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The Economic Importance of Technological Development in Achieving High Rates of Economic Growth

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ABSTRACT

Technological development is one of the effective economic tools for achieving economic growth. Indeed, most advanced economies rely on technological development to drive economic development, directing public spending toward research and development, in addition to supporting modern innovations that can create significant differences in the process of mass production. Most of these innovations stem from the historical importance of economic growth. The need for technological development is one of the tasks that enable a state to achieve acceptable rates of economic growth. It is noted that, according to Schumpeter, technological development occurs in conjunction with the government's drive to support creativity and innovation by individuals. This is achieved through an incentive system for individuals that ensures the process reaches the highest levels of competitiveness. Based on this description, the researcher saw it as important to address the importance of technological development in achieving economic growth. This was done through a historical review of the concept of economic growth, in addition to the types of growth and the mechanisms by which it occurs. The researcher concluded that technological development and the interest it provides constitute a significant addition to the production function and enables the government to Implementing their economic programs in an acceptable manner. The researcher recommends that governments adopt modern programs to support youth and developers to achieve the desired technological development.

Importance of the Research:

The research stems from the great importance of technological development in the current era of technological advancement. The country that possesses modern production technology is the one that controls the global economy. Accordingly, modern technology is a solid foundation for launching economic growth in various economic sectors.

Research Problem:

The research problem is that most developing economies suffer from chronic economic problems that they have become accustomed to without recognizing the importance of technological development and the economic disparities it has created, which have begun to form the foundation for competition in all economic fields.

Research Objective:

The research aims to clarify the essential role of technological development in driving economic growth in developing economies, the importance of focusing on the topic of innovation and renewal in various economic activities, and the fundamental role it plays in economic growth

Research Hypothesis: The research relied on a basic hypothesis stating that the process of economic growth cannot occur without the presence of an important element of production, namely technological development, which has become a fundamental pillar for economic growth in various economic activities, and its absence inevitably leads to the backwardness of these activities.

Keywords: Economic Growth, Technological Development, Economic Relationship.

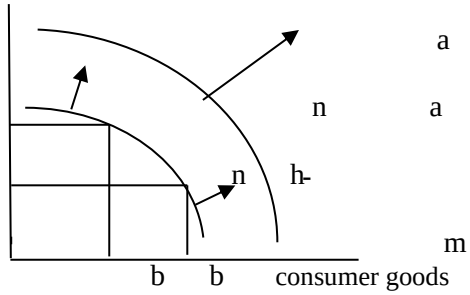
INTRODUCTION

Technological development constitutes one of the fundamental links through which economic growth is shaped. Given that the process of economic growth depends primarily on a wide range of key factors, technological development is the most important of these factors and the primary research topic for most advanced economies globally, as it constitutes the starting point for achieving targeted economic growth rates. For developing countries, most of which suffer from structural problems, the transformation in the use and adaptation of technology is considered a fundamental task for advancing the reality of economic activities, which suffer from backwardness in most of their functions. Perhaps the Iraqi economy is one of these economies that continues to suffer, to date, from a significant decline in the level of technological activities as a result of the major rupture that has lasted four decades, which has contributed significantly to the backwardness of most economic activities. This is in addition to the significant decline in the levels of economic growth achieved, with the exception of the oil sector. This topic will be discussed in detail in this research, which includes a broad reading of the concepts of economic growth in its first section, while the second section addresses the basic factors that lead to economic growth. The focus is on technological development and its role in bringing about the economic growth process, while the third section reviews the most important conclusions and recommendations reached by the researcher.

Section One: Economic Growth: Concept, Types, and Importance

First: The Concept of Economic Growth: The origin of the word "growth" is associated with a biological concept that essentially means an increase in the dimensions or measures of life, such as an increase in length, weight, and size. In other words, growth is a quantitative phenomenon resulting from changes subject to direct measurement using quantitative measures. Economic growth, on the other hand, represents the increase in the expected real gross domestic product (GDP) under the full employment of available resources, or the national product of a country. In other words, economic growth occurs when a country's production possibilities curve shifts outward (Samuelson, 2006: 586Economic growth is not a movement along the same maximum production possibilities frontier curve (APC), such as moving from point N to point N, as we see in Figure (1). This is because such a movement is merely a change in the composition of total production and not an absolute change in the volume of production. Rather, economic growth is reflected in the upward shift of the production possibilities frontier curve, as is clear from curve AP, where this new curve represents broader possibilities for production. It is noted that each point on the production possibilities curve actually represents a certain composition of production between consumer goods and capital or productive goods at the level of full use of economic resources. Therefore, each point located below this curve represents a level of incomplete use of economic resources (Al-Amin Pasha: 1987: 255).

