

Economics of Education In light of economic requirements Knowledge

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Abstract: This study aims to analyze the role of the economics of education in supporting the transition toward a knowledge-based economy by examining the efficiency of educational investment and the extent to which educational systems respond to the requirements of the knowledge economy. The study adopts a descriptive–analytical approach to review the theoretical framework of the economics of education and its relationship with economic growth, relying on the analysis of relevant literature, previous studies, and secondary statistical indicators from international reports. The findings indicate that education is a fundamental driver of the knowledge economy and a key factor in human capital development. Investment in higher and technical education yields high economic returns; however, a gap persists between educational outcomes and labor market needs. The results also highlight the importance of research and development and the effective integration of educational technologies in improving the quality and efficiency of education. The study recommends increasing investment in education as a strategic priority, aligning curricula with knowledge economy skills, strengthening partnerships between educational institutions and the private sector, and enhancing support for research, innovation, and digital learning.

Keywords: Economics of Education, Knowledge Economy, Human Capital, Measuring Returns on Investment in Education.

Jel Classification Codes: A2

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Introduction:

The trend towards higher returns on education in the primary stages and lower returns in the subsequent stages, especially university education, as well as the trend towards a decrease in the returns on education over time, must place a burden on economic and social policies in general and educational policies in particular to deal with the behavior of this type of returns as indicators of the reality of human capital in various countries of the Third World, and what these indicators represent in terms of the relationship with labor markets, family sectors and the rest of the economic sectors and activities.

This burden is compounded in most developing countries, where the contribution of human capital to economic growth is low. Estimates of the contribution of education to economic growth in the Middle East and North Africa region have shown that this contribution is lower than in other regions, and even becomes negative in the case of non-oil countries. These modest results for the contribution of education have been attributed to economic distortions in labor markets.

However, this analysis may be unfair to scientific economic analysis, given the immediate role that education plays in producing human capital and the most important variable in the human development equation. Hence, this type of education becomes extremely responsible for supplying the labor market with the appropriate competencies within the required time frame and spatial environment.

An important part of this responsibility has been undertaken by “educational economics,” which is dedicated to “researching the best ways to use educational resources – human, temporal, financial, and technological – in order to develop human beings (through science and training) in a comprehensive and integrated manner, present and future, individually and socially, and for the best possible distribution of this development.” (Weil ‘david n. (2009))

The content and use of these methods, the mechanisms of comprehensive and integrated training, and the requirements of modern education form the problem of our article, which will discuss the dimensions of investment in education in light of the requirements of the modern knowledge-based economy.

Research Problem:

This article addresses the following question:

How does education, as an investment in human capital, contribute to the transition toward a knowledge-based economy?

Main Research Hypothesis

There is a significant relationship between the efficiency of investment in education and the effectiveness of the transition toward a knowledge-based economy, which positively contributes to human capital development and economic growth.

Significance of the Study

- ✓ To highlight the evolution of education from a social service to an economic investment.
- ✓ To analyze changes in educational returns in developing countries.
- ✓ To support policymakers in linking education strategies to the requirements of the knowledge economy.

Methodology

The study adopts a descriptive-analytical approach through:

- Reviewing the literature on the knowledge economy.
- Examining economic studies on human capital.
- Presenting quantitative methods for measuring returns on investment in education

Previous Studies

Several studies have examined the relationship between education economics and the requirements of the knowledge-based economy, emphasizing the critical role of education in economic growth and human capital development.

A number of studies have found that investment in education significantly contributes to economic growth, particularly in knowledge-based economies where human capital, innovation, and technological skills are key drivers of productivity. These studies indicate that higher levels of educational attainment are positively associated with income growth, labor market efficiency, and national competitiveness.

Other studies have focused on the role of higher education and technical education in supporting the knowledge economy. Their findings suggest that universities play a central role in knowledge production through research and development, innovation, and

technology transfer. However, several studies also highlight a mismatch between educational outcomes and labor market needs, which limits the effectiveness of education systems in meeting knowledge economy demands.

In addition, previous research has emphasized the importance of educational technology and digital learning in improving the efficiency and quality of education. These studies conclude that integrating information and communication technologies (ICT) into education enhances learning outcomes, supports lifelong learning, and increases access to knowledge, provided that adequate infrastructure and teacher training are available.

