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MAJOR TRENDS IN ECONOMIC GROWTH AND DIGITAL GLOBALIZATION

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Formulation of the problem. Economic growth is the act of increasing and improving national production so that a country can produce more and better goods and services. It is important to maintain this growth, it will affect the standard of living in the country and give humanity more opportunities. *The purpose of the article* is coverage of problematic aspects and main trends of economic growth and digital globalization. *Methods used in the research:* comparison, comparative analysis, systematization and logic, etc. *The hypothesis of the study* was the assumption that trade is a means by which countries can develop specialization, increase the productivity of their resources and, in general, increase the total volume of production (develop as a whole). *Presenting main material.* Economic growth has traditionally been explained by the accumulation of human and physical capital and the increase in productivity. Further division of labor (specialization) is also fundamental to increasing productivity. Growth in labor productivity (the ratio of the value of production to labor consumption) has historically been the most important source of real economic increase. *Originality and practical significance of the research.* Economists reflect on the topic of economic growth and offer ideas for sustaining economic growth and increasing it. *Conclusions.* Governmental organizations have questioned the justification of economic growth in developed countries, arguing that it has not increased the well-being of society in recent decades. They point out that despite an increase in the size of the annual economy, measures of subjective life satisfaction have not increased, which in turn confirms that economic growth does not condition economic development.

Key words:

economic growth, GDP, production, energy, wealth.

ОСНОВНІ ТЕНДЕНЦІЇ ЕКОНОМІЧНОГО ЗРОСТАННЯ ТА ЦИФРОВОЇ ГЛОБАЛІЗАЦІЇ

Постановка проблеми. Економічне зростання — це акт збільшення та вдосконалення національного виробництва, щоб країна могла виробляти більше та кращих товарів і послуг. Важливо зберегти це зростання, це вплине на рівень життя в країні і дасть людству більше можливостей. *Метою статті* є висвітлення проблемних аспектів та основних трендів економічного зростання та цифрової глобалізації. *Методи, використані в дослідженні:* порівняння, порівняльний аналіз, систематизація та логіка тощо. *Гіпотезою дослідження* було припущення, що торгівля є засобом, за допомогою якого країни можуть розвивати спеціалізацію, підвищувати продуктивність своїх ресурсів і, загалом, збільшувати загальний обсяг виробництва (розвиватися в цілому). *Виклад основного матеріалу.* Економічне зростання традиційно пояснюється накопиченням людського та фізичного

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капіталу та підвищенням продуктивності. Подальший поділ праці (спеціалізація) також має фундаментальне значення для підвищення продуктивності. Зростання продуктивності праці (відношення вартості виробництва до споживання праці) історично було найважливішим джерелом реального економічного зростання. *Оригінальність та практична значущість дослідження.* Економісти розмірковують над темою економічного зростання та пропонують ідеї для підтримки економічного зростання та його збільшення. *Висновки.* Урядові організації поставили під сумнів виправданість економічного зростання в розвинених країнах, стверджуючи, що воно не підвищило добробут суспільства за останні десятиліття. Вони зазначають, що, незважаючи на збільшення розміру річної економіки, показники суб'єктивної задоволеності життям не зросли, що, у свою чергу, підтверджує, що економічне зростання не зумовлює економічний розвиток.

Ключові слова:

економічне зростання, ВВП, виробництво, енергія, багатство.

Formulation of the problem. Economic growth is an increase in the market value of goods and services over a certain period of time (Conditioned by inflation). It is usually measured as the interest rate of increase in real gross domestic product (GDP) and is calculated in real terms - in other words, including inflation (To eliminate the distorting effects of inflation on the price of produced goods).

Economic growth has traditionally been explained by the accumulation of human and physical capital and the increase in productivity. Further division of labor (specialization) is also fundamental to increasing productivity. Growth in labor productivity (the ratio of the value of production to labor consumption) has historically been the most important source of real economic increase.

An increase in economic growth caused by a more efficient use of resources (e.g., labor productivity, physical capital» energy, or materials) is called intensive growth. GDP growth caused only by an increase in the amount of resources available for use (increased population, new territory) is called extensive growth.

Analysis of recent research and publications. Economic growth can be influenced by demographic factors, changing the ratio of employment to population and the labor force participation rate. Industrialization creates a demographic transition in which fertility declines and the average age of the population increases. Another interesting fact is that at one point in time in the U.S.A., economic growth was facilitated by an increase in women's labor force participation.

