this research work is associated with the use of qualitative characteristics to assess the impact of the educational system on the economic growth of the region.

In the scientific works devoted to this topic, attention is focused on the use of more quantitative indicators (educational financing, educational marketing, management structure of the educational system, amount of payment-contract, etc.). The scientists working on the qualitative assessment of education did not reflect the connection with economic growth in their work.

In this regard, the idea of the research is based on the idea that the economic growth of the region depends not only on the quantitative indicators of the educational system, but also on the assessment of the quality of services for the end users. In order to confirm the hypothesis, the survey method, expert assessment method, synthesis method and calculation-analytical methods were used in the research.

MATERIAL AND METHOD

In the modern world, the influence of international education and integration into the economic space in the training of new specialists is increasing. Therefore, the education sector requires the introduction of an innovative approach to the training of highly qualified personnel. From this point of view, the education system often stands out in the study of factors affecting the socio-economic development of the country or region, business activity, economic growth, etc.

The economy of most of the CIS countries is often associated with the "Dutch disease", and most sectors that contribute to the country's development remain underdeveloped due to the high share of the economy based on the supply of raw materials.

This approach also applies to the education system. In particular, B. Knall defines the state of the Russian economy during the crisis as "the circle of backwardness", and in his opinion explains the reason for everyone's backwardness is the lack of investments in the education

system[1]. This, in turn, naturally leads to problems in production: low productivity in production, family problems, poor quality goods and services, lack of creativity and initiative, all this means economic backwardness.

Currently, in most countries, despite the implementation of a number of measures to introduce advanced innovative practices into the educational process, they face a number of problems, the main of which is the lack of highly qualified specialists.

Therefore, it is no secret that classes are often conducted on an outdated methodological and technical basis, teachers do not have practical experience, and the knowledge gained by the audience is not suitable for the formation of professional competencies and their use in practical work.

Such uniqueness is typical for Uzbekistan, and the country is facing a number of problems in the development of the education system. In particular, compared to other countries, Uzbekistan took 80th place in the ranking of world countries (191 countries included) according to the education index in 2022. For comparison, in 2020 it was ranked 75th. According to this indicator, only Tajikistan (101st place) and Afghanistan (177th place) will be higher than Central Asian countries in 2022, Turkmenistan (77th place), Kyrgyzstan (76th place) and Kazakhstan (36th place) have a better performance than Uzbekistan on this indicator[2]. The rating itself (educational index) is calculated as the sum of 2/3 of the adult literacy index and 1/3 of the total student share index according to the formula. Among the reasons that influenced this result, experts usually indicate a lack of funds allocated for education, but in most cases, even with the most modern material and technical base, a professional crisis and a lack of highly qualified specialists cannot be overcome.

One of the main problems of the theory of "economics of education", a relatively new direction of economic theory, was the study of the relationship between education and economic growth. First, the relationship with the country's economic growth was studied. At the same time, education itself was considered as an investment area with long-term returns. At the end of the 20th century, education became synchronized with the national economy, and researchers began to study the resource base and its relationship with industry and production processes. Education was then classified as one of the largest sectors[3]. As a logical step of the next development, it is possible to show the development of projects aimed at improving the educational environment for the effective use, distribution and exchange of resources.

It is important for the scientific community to propose different estimation methods to look for the link between education financing and economic growth[4]. Thus, G.A. Untura's research

[1] Джумаева Р.А. Роль и значение системы образования в социально-экономическом развитии региона [Электронный ресурс] // Известия Самарского научного центра РАН. 2019. №2-2.

[2] https://gtmarket.ru/ratings/education-index

[3] Анисовец Т.А. Экономика образования и образовательного учреждения: учебно-методическое пособие. – СПб.: Отдел оперативной полиграфии НИУ ВШЭ, 2019. – 180 с.

[4] Де Мартино Марио, Г.Ф. Ткач, С.А. Коваленко Современные тенденции государственного финансирования высшего образования [Электронный ресурс] // Высшее образование в России. 2020. №3.

emphasizes that internal growth models in economic theory can be used to determine and evaluate the impact of funding higher education and science, because they usually work together to create economic conditions for increasing human capital and economic growth. will be considered. At the same time, Untura understands human capital itself as a set of knowledge, skills and abilities that a person has and uses in the life of society.

According to G.A. Untura's methodology, the impact of human capital on economic growth is related to the interaction of education financing with the dynamics of GDP growth, taking into account the flow of knowledge shown in the econometric model. The study also notes that funding for science and higher education plays a major role in potentially improving the economic situation. In view of the above, it is proposed to estimate the direct impact of education financing and economic growth of the region using economic modeling methods, which can, among other things, estimate the impact of knowledge migration between countries or regions[5]. According to statistical studies, financing of education and science creates a flow of knowledge between the regions of the country, which affects the dynamics of the gross regional product.