Furthermore, some studies have addressed challenges facing education systems in developing countries, such as insufficient funding, weak research capacity, and inequality in access to quality education. These challenges hinder the ability of education systems to fully support the transition to a knowledge-based economy.

Overall, previous studies agree that education is a fundamental pillar of the knowledge economy, but they stress the need for comprehensive educational reforms, increased investment, and stronger linkages between education, research, and the labor market.

First: Requirements of the knowledge economy: the education approach.

The current era is known as the knowledge age and is characterized by key features that make it very different from previous eras in which philosophies and trends prevailed that expressed agriculture or industry as the main human activity in those eras.

Knowledge has become the true source of power enjoyed by individuals, organizations, or states. Knowledge, not money, position, or political affiliation, is the true source of power in the age and society of knowledge. This has led to an interest in integrating, organizing, and developing sources of knowledge, increasing the importance and value of work with knowledge content, and causing the majority of members of society to engage in it. Knowledge Workers) especially in the services industry, which has come to represent the highest proportions in the formation of the gross national product of countries that are economically, technologically and knowledge-based advanced. (Dominique foray,p58 2004)

Peter Drucker says A post-capitalist society will be characterized by knowledge as its primary resource, rather than capital, raw materials, or other factors of production. This new society will also comprise new social classes, distinct from those prevalent in capitalist society. In this society, there are two main classes:

First Capitalists and these have been replaced in importance by managers (Drucker P35 2000) .

Second Workers, some of whom are becoming a middle class as a result of increased productivity and industrial progress.

The knowledge society consists of two basic layers:

- knowledge workers
- service workers

Cognitive activities will also be included is the basis of wealth production two most important tools are "productivity". "Creativity".

The value of knowledge lies in its being the basis for wealth-producing activities through the application and use of ideas, information, concepts, and methods for any of the following three purposes:

- Continuous Improvement [Kaizen], which is working on developing current processes, products and services by applying available knowledge.
- Using existing knowledge to produce new and different processes and products, but of the same types as existing products.
- Creating processes, products, and services that were previously unknown.

And in the same vein we find (Alvin Toffler It affirms that knowledge is the source of the highest quality power. the key to power transfer Power shift Therefore, the struggle to own and control knowledge, and to monopolize the means of communication that transmit knowledge, is at the heart of the conflict between global economies, and the future belongs to those who use their minds and not their hands.

Access to the knowledge economy makes the analysis of production systems more complex, since traditional statistical approaches, which are based in particular on the contribution of different activity sectors to the gross domestic product, and input-output tables, do not allow for an understanding of the basic characteristics of knowledge generation and circulation. That is, the

transformation of the way economies operate must be accompanied by a renewal in the tools for measuring economic phenomena (Weil & David P144 2009).

The meaning of a knowledge-based economy varies according to the nature of the business, and these differences are related to two questions:

As for the first Do we distinguish between knowledge and information?

As for the second Is knowledge defined by the results of activities adopted to produce knowledge?

Knowledge differs from information because it requires the ability to learn, and it consists not only of general information, but also of established knowledge and skills that can be easily isolated from their surroundings. Therefore, generating new knowledge appears to be a learning process.

The logic based on integrating knowledge and information into reality stems from confusing two types of knowledge dissemination:

The first It relates to information about the results of innovation activity in research bodies, which are actually published at a low cost.

The second It is concerned with transforming this information into practical knowledge for production.

The second type of dissemination is the most difficult, requiring each educational institution to ensure sufficient learning capacity to absorb the results obtained elsewhere.

The distinction between knowledge and information allows us to identify the economic problems related to these two concepts. Since information is generated at almost no cost, the economic problem related to it is the problem of discovering and producing it. In contrast, the basic economic problem related to knowledge is the problem of generating it, which goes through a learning process, even if it is in a coded form (William a. Fischel, 2008 P98)

Starting in the 1990s, approaches developed suggesting that knowledge-based economies consist of a dual phenomenon:

First: "A trend associated with increasing resources allocated to the production and transfer of knowledge (education, training, research, economic integration...)."

Second: "The emergence of new information and communication technologies has led to a flourishing of knowledge activities through processing, storage, distribution and dissemination capabilities."