Figure (1) Production Possibility Frontier Curve



Ismail Abdel Rahman, Harbi Muhammad Araikat, Economic Concepts and Systems (Macroeconomic and Microeconomic Analysis), 1st ed., Wael Publishing House, Jordan, 2004, p. 277.

There is another concept that is closely linked to the concept of economic growth, which is the growth rate of the per capita share of the real GDP, at which the standards of living in the country rise. The interest of countries is primarily directed towards the issue of growth of the per capita share of the real GDP, and this in turn leads to an increase in the average income of the citizens in that country, i.e. the continuous increase in the GDP over a long term or long terms, each of which includes several economic decade cycles. Typically, the economic cycle takes ten years for the economy to recover. In reality, this depends on the ability of the capitalist economy to undertake a comprehensive renewal and expansion of fixed capital in its productive assets (Morsi: 1990: 404). Economic growth also means a continuous increase in average real per capita income over time, and this increase leads to a rise in living standards. This is expressed by economic growth (as the change in gross domestic product, while average per capita income is total income divided by the population) (Attia: 2013: 11). It should be noted that economic growth (means an increase in real per capita income, not monetary income, as the latter refers to the number of monetary units an individual receives over a specific period of time, usually one year, in exchange for the productive services they provide. Thus, real income is the result of dividing monetary income by the general price level). The concept of economic growth (refers to an increase in income, per capita income, or gross domestic product. When the production of goods and services increases in a country, in any way, it is called economic growth) (Gils: 2009: 31).

Second: Indicators of Economic Growth: Economic growth concerns the increasing ability of an economy to provide goods and services over a given period of time, regardless of the source of this provision, whether domestic, foreign, or both (Marouf: 2005: 31). The English economist Pigou defined economic growth as "the quantity of goods and services produced and made available to citizens over a given period of time at lower costs, better quality, and in larger quantities than before." Economic growth reflects quantitative changes in productive capacity and the extent of its utilization. The higher the utilization rate of available productive capacity across all economic sectors, the greater the growth rate of the gross domestic product, and vice versa. Naturally, it is not possible to maintain growth rates in the gross domestic product (GDP) after reaching its maximum capacity utilization. Economic growth can be inferred from two indicators (Erekat 2013:67):

The first: determining the growth rates of real average per capita income.

The second: determining the growth rates of real GDP or real net income.

We note that the first method expresses the development of the material standard of living of individuals in a given country compared to the standards of living in other countries, while the second method expresses the use of production expansion. Economic growth can sometimes be expressed in terms of productivity or efficiency, which is the increase in output per unit of inputs (labor force and physical capital) over a period of time. Economic growth is the increase in any measure within an economy over time. It can be expressed by the term "change in any of the concepts of national income," but the term "gross domestic product" (GDP) is the most commonly used. (Benson 1963:81)

In many cases, a country's GDP increases, but its population grows at a higher rate, resulting in this increase not being reflected in its average per capita income. Despite the increase in a country's GDP, it has not achieved a growth in the standard

