

MUHANDISLIK

& IQTISODIYOT

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ijtimoiy-iqtisodiy, innovatsion texnik,
fan va ta'limga oid ilmiy-amaliy jurnal

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ИМЕНИ Г.В. ПЛЕХАНОВА
ТАШКЕНТСКИЙ ФИЛИАЛ



muhandislik **& iqtisodiyot**

ijtimoiy-iqtisodiy, innovatsion texnik,
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- 05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
05.01.03 – Informatikaning nazariy asoslari
05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
05.01.06 – Hisoblash texnikasi va boshqaruv tizimlarining elementlari va qurilmalari
05.01.07 – Matematik modellashtirish
05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
05.02.00 – Mashinasozlik va mashinashunoslik
05.02.08 – Yer usti majmualari va uchish apparatlari
05.03.02 – Metrologiya va metrologiya ta'minoti
05.04.01 – Telekommunikatsiya va kompyuter tizimlari, telekommunikatsiya tarmoqlari va qurilmalari. Axborotlarni taqsimlash
05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
05.05.05 – Issiqlik texnikasining nazariy asoslari
05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
05.06.01 – To'qimachilik va yengil sanoat ishlab chiqarishlari materialshunosligi
05.08.03 – Temir yo'l transportini ishlatish
05.08.06 – "G'ildirakli va gusenisali mashinalar va ularni ishlatish" (texnika fanlari)
05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
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08.00.03 – Sanoat iqtisodiyoti
08.00.04 – Qishloq xo'jaligi iqtisodiyoti
08.00.05 – Xizmat ko'rsatish tarmoqlari iqtisodiyoti
08.00.06 – Ekonometrika va statistika
08.00.07 – Moliya, pul muomalasi va kredit
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08.00.15 – Tadbirkorlik va kichik biznes iqtisodiyoti
08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
08.00.17 – Turizm va mehmonxona faoliyati

Ma'lumot uchun, OAK
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ANALYSIS OF THE EFFECTIVENESS AND CURRENT STATE OF INVESTMENTS IN HUMAN CAPITAL IN THE REPUBLIC OF UZBEKISTAN

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Abstract. This article analyzes the effectiveness of investments in human capital in the Republic of Uzbekistan, their current state, and the factors influencing their efficiency. The study applies modern approaches to human capital assessment, particularly the World Bank's HCI+ (Human Capital Index Plus) methodology, which integrates health, education, and employment indicators. The analysis shows that although the volume of resources allocated to human capital in Uzbekistan has increased in recent years, their final economic and social outcomes still have further potential for improvement. In particular, improving the quality of education, expanding higher education coverage, increasing female employment, strengthening the linkage between the education system and the labor market, and enhancing results-based monitoring mechanisms are identified as priority areas.

Keywords: human capital, investment in human capital, investment efficiency, HCI+, education quality, higher education coverage, employment, female employment, labor market, Uzbekistan.

Annotatsiya. Mazkur maqolada O'zbekiston Respublikasida inson kapitaliga yo'naltirilgan investitsiyalarning samaradorligi, ularning amaldagi holati hamda samaradorlikka ta'sir etuvchi omillar tahlil qilingan. Tadqiqotda inson kapitalini baholashning zamonaviy yondashuvlari, xususan, Jahon bankining IKI+ (Inson kapitali indeksi plus) metodologiyasi asos qilib olingan bo'lib, unda sog'liqni saqlash, ta'lim va bandlik ko'rsatkichlari integrallashgan holda baholangan. Tahlillar shuni ko'rsatadiki, O'zbekistonda inson kapitaliga yo'naltirilayotgan resurslar hajmi so'nggi yillarda ortib borayotgan bo'lsa-da, ularning yakuniy iqtisodiy va ijtimoiy natijalarini yanada yaxshilash imkoniyatlari mavjud. Xususan, ta'lim sifatini oshirish, oliy ta'lim qamrovini kengaytirish, ayollar bandligini oshirish, ta'lim tizimi bilan mehnat bozori o'rtasidagi uzviylikni mustahkamlash hamda natijadorlikka asoslangan monitoring mexanizmlarini rivojlantirish ustuvor yo'nalishlar sifatida baholandi.