Many contemporary thinkers and researchers agree that the world is now living through a different and distinct phase compared to previous phases, and the term "information age" has become widely used to describe this phase, which is characterized by the following:

- The emergence of the information industry as a fundamental pillar in building the economy.
- The emergence of services as the most important aspect of economic activity.
- Intensive investment in the product of human thought.
- Extensive investment in computer and communication technologies.

The tremendous development in information and communication technologies has led to an intense focus on human beings and human development as the goal of all economic progress. Consequently, interest in science and scientific research has become a fundamental pillar in the new global system, and the product of human work and the accumulation of scientific and technological creativity has become a feature of the new era or the age of knowledge (Diaconescu claudia 2014P 240).

Based on these characteristics, the knowledge economy has a set of distinctive indicators that can be divided into:

1- Science and Technology Indicators: Which takes one of the following forms:

A- Research and Development: The two main inputs used are: expenditures allocated to research and development, and the staff employed for research and development. These indicators are subject to a long, systematic, and standardized data collection process that allows for dynamic analyses and international comparisons. The calibration is based on the principle that research and development includes experimental work carried out systematically with the aim of increasing the body of knowledge and using it for new applications.

b) Patents: A patent is a temporary monopoly right granted by the government to an inventor in exchange for publishing their invention for a limited period and according to certain conditions. Three main criteria are used to enumerate patents:

- The censuses are arranged according to priority (the country where the first application is submitted).
- Statistics based on the inventor's country of residence reflect a country's technological capabilities.
- The enumerations, according to the applicant's country of residence, represent control over the invention.

However, there are many limitations to using patent statistics as indicators of the knowledge economy, as not all inventions can technically be patented, as is the case according to the industrial sector, the size of companies, and legal differences in countries.

c) Scientific publications: The quantitative science data for indexing is based on a number of publications to evaluate the results of basic research activities, and allows for three types of indicators:

- Scientifically focused indicators.
 - Indicators of scientific disciplines by subject.
 - Research impact indicators (number of certificates) by subject.
- These indicators also allow for the analysis of the relationships between the scientific system and technological knowledge.

d- Technological balance of payments: The balance of payments for technology is a measure of international transfers of non-embedded technology, and it includes four categories:

- ✓ Transfer of expertise and licenses.
- ✓ Transfer of privileges, trademarks, and models.
- ✓ Transfer of technical services and engineering studies.
- ✓ Industrial-oriented research.

2- Indicators related to human resources: Human resources indicators have two main sources:

A- Education and training: Education-based indicators allow for the assessment of knowledge and skills acquired during the formal education stage, through indicators of the population's training level, measuring adult skills, and measuring the individual characteristics of people.

As for training-based indicators, they are based on data on resources allocated to training by individuals, companies, or governments.

B- Skills and professions: This includes a range of indicators, among them:

- Human resources dedicated to science and technology.
- Indicators of human resource mobility.

These were a set of indicators that can be used to judge the extent of knowledge penetration into a country, society, or educational institution. They can also be used to highlight the most important aspects of the knowledge economy. However, the limitations of these indicators are soon raised sharply in light of the particularities of this new economy based on the particularities of knowledge itself, as it is difficult to measure the latter by current standards. On the one hand, this is the case, and on the other hand, the knowledge economy does not only require technical and intellectual skills, but also entirely new methodologies to deal effectively and efficiently with achievements and their rapid rates of change. This confirms that despite the enormous developments and unprecedented opportunities that this economy provides in the educational fields, it simultaneously imposes expected and unexpected challenges on educational institutions, which necessitates modern requirements and alternatives that we will address in the following points (Joseph holden 2014 P102).

Second: Economics of Education: An Investment Approach.

The human population of a country may be a source of active and effective economic and cultural power, interacting with any amount of natural resources to achieve greater economic prosperity... and therefore the growth of this human population or population increase is desirable (as is the case in developed countries), or the population size may turn into a mere inactive human quantity that does not affect the social and economic environment in which it lives (even if natural resources are available in large quantities), and therefore its increase or growth can only be described as harmful inflation.

The United Nations has given special attention to the term human development since 1990 when it issued its first Human Development Report. The latter can be defined as "the currency of expanding and utilizing human capabilities." In this regard, it should be noted that human development has two aspects:

- **Firstly** The capacity-building aspect involves investing in education, health, nutrition, and training.
- **Secondly** The aspect of utilizing these capabilities through increasing added value and driving development.