of living of its people. Therefore, countries with large population growth rates suffer from underdevelopment, and most of them are developing countries, especially those with extreme poverty. This does not occur in advanced industrial countries. Therefore, developing countries seeking to improve their conditions must address the issue of population growth; otherwise, their efforts will yield little progress. It has been observed that the highest population growth rate in sub-Saharan Africa was 3%, while the lowest rate prevailed in developed countries, reaching 0.04% in European countries and the former Soviet Union. Economic growth is one of the primary economic goals pursued by all countries in the world to develop their economies and raise their standards of living, achieving the highest levels of well-being. Regardless of the source of economic growth, it is important to clarify the choice it entails between alternatives, whether the source of growth is technological progress, an increase in physical capital, or human capital. All of these factors force society to choose between using productive resources for current consumption or achieving high rates of economic growth. Economic growth requires sacrificing current consumption and directing the bulk of economic resources toward developing these sources of growth, especially at the beginning of comprehensive development (Al-Essa, 2016: 44). Economic growth is also interpreted as the growth in the economic system's ability to satisfy individual and collective consumption desires. However, how these desires are satisfied may be a technical problem that requires maintaining competition and insisting on securing private goods (Hirsch, 1982: 43).

Third: Types of Economic Growth

There are three types of economic growth (Al-Rashdan: 2018: 51).

1- Spontaneous Growth

This is growth that occurs spontaneously through the inherent forces of the national economy, without the use of scientific planning at the global or national level. This type of growth is usually slow, gradual, and successive, although it sometimes experiences violent, short-term fluctuations. This type of growth is the pattern followed by advanced capitalist countries since the Industrial Revolution in England. The requirements of this type of growth require great flexibility within the social and cultural framework within which it occurs, as the spark of growth is rapidly transferred from one sector to another. (Karam: 1993: 25).

Temporary Growth

This is growth that lacks continuity and stability, but rather emerges in response to the emergence of emergency factors, usually external. These factors quickly disappear, along with the growth they generated. However, this pattern actually represents the general state of growth experienced or experienced by most developing countries. It often arises as a response to sudden and favorable developments in their foreign trade, which quickly fade. This growth occurs within the framework of rigid cultural and social structures, thus having little impact on overall development.

Planned Growth

This is a type of growth that arises from a comprehensive planning process for a society's resources and needs. The strength and effectiveness of this growth are closely linked to the efficiency of planning, the realism of the plans drawn up, and the effectiveness of implementation and follow-up. This is in addition to the participation of executive authorities in the planning process. It is noted that both spontaneous and planned growth are self-sustaining, while temporary growth in most developing countries is dependent and inert. It can be said that if self-sustaining growth continues for a period exceeding a few decades, it transforms into steady growth.

Thus, it is concluded that temporary growth does not represent growth in the economic sense. In light of this, economic growth means:

- Achieving an increase in the average per capita national income.
- The increase in average per capita income must be real, not monetary.
- The increase in average per capita income must be continuous

Thus, it can be said that economic growth focuses on the average amount of income an individual receives—that is, the quantity of goods and services they may obtain—and ignores the quality of goods and services, nor does it consider the distribution of income among segments of society. Furthermore, economic growth is achieved automatically, without government intervention (Al-Shafi'i 1978:77)

Although economic growth and the resulting economic development are the result of economic and non-economic factors, its criteria have become economic in nature, without neglecting their other qualitative aspects. These criteria include quantities such as national income and its

distribution, per capita income, and capital accumulation. There are other criteria as well, including population growth, citizens' health, education, and life expectancy. These criteria are social in nature, meaning they are not purely economic criteria. Thus, economic growth is the process of steady or continuous increase in a specific aspect of life.

Section Two: Factors Determining Economic Growth:

It is important to monitor economic growth and record its figures, but even more important is discovering the causes and factors of that growth, and thus the ability to achieve it. A combination of internal and external factors influence economic growth. Among the internal factors influencing economic growth is the extent to which the factors of production involved in production are capital and the labor force employed in it. External factors, such as legal, political, and economic factors, include the state's laws regulating economic affairs, particularly taxes, investment promotion laws, and others (Al-Dayem, 1977:37). This includes political stability, which facilitates and supports economic growth. Individual businesses are typically naturally inclined toward stability and assured profitability, thriving in such environments. They are repelled by turbulent environments and unstable political situations that threaten individual efforts and expose them to loss. Among the general economic factors influencing economic growth is the guarantee that individual businesses have access to broad markets, enabling them to define production and profit. It is clear that when one individual business increases its production, production for that country subsequently increases, unless another business decreases at the same time (Erekat: op. cit.: 77).