Kalit so'zlar: inson kapitali, inson kapitaliga investitsiyalar, investitsiya samaradorligi, IKI+, ta'lim sifati, oliy ta'lim qamrovi, bandlik, ayollar bandligi, mehnat bozori, O'zbekiston.

Аннотация. В данной статье проанализированы эффективность инвестиций в человеческий капитал в Республике Узбекистан, их текущее состояние, а также факторы, влияющие на их результативность. В исследовании использованы современные подходы к оценке человеческого капитала, в частности методология HCI+ (Human Capital Index Plus) Всемирного банка, основанная на интеграции показателей здравоохранения, образования и занятости. Результаты анализа показывают, что, несмотря на рост объемов ресурсов, направляемых на развитие человеческого капитала в Узбекистане в последние годы, сохраняются дополнительные возможности для повышения их конечной экономической и социальной отдачи. В частности, повышение качества образования, расширение охвата высшим образованием, увеличение занятости женщин, укрепление взаимосвязи между системой образования и рынком труда, а также совершенствование механизмов мониторинга, ориентированных на результат, определены как приоритетные направления.

Ключевые слова: человеческий капитал, инвестиции в человеческий капитал, эффективность инвестиций, HCI+, качество образования, охват высшим образованием, занятость, занятость женщин, рынок труда, Узбекистан.



INTRODUCTION

In the context of global economic transformation and increasing competition among countries, the development of human capital has become one of the key drivers of sustainable economic growth. Modern economic theory emphasizes that investments in human capital, particularly in education, healthcare, and employment, play a decisive role in enhancing productivity, innovation capacity, and long-term national competitiveness [1].

In recent years, the Republic of Uzbekistan has been implementing large-scale reforms aimed at improving the quality of human capital and increasing investments in social sectors. Within the framework of the Uzbekistan–2030 Strategy and other national development programs, particular attention has been paid to expanding access to education, improving healthcare systems, and increasing employment opportunities [2]. However, despite the growing volume of financial resources allocated to human capital, the issue of evaluating their effectiveness remains highly relevant. In particular, it is important to determine how these investments translate into measurable outcomes such as improved education quality, better health indicators, and higher employment levels.

Therefore, this study focuses on analyzing the effectiveness of investments in human capital in Uzbekistan and identifying priority directions for enhancing their efficiency based on modern methodological approaches.

LITERATURE REVIEW

Human capital has long been recognized as one of the main determinants of economic growth and national competitiveness. Classical studies by Gary Becker and Theodore Schultz emphasized that investments in education, health, and skills formation increase labor productivity and generate long-term economic returns. Human capital theory argues that expenditures on education and healthcare should not be considered as simple social spending, but rather as productive investments that contribute to higher incomes, technological progress, and sustainable development.

Recent literature has expanded the concept of human capital beyond formal education. According to World Bank studies, human capital includes not only years of schooling but also health conditions in early childhood, learning quality, higher education completion, labor market participation, and workplace experience. The introduction of the Human Capital Index Plus (HCI+) methodology reflects this broader understanding by integrating health, education, and employment indicators into a single framework. This approach allows researchers to assess not only the amount of investment in human capital but also its real social and economic outcomes.

A significant body of literature emphasizes the importance of health as the biological foundation of human capital. Research shows that poor nutrition, childhood stunting, and low adult survival rates reduce cognitive development, educational attainment, and future earnings. Studies by the World Bank demonstrate that investments in healthcare and early childhood development have one of the highest long-term returns among all forms of human capital investment. Countries with stronger health outcomes tend to achieve higher labor productivity and stronger economic growth.

Education is considered the second major pillar of human capital. However, modern studies stress that the number of years spent in school alone is not sufficient. What matters more is the quality of learning outcomes, including literacy, numeracy, digital skills, and problem-solving abilities. According to international evidence, countries that improve teacher quality, curriculum standards, and access to higher education experience stronger human capital growth and better labor market outcomes. In the case of Uzbekistan, the literature highlights that although education spending has increased significantly, the effectiveness of these investments depends on how successfully they improve learning quality and align graduates' skills with labor market demands.