Undoubtedly, advancing development can only be achieved through building human resources by providing the right educational and training opportunities that bring them to that stage and continuously

raising their efficiency to meet the demands of the changing economy. To enable the establishment of the foundations of sustainable development, this requires a workforce with higher levels of education

Table (1): The impact of different education levels on rates of return in low-income countries.

Social rate of return	Special rate of return	Rates of return
		Education levels
20.60%	26.40%	primary education
14.10%	18.50%	Secondary education
11.30%	22.40%	Education High

The source: Diaconescu claudia (2014). The costs and benefits of education p 48

Among the most prominent findings of studies that have explored education and its relationship to development are the following:

- In a study that used sectoral series data from 27 Brazilian states in 1970-1980 to estimate a production function, where the dependent variable was the real growth rate and the explanatory variables were the growth rate of physical capital, the growth rate of labor, the growth rate of human capital (expressed as education), and the rate of technological progress, it became clear that education was the second most important factor affecting economic growth after technological progress, with the latter explaining 40%.% of growth, while the first explained 24% of growth, and it turned out that increasing the average years of education for members of the workforce by one percentage point leads to an increase in real output of approximately 20%.
- In a study conducted on six developed countries, namely Japan, Britain, Sweden, France, Italy and Australia, during different time periods to test the reciprocal causal relationship between growth and education, it became clear that the level of education and its development had a substantial and direct impact on the level of development and its growth rate in the first four countries, and it did not have a substantial impact on development in two, namely Australia and Italy. This study indicated that there is no mechanical relationship between education and development, as education may not lead to development in some cases. This occurs if the content of education does not serve the purposes of development or if the quality of education itself is so poor that graduates with their high

but low level cannot benefit development more than what is actually required, which results in an increase in unemployment rates without any increase in output.

- Another study distinguished between over-educated and under-educated individuals. If an individual receives more education than the job they hold requires, they are over-educated. If an individual receives less education than the job they hold requires, they are under-educated. This study proved that enrollment in universities with low-quality education creates the phenomenon of over-educated individuals. These individuals are not suitable for jobs that match their academic degrees due to their lack of experience and poor academic level. Therefore, they seek jobs that require a level lower than their degree. As for universities that provide good-quality education, their graduates are not over-educated. This is due to their ability to join jobs that match their academic degree because of their outstanding performance. This confirms that agreeing on education may not help to drive development if this education is of poor quality (Mohammad sadik 2018 P65)
- In a study conducted on 17 academic departments in the United States across three different scientific fields, in addition to engineering, social sciences, and natural sciences, where each department produces four outputs—undergraduate teaching, master's teaching, doctoral teaching, and scientific research—it became clear that there are two types of economies of scale in education at these institutions:
- ✓ The first is economies of scale, which is represented by the decrease in average cost as the volume of production increases.
- ✓ The second is economies of scale, which refers to the cost savings achieved by an enterprise as a result of producing a number of products instead of producing a single product.

Economically, education is of interest to us as an industry whose main function is to disseminate existing knowledge, and it also tries to increase and develop the existing volume of knowledge. Undoubtedly, much of the attention that has been directed towards the economics of education has resulted from viewing it as an industry that absorbs economic resources like any other industry. It agrees with other industries in purchasing the necessary factors of production from the markets for these factors. However, the education industry differs in its nature from other industries in the following ways:

- The output of the education industry is not sold directly like the output of consumer industries, for example.
 - The production cycle in this industry is much longer than in other industries.
 - This industry consumes a large portion of its production, which is again considered one of the factors of production necessary for it.
- For economists, the labor market is no longer just a study of employment requirements and conditions, the beginning and development of salary and wage rates, and promotion rules. Rather, it also takes into account planned expansions in education, which must be linked to specific economic goals. Here, the problem arises of how to measure the economic value of education, and what is the rate of return on investment in this industry so that it can be compared to the economic returns on other investments. In other words, is spending on education consumption spending or investment spending?(Joseph holden.(2014).