Since economic growth is measured as annual percentage gross domestic product (GDP), it has all the advantages and disadvantages of this measure. «Economic growth rates» refer to the geometric annual growth rate of GDP between the first and last year over a period of

time and are usually compared using the ratio of GDP to population or income per capita. It is calculated (the economic growth rate) based on GDP data. It should also be noted that GDP per capita is a measure of total output in a country, which includes the amount of gross domestic product (GDP) divided by the number of people in the country. GDP per capita is particularly useful in comparing the level of development of countries, because it shows the relative productivity.

The purpose of the article is coverage of problematic aspects and main trends of economic growth and digital globalization.

Presentation of the main research material. When national income is taken into account, output per capita can be calculated using the following factors: output per unit labor force, (labor productivity) hours of work, (intensity), the percentage of the actual working population (participation rate), and the percentage of the working-age population to the total population (demographics). The rate of change in population GDP is the sum of the rate of change in these four variables plus their cross products (Table 1) [1].

Another important reason for economic growth is the introduction of new products and services. New products create the demand that is needed to offset the decline in employment that comes with labor-saving technologies. For example, in the U.S. by 2013, about 60% of consumer spending was for goods and services that did not exist in 1869. Also, the creation of new services was more important than the invention of new goods [2].

As we can see, the growth of GDP per capita indicates the presence of economic growth, as well as exports, as can be seen in the following table (Table 2). In addition to all of the above, economic growth can be due to capital investment, for example, several Asian countries have achieved



high rates of economic growth in recent decades precisely because of prudent capital investment.

Table 1 – Macroeconomic indicators of economic and social development of the country in January 2022

Indicator name	At the beginning of January 2022, de facto	2022 for the month of January relative to the month of January 2021, as a percentage
GDP, million manat	9 257,6	105,8
Including GDP in the non-oil sector	4 669,7	108,8
GDP per capita, manat	922,2	105,4
State budget revenues, million manat	2 746,9	118,4
State budget expenditures, million manat	983,4	79,8
State budget surplus, million manat	1 763,5	x
Average monthly nominal salary, manat	732,1*	103,4**

Source: compiled by the authors

Let's look at the statistics for Azerbaijan as an example. The factors influencing economic growth will be discussed in more detail separately in each model of economic growth.

Modern literature distinguishes between exogenous growth theory, pioneered by Robert Solow, and endogenous growth theory, which began with the works of Paul Romer.

In classical economics, production theory and growth theory are based on the theory or law of variable proportions, whereby either one of the factors of production (labor or capital) is increased, holding the other constant and assuming no technological change, or output is increased, but at a decreasing rate which eventually approaches zero. These concepts

originate in the writings of T. Malthus on agriculture. Malthus' examples included the amount of seed harvested in relation to the amount of seed (capital) planted on a plot of land and the amount of yield from a plot of land in relation to the number of workers employed.

Harrod, on the other hand, argued that economic growth could be driven by increasing variables such as population growth, technological improvement and natural resources, yet he was convinced that these factors could induce a maximum growth rate, which would, in fact, be the natural rate of economic growth. In fact, the natural growth rate is the highest achievable growth rate that will maximize the use of the resources that exist in an economy.

Table 2 – GDP per capita

	Total			Per capita		
	Million manat	Million dollars	Million euros	Manat	Dollars	Euros
2014	57322,4	73078	54959,2	6088,3	7761,7	5837,3
2015	52641,2	51302,3	46257,7	5524,2	5383,6	4854,3
2016	56794,0	35587,4	32161,5	5892,8	3692,5	3337,0
2017	67678,6	39322,9	34844,6	6952,8	4039,7	3579,7
2018	76251,0	44853,5	37947,1	7765,0	4567,6	3864,3
2019	78741,5	46318,5	41362,4	7950,3	4676,6	4176,2
2020*	72005,6	42356,2	37112,5	7220,0	4247,1	3721,3

Source: azstat.org

However, Robert Solow and Trevor Swan developed a model that evolved into the mainstream model used in growth economics in the 1950s. This model assumed diminishing returns to capital and labor. They believed that

capital was accumulating through investment, but that its level or stock was constantly decreasing due to depreciation. Due to the increasing returns on capital, with the increase in employee capital and the lack of technological



progress, the economic output of capital/worker eventually reaches a point where capital per employee remains constant, as the annual investment in capital equals annual depreciation. This condition is called the «stable state».

In the Solow-Swan model, if productivity increases due to technological progress, then output and the number of workers increase, even if the economy is in a steady state. If productivity increases at a constant rate, output also increases at an appropriate steady-state rate. But for any share of GDP invested, capital and the number of workers eventually converge to a steady state, leaving the growth rate of output and the number of workers determined only by the rate of technological progress. Each country has a different GDP level of labor determined by the share of GDP it invests, but all countries have the same rate of economic growth. Roughly speaking, in this model, rich countries are those

that have long invested a significant share of GDP, hence poor countries can become rich by increasing the share of GDP they invest. One important prediction of the model, is the possibility of conditional convergence; the idea that poor countries will grow faster and catch up with rich countries if they have the same investment (and saving) rates and access to the same technology. The Solow-Swan model is considered an «exogenous» growth model because it does not explain why countries invest different shares of GERs in capital or why technology improves over time. Instead, the rate of investment and the rate of technological progress are exogenous. The significance of the model is that it predicts the pattern of economic growth after identifying two criteria - the rate of investment and the rate of technological progress. The inability to explain the determinants of these indicators is one of the limitations of this model.