Employment outcomes are also widely discussed in the literature as an important dimension of human capital efficiency. Scholars argue that investments in education and health produce strong economic returns only when individuals are effectively integrated into the labor market. High unemployment, informal employment, and low female labor force participation reduce the economic value of human capital. In particular, the low level of women's employment remains one of the major constraints on human capital development in many developing countries, including Uzbekistan. International evidence suggests that expanding childcare services, flexible work arrangements, and entrepreneurship support programs for women can significantly improve both employment and economic growth.

Another important issue emphasized in the literature is the "cost–result lag" phenomenon. Human capital investments do not generate immediate returns; instead, their effects appear gradually over a period of several years. For example, improvements in school quality or healthcare services may take 5–10 years to be reflected

in productivity and employment indicators. Therefore, many authors argue that the evaluation of human capital investments should be based on long-term outcomes rather than short-term changes in expenditure levels. This is particularly relevant for Uzbekistan, where increases in education expenditures have not always produced proportional growth in the HCI indicator.

Finally, recent studies underline that human capital formation is not limited to schools and healthcare systems alone. Household environments, local communities, workplace experiences, and institutional quality also play a critical role. In Uzbekistan, the mahalla institution, family support, and enterprise-based training programs can contribute significantly to strengthening human capital outcomes. Therefore, most researchers conclude that an integrated policy approach combining education, healthcare, employment, and community support mechanisms is necessary to increase the overall effectiveness of human capital investments.

RESEARCH METHODOLOGY

This study aims to evaluate the effectiveness of investments in human capital and employs a comprehensive, systemic, and comparative approach. The theoretical foundation of the research is based on human capital theory, the concept of results-based evaluation, and the HCI+ methodology, which enables the integrated measurement of human capital through health, education, and employment outcomes.

During the research process, methods such as analysis and synthesis, comparison, grouping, dynamic analysis, and logical generalization were applied. First, the indicators reflecting the effectiveness of investments in human capital were systematized into four categories: health outcomes, education outcomes, employment outcomes, and an integrated index. Subsequently, the current state of these indicators in Uzbekistan was analyzed, and their interrelationships were examined.

The study also pays particular attention to identifying the relationship between the dynamics of education expenditures during 2018–2025 and changes in the human capital index. In this context, the proportionality between government spending as a share of GDP and integrated human capital outcomes, as well as issues related to time-lag effects and investment returns, were analyzed. This approach makes it possible to assess the effectiveness of investments in human capital not only in the short term, but also on the basis of their long-term outcomes.

ANALYSIS AND RESULTS

To increase the effectiveness of investments in human capital in Uzbekistan, it is necessary to implement not isolated policy measures, but interconnected and comprehensive policy actions. From this perspective, the following table systematizes the priority areas that contribute to strengthening human capital outcomes, their current state, proposed policy measures, and expected impacts (Table 1).

Table 1. Priority directions for increasing the effectiveness of human capital investments in Uzbekistan¹

Direction	Current Status (2026)	Proposed Policy Measures	Expected HCI+ Impact	Implementation Period
Education Quality	Education quality indicator: 392/625	Improving teacher qualifications at the school level; introducing digital learning platforms	+15–20 points	3–5 years
Higher Education Coverage	10% (ages 30–34)	Expanding university quotas; developing distance/part-time education; strengthening business–education cooperation	+12–18 points	5–8 years
Female Employment	31% formal employment	Expanding childcare infrastructure; providing preferential loans for women’s entrepreneurship; supporting flexible work arrangements	+10–15 points	3–6 years
Mahalla-based Human Capital	Existing platform, but limited	Integrating healthcare and education services through the mahalla; involving community representatives in monitoring	+5–8 points	2–4 years
Corporate Training and Internships	Low coverage, mostly informal	Providing tax incentives for enterprise-based internship programs; introducing a system of professional standards	+6–10 points	3–5 years

¹ author’s development



The data presented in the table show that one of the most important directions for improving the effectiveness of human capital investments in Uzbekistan is the quality of education. The education quality indicator at the level of 392/625 suggests the need to further strengthen students' knowledge and skills. Therefore, improving teacher qualifications and expanding the use of digital education tools can have the most significant positive impact on the HCI+ indicator.