The assertion that spending on education is an investment was only possible through recognizing the contribution of this type of education to increasing national production and economic growth. To recognize this contribution, it came first through observing that the increases in the national product of some developed countries were large compared to the increases in the uses of physical capital, working hours (employment), and natural resources. From this, some economists concluded that this increase in national product, which cannot be explained by increases in employment, physical capital, and natural resources, was due to the residual element, which subsequently became synonymous with the expression investment in human capital.

To explain education as a human investment, we present the most important economic theories of the leading pioneers in the field of investment in human capital: (T.w schultz.1961)

Schultz's theory: Schultz based his concept of human capital on three basic assumptions:

Economic growth that cannot be explained by an increase in material inputs is due to an increase in the accumulated stock of human capital.

- Differences in revenue can be explained by differences in the amount of human capital invested in individuals.

- Income equity can be achieved by increasing the ratio of human capital to traditional capital.

Schultz focused his attention on the education process as a necessary investment for human resource development after his research in the agricultural field, where he found that agricultural yields increase with constant material factors of production due to continuous investment in farms. Schultz identified two types of resources that go into education:

- The lost income for the individual, which he could have obtained if he had not pursued education.
- The resources needed to complete the learning process itself.



Baker's theory Becker is considered one of the most important researchers who developed the theory of human capital, especially in the field of education, by emphasizing the training process, which he divided into two types:

- ✓ General training that increases an individual's marginal productivity.
- ✓ Specialized training that increases an individual's marginal productivity in the field in which they practice or specialize, and no other.

The value of an individual who receives specialized training in education increases, and to clarify the components of this investment in the field of education, we will present the following proposal.

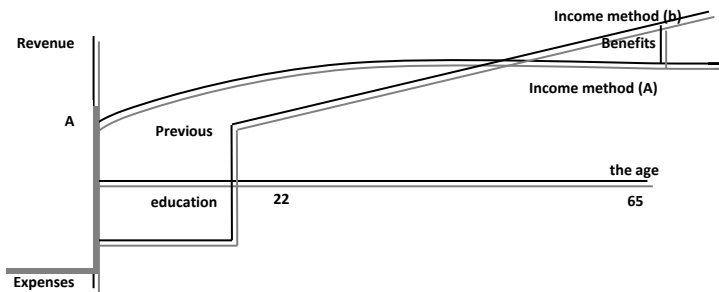
Calculating the interest on an investment over time requires a successive discounting of future benefits. Future benefits are less important to us than present benefits for two reasons: firstly, individuals plan to consume their benefits early to ensure their availability and eliminate future uncertainties; secondly, individuals prefer to invest their present benefits to grow them in the future. The present value of annual interest (P) over a time period (N). Since (F) is the interest rate or discount rate and is positive, interest will be discounted gradually in the future. For example, if $F = 60\%$ Therefore, interest payable over 30 years will represent only 17% of the weight placed on interest payable immediately, and includes costs the Colleges usually:

- ❖ Direct costs of education, fees, and books.
- ❖ Opportunity costs associated with being a full-time student.

Therefore, the costs Total To join the All at Highvery, If a person enrolls in an engineering college for example It has two methods:

Method (A) High school graduate has a lifetime income, starting immediately but not rising significantly. Method (B) College graduate, a negative path for the first four years, then a period where the pay is lower than in Method (A), but it rises afterwards, as illustrated in the following figure:

Figure (1): Higher education as an investment.



The source: Mohammad sadik (2018). Educational planning: approaches, trends, and learnings a case p 109

If we move away from this description of education as a human investment, we return to our question: Is education a consumer expenditure or an investment?

Economists consider spending on education, from an individual's perspective, as an investment if the desire to acquire it is linked to its impact on expected income, and as consumption if the desire to acquire it is linked solely to the purpose of knowledge. For society as a whole, it may be considered an investment in some cases and consumption in others. However, if we consider a specific expenditure on education as an investment, the rate of economic return on this investment must be calculated and compared to the rates of return on other investments. There are several questions that researchers in education face as an investment in human capital:

- ✦ Determining the amount of resources that should be directed to the education industry.
- ✦ Determining the optimal ratios for creating different types and stages of education.

- ✦ Determining the optimal ratios for creating factors of production in the education industry.
- ✦ Regarding the role of education in relation to human resource development and the rate of economic growth.
- ✦ How to fund educational programs.