In such conditions, the main task is to evaluate the factors that directly affect human capital, not the impact on the growth rates of GNP per capita. At the same time, growth of gross regional product is often used in dynamics to measure socio-economic performance. But in order to assess economic growth and its dynamics in relation to education, a clear theoretical approach and a methodology that synthesizes empirical analysis of real data are necessary by modeling[6]. G.A. Untura's research uses the "knowledge flow" indicator, which is nothing more than the relationship between the share of expenditures on science and higher education and the GNP in regions and the distance between them. In fact, we are trying to determine the correlation with the need for additional funds for the region, the size of which is related to the distance between the regions. Because one of the current problems is related to the fact that due to the influx of personnel from other regions, it is being directed to meet the needs of the regions. In its content, it is similar to the innovation diffusion model, but not for technologies, but for people. According to this study, access to science leads to an improvement in endogenous growth, which affects the economic growth of the country and individual regions in a given period due to the improvement of human capital that facilitates the introduction of innovations.

It should be noted that many different approaches have been developed to estimate economic growth. Exogenous and endogenous growth models, spatial econometrics, etc. are examples of theseThus, even Robert Solow took into account the exogenous factor that describes the effect of technological progress on factors of production such as labor and capital. And this has already made it possible to look for a connection between economic growth and the development of science and education. Endogenous growth models are based on the work of

[5] Унтура Г.А. Оценка влияния человеческого капитала на экономический рост российских регионов в условиях финансовых ограничений [Электронный ресурс] // Пространственная экономика. 2019. №1.

[6] Божечкова А. В., Кляч Т. Л. Образование и экономический рост – М.: Издательский дом «Дело» РАНХиГС, 2019. – 120 с.

Paul Romer and Robert Lucas. Such models are based on the hypothesis that technical progress and human capital are the results of nominal economic growth, that is, endogenous factors. For example, as Paul Romer pointed out, economic growth is related to the creation of new knowledge, which in turn depends on the level of employment in the research and development sector and the existing stock of accumulated knowledge. Robert Lucas considered the direct connection with education. In his works, he described the relationship between education time and economic growth rates. The conclusion of his works is that the effectiveness of education depends on the time spent on education, and an increase in such time directly leads to economic growth[7].

By the end of the 20th century, other models were proposed to describe the relationship between innovation (including science and education) and economic growth. For example, the increase in the share of highly skilled workers in production and the introduction of innovations are measured by the impact on the average growth rate of the economy. It was also suggested that the emergence of the "open" innovation model had a positive effect on the dynamics of economic growth. A. Jaffe, D. Audrietsch and M. Feldman studied the interaction of knowledge flows between regions in their works[8]. According to their theory, economic growth occurs based on the influence of three factors of knowledge sources::

1) research works;
2) highly qualified and professional personnel;
3) basic research of a fundamental nature.

These and other models of economic growth describing the impact of human capital have been tested many times in different countries and at different times. But, unfortunately, the inconsistency of the results did not allow us to form a final opinion about the relationship between human capital and economic growth[9].

Russian research experience is also related to endogenous factors and their impact on human capital. A.V. Bojechkova found out that it is those who are engaged in vocational training that have an impact on economic growth, and those with higher education have an impact only in regions where a lot of attention is paid to the development of production industries.

R. M. Melnikov and V. A. Teslenko also conducted similar studies. They were studied in the fields of science and education, as well as the importance of employment of highly educated personnel in the economic development of the whole country. Later, research was conducted for the regions on the uniqueness of their national economic sectors. The hypothesis of the study was that it is not possible to ensure the growth of GNP due to the increase in the number of highly educated personnel in all regions.

[7] Муллахмедова С.С., Шахпазова Р.Д., Саралинова Д.С., Омаров З.З. Модель экономического роста Р.Солоу: генезис теории и методологии [Электронный ресурс] // РППЭ, 2019. №12 (110)

[8] Канева М.А., Унтура Г.А. Эволюция теорий и эмпирических моделей взаимосвязи экономического роста, науки и инноваций (часть 2) [Электронный ресурс] // Вестник НГУ. Серия: Социально-экономические науки. 2018. №1.

[9] Канева М.А., Унтура Г.А. Эволюция теорий и эмпирических моделей взаимосвязи экономического роста, науки и инноваций (часть 2) [Электронный ресурс] // Вестник НГУ. Серия: Социально-экономические науки. 2018. №1.