The second important direction is related to higher education coverage. The fact that only 10% of the population aged 30–34 has higher education limits the potential of highly qualified human resources. Expanding university admission quotas and strengthening cooperation with the business sector can yield significant results in this area.

Female employment is of particular strategic importance. The formal employment rate of 31% indicates that labor resources are not yet being fully utilized. Expanding childcare infrastructure and promoting flexible forms of employment can increase not only employment but also overall economic activity.

At the same time, the mahalla system and corporate training programs serve as additional but important factors in strengthening human capital. Integrating healthcare and education services through the mahalla system reduces regional disparities, while internship and practical training programs in enterprises help bridge the gap between education and the labor market.

Overall, the measures presented in the table are likely to produce stronger results when implemented in an integrated rather than isolated manner. Therefore, a comprehensive and coordinated approach is required to enhance the effectiveness of human capital investments in Uzbekistan.

Evaluating the effectiveness of public expenditures directed toward human capital requires analyzing their dynamics and their relationship with outcome indicators. In particular, examining how increasing education expenditures are reflected in human capital indices makes it possible to assess the real effectiveness of public policy. From this perspective, a comprehensive analysis of the dynamics of education expenditures and the Human Capital Index (HCI) in Uzbekistan during 2018–2025 serves as an important methodological basis.

During this period, reforms and financial support measures aimed at developing the education system were expanded, and the share of education expenditures in GDP steadily increased. At the same time, growth in the HCI indicator was also observed. However, the proportionality of these increases and their level of effectiveness require separate scientific analysis (Figure 1).

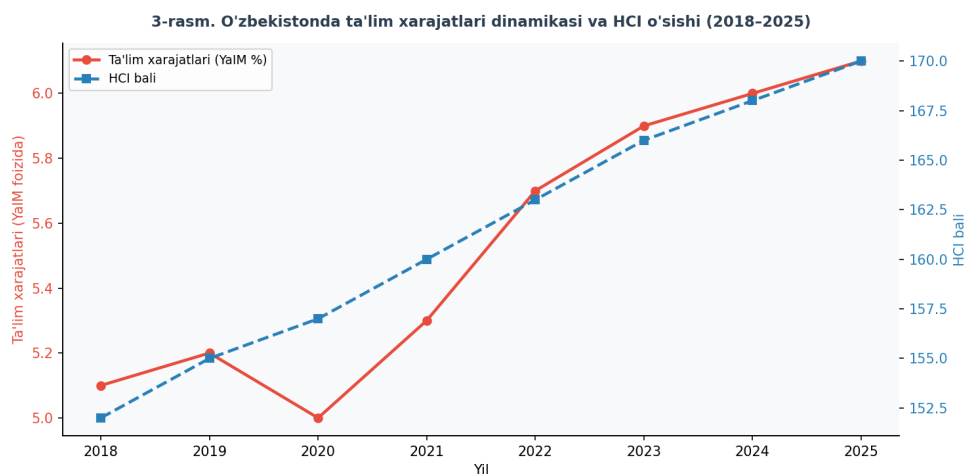


Figure 1. Dynamics of education expenditures and HCI growth in Uzbekistan (2018–2025)²

The data show that the share of education expenditures in GDP increased from 5.1% in 2018 to 6.1% in 2025, reflecting the government's strong commitment to human capital development. At the same time, the HCI indicator increased from 152 to 170 points, representing an 18-point improvement.

Although these trends demonstrate a positive relationship, they are not fully proportional. In some years, despite sharp increases in education expenditures, the growth rate of the HCI indicator remained relatively stable and moderate. For example, in 2021–2022, education expenditures increased significantly, while HCI growth remained more gradual. This indicates that the results of investments in human capital do not fully materialize in the short term.