Of course, these are questions that place some limits on the considerations of education as a human investment, and many studies have come to measure the economic value of education.

The demands and conditions of progress depend on the human capacity to generate wealth sustainably through the cognitive abilities that produce science and technology. In the context of these scientific, informational, and technological developments the importance of education, especially the kind of education that requires a restructuring of its framework and content, is becoming increasingly apparent. And employing information technology mechanisms to create flexible systems to maximize the opportunities of globalization in its various dimensions, in view of the immediate role that education plays in producing human capital and the most important variable in the human development equation.

The societal tasks of higher education are numerous, including equipping learners with performance skills and developing their various abilities and capacities in thinking, leading to creativity and innovation. The tasks require financial resources that are transformed into infrastructure and human resources (investment spending and current spending), which raises numerous issues regarding determining a course of action. Higher education and its priorities, and in planning and rationalizing resources which increased the need to maximize understanding, awareness, and research into the inputs and outputs of education.

Human capital represents the acquired capabilities of individuals, which lead to an increase in economic value of all kinds if they are properly invested, like other economic resources... Despite the great interest in the impact of the human element on achieving results, it was not matched by a similar interest in how to measure this impact, due to the difficulty of education being able to be evaluated, adapted and managed compared to other elements. Therefore, the workforce was evaluated by the quantity of production, without

paying attention to how it was performed or the extent to which the work satisfied the needs of individuals as human beings.

Recently, many studies and research have emerged on how to measure the returns on investment in human capital. Based on this, a set of quantitative measurements has been developed and applied since the 1990s. The clear shortage of skills and talents in the labor market has increased the importance of these measurements, which has led to not only focusing on analyzing data on the cost of education, but also on making efforts to develop it and find ways to increase the effectiveness of human capital through the availability of accurate data that can be relied upon in how to invest in productive capacities through education. (Joseph holden 2014 P211).

In the 1940s and 1950s, development was viewed as a rise in individual income levels. In the 1960s, it referred to the national economy's ability to achieve an annual increase in national output exceeding the population growth rate. By the mid-1970s, the concept had evolved to encompass the reduction or eradication of poverty, income inequality, and unemployment through sustained economic growth. Later, it came to signify the comprehensive advancement of society as a whole, empowering individuals and providing them with freedom of choice. This led to the emergence of "sustainable development," which aims to meet the needs of the current generation without compromising the ability of future generations to meet their own. Within the framework of sustainable development, the human dimension has emerged as the most important element, focusing on expanding human capabilities through sound investment in education and its application across all sectors. Within this context, the role of education as the most crucial investment in human potential and the significant returns it yields become evident. To achieve Factors of sustainable development, and the following are the most important trends that have taken place in measuring the returns on investment in human capital:

1- Income method:

This method is based on the relationship between the different levels and patterns of investment an individual receives and the extent of their contributions to the gross national product. It assumes that the wages earned by working individuals fully reflect the contribution of different types of human resources to national

production, and that variations in income throughout a person's life reflect differences in their investment backgrounds and, consequently, their contribution to the achieved output. Thus, the wage paid to a worker at a given time...(Wt) must equal the marginal productivity of the worker (Mp), i.e.: $Mp = Wt$

However, human capital investment would reduce revenues and increase costs, and in order to be profitable, expected revenues must be higher than total costs. Accordingly, the equilibrium conditions become as follows:

$$\sum_{t=0}^{n-1} (R_t / (1+i)^{t+1}) = \sum_{t=0}^{n-1} (E_t / (1+i)^{t+1})$$

Where (n) is the number of time periods, (Rt) is the total revenue, (Et) is the total costs, and (i) is the social discount rate. The following conclusion is that the present value of the expected increase in the marginal product of human resources, as a result of human development, should be at least equal to the present value of the total costs to development, as illustrated by the following equation:

$$\sum_{t=0}^{n-1} (MP_t - W_t) / (1+i)^{t+1} = K_0 + K_1 + K_2$$

where:

K0 Direct expenditures on education.

K1 Lost income that could be obtained if work continued.

K2 Living costs during the study period.

However, this method faced many criticisms, the most important of which was that the income method can be used as an indicator to guide the individual decision to invest in education, and that the returns to society as a result of investing in education are limited to the direct returns represented by the income that the individual receives, but there are also indirect returns such as encouraging and developing research and innovation, improving mass communication, and creating the necessary awareness of the need for development. ...