For example, Bozhechkova did not take into account the financing of science and higher education, as well as the flow of knowledge, while the approach of Melnikov and Teslenko covered this shortcoming[10].

In the ideas of A.Barro, X.Sala, M.Sresenzi and other researchers working with endogenous type models, the influence of spending on science in regions on economic growth and "diffusion of knowledge" was taken into account.

Among the approaches to calculating the value of the flow of knowledge, an important place is occupied by the formula of the access to education index. There are several other ways to assess the impact of education on economic growth. Their creation was also related to the search for shortcomings and mistakes of previous researchers. Thus, Kimko and Wasmen overcome the problem of incorrect measurement of human capital based on the calculation of the time of general and higher education and created their evaluation method, according to which, in order to have an objective conclusion, international research ma data should be used in a comparative form.

One of the features of their model is as follows:

$$g = GDP + C + S + e \quad (1)$$

Here

g - average annual growth rate of GDP per capita;

GDP - initial level of GDP per capita;

C - cognitive skills assessment measure (Program for International Student Assessment - PISA);

S - number of years of study.

According to the results of the model testing, the researchers proved that the evaluation of the scores is related to the rate of economic growth, and also found that the results of PISA are positively related to the gross domestic product and labor productivity.

Research was continued in other areas. In particular, T. Shultz in his works discussed the role of investments in education, i.e., the impact of investments in education on the rapid growth of human capital and the growth of national income was analyzed. This is a new theory, the investment component was moving from the material world (equipment, machines, raw materials) to the immaterial world of knowledge, and the effectiveness of such a phenomenon was actively proven. In general, investing in a person is a logical case, and it is aimed at getting a profit in the future.

In world practice, there are also approaches that evaluate education in terms of quality. For example, Ranepa employees have developed an approach related to calculating the overall level of the education system based on sub-index questionnaires, i.e. [11] such as "the result of

[10] Тренды цифрового образования [Электронный ресурс] // Материалы вебинаров, бесед и исследований Юрайт.Академии. Выпуск 2. Зимняя школа преподавателя 2021 / А. А. Сафонов [и др.]; составитель А. А. Сафонов, Э. Т. Кокая, А. А. Красюк, П. А. Частова. – Москва : Издательство Юрайт, 2021. – 93 с.

[11] Глухов П.П. Оценка качества системы дополнительного образования в регионе [Электронный ресурс] // Федеральный институт развития образования РАНХиГС.

the system's work", "ensuring the educational process", "conditions for the implementation of educational activities" and others:

IR = (r*0,30) + (p*0,20) + (c*0,20) + (a*0,30) (2)

Here:

IR - the final level of the educational system;

r – the value of the educational system according to the sub-index "result of system work";

p – the value of general education according to the subindex "providing the educational process";

c – the value of general education according to the sub-index "conditions for the implementation of educational activities";

a – the value of general education according to the subindex "availability of additional education".

The considered approaches allow assessing the impact of education on economic growth, but do not take into account modern conditions (rapid digitalization of education in the context of a pandemic).

Therefore, it is appropriate to make some changes to this formula, which can be expressed as follows:

IR = (r*0,30) + (p*0,20) + (c*0,20) + (b*0,30) (3)

Here:

r – the value of the educational system according to the sub-index "the result of the system's work";

p – the value of general education according to the subindex "providing the educational process";

c – the value of general education according to the subindex "conditions for the implementation of educational activities";

b – the value of general education according to the subindex "availability of distance education".

We believe that adding the indicator "Availability of distance education" to the formula will retain its value even during various crises and pandemics that may occur in the country.

CONCLUSION

Thus, as a result of the research, the study of theoretical and methodological approaches to substantiating and evaluating the impact of education on economic growth made it possible to identify a number of relationships. Different situations and conditions that arise in the world also set certain limits for determining the relationship between education and the economic growth of the country and require adaptation of the existing methods to the requirements of the changing world. Therefore, the introduction of additional indicators to determine interdependence is one of the important issues. All the indicators used in the calculations directly affect education, as a result of which the economic development of the country and regions. As a result of adding the sub-index "Availability of distance education", the following conclusions can be highlighted: the use of information and telecommunication technologies, which completely replaces the form of full-time education in the educational process, has a positive effect on all its participants (quality of education, assimilation of information, etc.)

leads to improvement of qualifications and skills, affects the involvement of students in the educational process, their passion and interest, as a result, the quality of future specialist personnel increases, which directly affects the economy of the country and region. Other sub-indexes produce the same result.

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