Moreover, in 2020, despite a decrease in education expenditures (from 5.2% to 5.0%), the HCI indicator continued to grow. This reflects the inertia of human capital indicators, meaning they are shaped by investments

² author's development



made in previous years. Thus, human capital outcomes are determined not only by current expenditures but also by the cumulative effect of long-term investments.

One of the most important features observed in the graph is the “cost–result lag” phenomenon. In other words, the real effects of investments in education are formed gradually over a period of 5–10 years. Therefore, although expenditures increased significantly during 2018–2025, the growth of the HCI indicator occurred more slowly and steadily.

Additionally, the graph indirectly highlights the importance of the composition of investments. If expenditures are directed mainly toward infrastructure or quantitative expansion, their impact on HCI may be limited. In contrast, investments aimed at improving teacher quality, education content, curricula, and integration with the labor market tend to have a stronger qualitative effect on human capital.

The data confirm that investments in human capital in Uzbekistan are increasing, but their results are reflected in HCI indicators gradually and with a time lag. This justifies the need for a long-term approach to evaluating the effectiveness of human capital investments.

The analysis of effectiveness indicators and the current state of investments in human capital in Uzbekistan shows that although the volume of resources allocated to this sector has significantly increased in recent years, their final effectiveness has not yet reached its full potential. It is evident that evaluating human capital requires not only assessing financial inputs but also understanding how these investments are reflected in health, education, and employment outcomes.

In this regard, the HCI+ methodology has proven to be one of the most important comprehensive tools for assessing the current state of human capital. The overall indicator for Uzbekistan stands at 170 points, suggesting that there are still opportunities to utilize the country's existing potential more effectively. The analysis shows that among the components of human capital, relatively better results are observed in education. However, limitations related to education quality, harmonized learning outcomes, and higher education completion rates reduce the effectiveness of investments.

Within the health component, some indicators remain below regional averages, which may weaken the biological and functional foundations of human capital. The most challenging area is employment, where insufficient levels of effective employment, wage labor, and especially female economic participation significantly limit the economic returns of human capital.

The table and graphical analysis also lead to an important conclusion: an increase in investment volume does not always result in a proportional increase in human capital outcomes. The slower growth of HCI compared to the growth of education expenditures during 2018–2025 is explained by the “cost–result lag” phenomenon. This indicates that the evaluation of human capital investments should be based on long-term outcomes rather than short-term results. In particular, alongside infrastructure spending, greater priority should be given to investments in teacher quality, education content, labor market integration, and institutional governance.

Furthermore, human capital formation does not occur solely within schools, universities, or healthcare systems but is also closely linked to household environments, the mahalla institution, and workplace experiences. Therefore, the recommended policy directions—improving education quality, expanding higher education coverage, increasing female employment, integrating mahalla-based services, and developing corporate training systems—should be implemented as interconnected measures.

Overall, the evaluation of human capital investments in Uzbekistan shows that while there are positive developments, increasing the volume of resources alone is not sufficient to significantly improve effectiveness. Greater emphasis should be placed on the quality of investments, their targeted allocation, strengthening monitoring and evaluation mechanisms, and ensuring coordination between education, health, and employment policies. Only under such conditions can the economic return on human capital be increased, creating a solid foundation for long-term competitiveness and sustainable economic growth.

CONCLUSION AND RECOMMENDATIONS

The results of the study show that although the volume of investments directed toward human capital in Uzbekistan has been increasing in recent years, their effectiveness still has further potential for improvement. It is substantiated that, in evaluating human capital, it is important not only to consider the volume of financial resources but also how these resources are reflected in health, education, and employment outcomes.

The analysis indicates that among the components of human capital, relatively positive progress is observed in education. However, issues such as education quality, higher education graduation rates, and the insufficient alignment of education outcomes with labor market demands continue to limit the effectiveness of investments. At the same time, employment indicators—especially the low levels of employment among women and youth—emerge as key factors reducing the economic return of human capital.