There is no set of principles that can, in and of themselves, serve as a general theory of economic growth. However, there are certain factors that play an important role in achieving economic growth. These factors include:

Human Resources: The rate of economic growth increases when the rate of increase in real gross national product (GNP) is greater than the rate of increase in population. This results in a greater increase in real per capita income, thus achieving a higher rate of economic growth, as shown in the following equation:It can be noted that the equation uses population as a quantitative indicator only, but there are quantitative and qualitative considerations that must be taken into account. For example, an increase in population leads to an increase in the size of the labor force (i.e., an increase in the number of workers), which in turn impacts labor productivity and, consequently, the rate of economic growth. It is used as an indicator to measure the efficiency of allocating economic resources or to measure the ability of a given economy to convert economic resources into goods and services.

Many economists believe that the quality of the labor force represents the most important element in the economic growth process. In other words, what is the point of purchasing computers, modern communications equipment, and advanced equipment if there is no skilled and well-trained labor? Improvements in education, health, management, organization, and the ability to keep pace with developments have led to increased labor productivity.

2- Natural Resources:

The other element that affects production and productivity is represented by natural resources in terms of quantity and diversity. Natural resources include soil fertility, mineral abundance, water, and forests (Yenke: 2008: 566).

Some economists believe that there is no such thing as natural resources. Natural resources are of no value to society unless humans can exploit them to achieve economic and social goals. When this is achieved, resources lose their natural character and become as if they were man-made.

It is noted that some countries have achieved economic growth by relying primarily on their abundant resources, along with significant agricultural production. But is the possession of natural resources a prerequisite for achieving growth? In fact, Japan can be cited as an example of a country that does not have an abundance of natural resources.

Natural resources, but they were able to achieve growth by focusing on sectors that directly depend on capital and the availability of skilled labor, with the aim of overcoming the issue of natural resource shortages (Al-Amin: previous source: 271). It is worth noting that the quantity and quality of a given country's natural resources are not necessarily constant, as a country may discover and develop new natural resources, thus achieving economic growth in the future.

Capital Accumulation:

The term capital accumulation refers to the material component resulting from the investment process and is primarily embodied in the additions

made to existing assets such as machinery, equipment, buildings, construction, and means of transportation. Capital accumulation is generated when a portion of current income is allocated as savings to be invested in the production of capital goods such as factories, machinery, roads, bridges, schools, universities, etc.

The rate at which a society can add capital affects its rate of economic growth. The factors that determine the rate of capital accumulation are the same factors that affect investment: investment, capital depreciation rates, and government policies toward investment. The extent of these factors' influence varies from country to country.

Although capital accumulation can add new resources, such as reclaiming unused land or improving the quality of existing resources, such as irrigation systems, the use of pesticides to combat agricultural pests, and the use of chemical fertilizers, the fundamental characteristic that must be taken into account is the existence of a trade-off between current consumption and future consumption. Reducing current consumption (increasing savings and thus investment) will lead to increased future consumption (Todaro 2008: 261).

Thus, capital accumulation is directly related to the amount of savings. Therefore, the cost (price) of economic growth for a society is the sacrifice of current consumption for the sake of saving for the purpose of capital accumulation. When we think about capital, we should focus on investments known as social overhead capital, which includes the feeder projects that are implemented on a large scale before the start of trade, such as building roads, irrigation, water, and public health projects, or government intervention to ensure the implementation of the capital structure.

Social. There are also other investments in transportation and communications systems that involve externalities (the network), the productivity of which depends on the intensity of public use (Samuelson: op. cit. 587).

Technological Change and Innovations

There are qualitative factors that determine economic growth in addition to quantitative considerations. One of these qualitative factors is the level of technological progress. Technological progress is nothing but a continuous process of improvements and developments, both large and small (Todaro: op. cit. 173).