2- Calculating the remaining amount:

This method relies on calculating the total increase in a country's economic output over a specific period, and then attributing portions of this increase as a result of increases in material factors of production, which can QIts (labor and capital) exclusion, and residual

The increase can then be considered as the extent to which education contributes to economic growth.

This method can be expressed mathematically by the following equation:

$$X_t = F(L_t K_t A_t, t)$$

X Gross National Product.

L Work inputs.

K Capital inputs.

A. Ground inputs.

Despite the significant role this method plays in clarifying the major contribution that human investment can make to increasing national income by improving the quality of human resources, it has many practical difficulties, foremost among them being the identification of the remaining undefined factors and the difficulty of demonstrating the contribution of human investment to them, due to the impossibility of isolating this factor from all other factors. It is also noted that this method focuses on the role and contribution of the human element in general to the total returns achieved, without considering its details.

3- Forecasting human resource needs: This method is based on studying forecasts about future human resource needs in various sectors and identifying the needs for different types of education. This helps in developing a current education plan that meets future needs. If the education system succeeds in producing qualified people, then the main part of the economic and social contribution has been accomplished. This is done by comparing the components of the demand for labor in the labor market with the supply that can be provided. It is noted that this method does not concern itself with calculating the expected returns from investment in human capital, on the assumption that the returns on investment in education are represented in increased production that could not have been achieved without providing the necessary types of labor.

4- Calculating the direct return on education: This method is based primarily on calculating the material gains obtained by individuals who have acquired different levels of education throughout their productive lives, then calculating the educational costs for each of the different stages, and thus the rate of return on these costs can be calculated. However, to evaluate different educational programs, the rate of return on them can be calculated in a more comprehensive

way, by analyzing the costs borne by society as a whole and comparing them to the overall main and subsidiary benefits of the programs. This is known as cost-benefit analysis.

Conclusion:

Today, education is considered the most important axis in the processes of modernizing society and creating suitable conditions for industrialization and development within the knowledge economy. This is achieved by breaking down old scientific standards and creating new standards more suitable for the modern economy. Therefore, education is linked to the concept of A Investing in human capital is a concept that views individuals as embodying a set of skills that can be leased to employers. The knowledge and skills an individual possesses—which come from education—produce a certain stock of productive capital. However, the value of this productive capital is derived from the extent to which those skills are acquired in the labor market. Thus, the returns on investment in human capital manifest in increased employment opportunities and greater choice. Harry Johnson:“...Laborers have become capitalists not from a diffusion of the ownership of corporate stocks, as folklore would have it, but from the acquisition of knowledge and skill that have economic value...”

Discussion of the Study Hypothesis

The findings of this study support the main research hypothesis, which assumes significant relationship between the efficiency of investment in education and the effectiveness of the transition toward a knowledge-based economy. The results indicate that education plays a vital role in developing human capital and enhancing economic growth when aligned with the requirements of the knowledge economy. Efficient educational investment contributes to improving skill levels, fostering innovation, and increasing productivity, which are essential elements of a knowledge-based economy.

Main Findings :The study reveals several key findings:

- ✓ Education is a fundamental driver of the knowledge-based economy and a critical factor in sustainable economic development.
- ✓ Investment in higher and technical education yields high economic returns, particularly in economies that rely on innovation and knowledge production.

- ✓ There is a noticeable gap between educational outputs and labor market requirements, which limits the effectiveness of education systems in meeting knowledge economy needs.
- ✓ Research and development activities within educational institutions significantly enhance innovation capacity and economic competitiveness.
- ✓ The effective integration of educational technologies improves the quality, efficiency, and accessibility of education.

Recommendations : Based on the study findings, the following recommendations are proposed:

- ❖ Increase investment in education as a strategic priority for human capital development in the knowledge economy.
- ❖ Align educational curricula with labor market demands and knowledge economy skills, such as critical thinking, digital literacy, and innovation.
- ❖ Strengthen partnerships between educational institutions and the private sector to enhance employability and practical skills.
- ❖ Support research, development, and innovation within universities and educational institutions.
- ❖ Expand the use of digital learning technologies while ensuring equitable access and continuous teacher training.

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