Furthermore, the study shows that the effects of investments in human capital do not appear immediately but manifest over a certain period. Although there is a positive relationship between increasing education expenditures and the Human Capital Index, this relationship is not fully proportional. This phenomenon is explained by the “cost–result lag,” highlighting the necessity of evaluating human capital investments from a long-term perspective.

In conclusion, to enhance the effectiveness of investments in human capital in Uzbekistan, it is necessary to develop, in an integrated manner, education quality, higher education coverage, health outcomes, the employment of women and youth, community-based support institutions, corporate training systems, as well as monitoring and evaluation mechanisms. Only through a comprehensive and integrated policy approach can the economic returns on human capital be increased, the country’s long-term competitiveness strengthened, and the necessary conditions for sustainable economic growth created.

Human capital has long been recognized as one of the main determinants of economic growth and national competitiveness. Classical studies by Gary Becker and Theodore Schultz emphasized that investments in education, health, and skills formation increase labor productivity and generate long-term economic returns. Human capital theory argues that expenditures on education and healthcare should not be considered as simple social spending, but rather as productive investments that contribute to higher incomes, technological progress, and sustainable development.

Recent literature has expanded the concept of human capital beyond formal education. According to World Bank studies, human capital includes not only years of schooling but also health conditions in early childhood, learning quality, higher education completion, labor market participation, and workplace experience. The introduction of the Human Capital Index Plus (HCI+) methodology reflects this broader understanding by integrating health, education, and employment indicators into a single framework. This approach allows researchers to assess not only the amount of investment in human capital but also its real social and economic outcomes.

A significant body of literature emphasizes the importance of health as the biological foundation of human capital. Research shows that poor nutrition, childhood stunting, and low adult survival rates reduce cognitive development, educational attainment, and future earnings. Studies by the World Bank demonstrate that investments in healthcare and early childhood development have one of the highest long-term returns among all forms of human capital investment. Countries with stronger health outcomes tend to achieve higher labor productivity and stronger economic growth.

Education is considered the second major pillar of human capital. However, modern studies stress that the number of years spent in school alone is not sufficient. What matters more is the quality of learning outcomes, including literacy, numeracy, digital skills, and problem-solving abilities. According to international evidence, countries that improve teacher quality, curriculum standards, and access to higher education experience stronger human capital growth and better labor market outcomes. In the case of Uzbekistan, the literature highlights that although education spending has increased significantly, the effectiveness of these investments depends on how successfully they improve learning quality and align graduates’ skills with labor market demands.

Employment outcomes are also widely discussed in the literature as an important dimension of human capital efficiency. Scholars argue that investments in education and health produce strong economic returns only when individuals are effectively integrated into the labor market. High unemployment, informal employment, and low female labor force participation reduce the economic value of human capital. In particular, the low level of women’s employment remains one of the major constraints on human capital development in many developing countries, including Uzbekistan. International evidence suggests that expanding childcare services, flexible work arrangements, and entrepreneurship support programs for women can significantly improve both employment and economic growth.

Another important issue emphasized in the literature is the “cost–result lag” phenomenon. Human capital investments do not generate immediate returns; instead, their effects appear gradually over a period of several years. For example, improvements in school quality or healthcare services may take 5–10 years to be reflected in productivity and employment indicators. Therefore, many authors argue that the evaluation of human capital investments should be based on long-term outcomes rather than short-term changes in expenditure levels. This is particularly relevant for Uzbekistan, where increases in education expenditures have not always produced proportional growth in the HCI indicator.

Finally, recent studies underline that human capital formation is not limited to schools and healthcare systems alone. Household environments, local communities, workplace experiences, and institutional quality also play a critical role. In Uzbekistan, the mahalla institution, family support, and enterprise-based training programs can contribute significantly to strengthening human capital outcomes. Therefore, most researchers conclude that an integrated policy approach combining education, healthcare, employment, and community support mechanisms is necessary to increase the overall effectiveness of human capital investments.

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