Technological development is a vital component of the rapid growth of living standards. Historically, growth certainly does not occur simply by replicating production lines, adding steel mills or power plants next to each other. On the contrary, the endless flow of inventions, coupled with technological progress, has led to tremendous improvements and advancements in production capabilities across Europe, North America, and even Japan. (Samuelson, op. cit.: 677)

Technological progress can be defined as a change in the scientific state resulting from inventions and scientific discoveries that can be applied economically—that is, can be used in mass production at a cost that is appropriate to the prevailing price level or purchasing power of that society. If we assume that someone invents a new machine, commodity, or method for manufacturing a particular commodity, this invention does not fall within the economic definition of technological progress unless it can be applied economically. This is because many of the scientific inventions and discoveries made by scientists and researchers do not, in reality, lead to any technological progress due to their inability to be utilized on a commercial or economic scale. Practically speaking, they cannot be used to increase production capacity. However, if they are used commercially, they will naturally lead to increased production capacity. The question that comes to mind is why some countries have advanced technologically while others have lagged behind, in addition to the disparity between countries in levels of technology. Modern progress in the world occurs in one or both of two ways: (Guartini 1999: 588)

The first is through developing national scientific cadres and investing in scientific research and experiments. The second is through importing technology from more advanced regions to less advanced regions.

Through international trade or through foreign direct investment (Al-Essa: previous source: 47).

It is worth noting that technological progress requires sacrificing the present for a better future. This is because technological progress requires allocating greater economic resources for scientific research and studies or importing advanced production goods. This means allocating fewer resources for current consumption in order to obtain more in the future. Thus, the importance of savings and capital investment is highlighted (Abdul Rahman: 1999: 71).

The state must create an environment conducive to development by establishing a comprehensive network of economic, social, and political systems and institutions that contribute to development. It

must also work to change individuals' attitudes toward development and create the necessary incentives in a manner consistent with development needs and requirements. Among the types of technology (Al-Quraishi: 2007: 144) are:

Neutral technological progress

This occurs when greater production is achieved with the same quantity and combination of factors of production, meaning a graphical movement outward along the production possibilities curve.Labor-saving technological progress

Occurs when large-scale production is achieved using the same amount of labor, such as with computers and tractors.

Labor- and capital-expanding technology

This occurs when the quality and skill of labor improve, through the use of videotapes and television, for example.

There are other factors that influence economic growth. Economic growth requires the availability of political, economic, social, and cultural factors that encourage growth. This means a banking sector capable of financing growth requirements, as well as a legal system that establishes the rules for trade and economic cooperation, meaning the availability of appropriate political, economic, legislative, and cultural environments (Al-Amin et al., 2006: 262).

Section Three: Conclusions and Recommendations

First: Conclusions

1-Technological development currently constitutes the cornerstone of economic growth. It has become an important indicator in advanced economies that have embarked on a major race in the fields of communications, space, and microelectronics industries.

2-Government spending directed toward research centers, universities, and institutes, in addition to supporting scientific research that enhances global technological competition, represents a major difference in bringing about technological development in various economic activities.

3-It is essential that the orientation of government ministries that embrace the process of technological development in various productive fields, which can play a major role in the process of economic growth, be directed toward activities that suffer from a lack of modern technology.

4-The government, represented by the various ministries, has not undertaken the issue of supporting innovations and innovators, but has rather taken upon itself a neutral stance in the process of technological development, which has significantly impacted economic activities in various fields.

Second: Recommendations

1-Government ministries, represented by the Ministry of Higher Education and Scientific Research, the Ministry of Industry and Minerals, and the Ministry of Communications, should undertake the issue of government support for modern innovations in technological fields, which will undoubtedly and significantly advance production processes and ensure accurate information on technological developments is provided in the best possible manner.

2-The researcher recommends adopting a method of attracting highintensity global investments in the use of technology, which will enable the transfer of modern technologies used globally and their entry into the country without incurring additional public expenditures.

3-Training individuals working in the public and private sectors on the use of modern technology in various production fields, which will enable local workers to replicate global experiences and begin producing goods and services that rely on modern technology locally, thus relieving the 4-government's burden of wages and salaries for these workers. Supporting the state system represented by service ministries, which could be the decisive factor in harnessing technological tools and transforming them into productive ones. This is achieved by increasing government spending directed towards the Ministries of Higher Education and Scientific Research, the Ministry of Industry and Minerals, and the Ministry of Communications, so that these centers are responsible for producing modern technology instead of importing it.

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