Table 3 – Investment in the country's economy, million manat

	2014	2015	2016	2017	2018	2019	2020
Investments at the end of the year	18542,6	21730,4	16444,6	11757,8	13020,3	15298,2	14530,4
Investments aimed at the country's economy, million manat	21890,6	20057,4	22706,4	24462,5	25877,0	24986,6	22484,0

Source: azstat.org

Unsatisfied with the assumption of exogenous technological progress in the Solow-Swan model, economists worked on the «endogenization» of technology in the 1980s. Eventually, they developed a theory of endogenous growth that includes a mathematical explanation of technological progress. This model also includes a new concept of human capital, the skills and knowledge that make workers productive. Unlike physical capital, human capital has rising rates of return. Research in this area has focused on what increases technological change or human capital (e.g. education or innovation, respectively). A special place in the development of economic growth theory is occupied by the so-called «Schumpeterian growth». This is an economic theory named after the 20th century Austrian economist Schumpeter. The approach explains growth as the result of innovation and the process of «creative destruction» which reflects the dual nature of technological progress: entrepreneurs introduce new products or services in the hope that they will make a temporary mo-

nopoly profit by capturing a certain market segment. In doing so, earlier technologies and products become obsolete. This can be seen as the invalidation of previous technologies, making them obsolete. The basic model that illustrates the growth of Schumpeter is the Agion-Howitt model. It should also be noted that the first to introduce the distinction between economic growth and development was also Joseph Schumpeter. In his seminal work «Theory of Economic Development» (1911), Joseph Schumpeter defined economic growth as quantitative changes (increased production and consumption of the same goods and services over time) and economic development as positive qualitative changes (innovations in production, products and services, management, and other areas of life and economic activity).

Many theoretical and empirical analyses of economic growth identify the main role of the level of human capital in a country. Human capital has been included in both neoclassical and endogenous growth models. The level of human





capital in a country is difficult to measure because it can function at home, at school and at work, etc. Economists have tried to measure human capital using a variety of measures, including literacy rate of the population, its skill level, its level of capital investment, its average level of formal education, its average score on international tests and its aggregate contributions to education. The most commonly used measure of human capital is a country's level of education, based on the development of Robert Barro and Chong-Wah Lee data. This measure is widely used because Barro and Lee provide data for many countries at five-year intervals over a long period of time.

One of the problems with achieving high levels of education is that the amount of human capital acquired in a year of education is not the same at all levels of education, nor is it the same in all countries. The measure also assumes that human capital develops only in formal education, contrary to extensive evidence that families, neighborhoods, peers and health also contribute to human capital development. Despite these potential limitations, Theodore Breton has shown that this measure can represent human capital in long-term growth models.

There is also the notion that energy consumption and energy efficiency rates are causally related to economic growth. Thus, there has been a fixed relationship between the historical rate of global energy consumption and the historical accumulation of global economic wealth. Improvements in energy efficiency have been part of increases in overall factor productivity. Some of the most technological innovations in history have been associated with such improvements in energy efficiency. These include large improvements in the efficiency of heat conversion to work, heat reuse, friction reduction and power transmission, especially through electrification. Electricity consumption and economic growth are strongly correlated. Electricity consumption per capita is almost completely correlated with economic development.

Over long periods of time, even small growth rates, such as an annual growth rate of 2%, have a large impact. This is due to the degree of exponential growth (an increase in value when the rate of growth is proportional to the value of the value itself). The rule of 72, a mathematical result, states that if something grows at a rate of $x\%$ per year, its level will double every $72 / x$ years. For example, a growth rate of 2.5% per annum leads to a doubling of GDP within

28.8 years, whereas a growth rate of 8% per annum leads to a doubling of GDP within years. 9 Thus, a small difference in the rate of economic growth between countries can lead to very different standards of living for their populations if this small difference continues over many years.

Another theory that links economic growth to quality of life is the «Threshold Hypothesis», which states that economic growth brings with it, to a certain extent, improvements in quality of life. But at a point called the threshold point, further economic growth can lead to a deterioration in quality of life. This leads to an inverted-O-curve, where the top of the curve represents the level of growth. It has been shown that «happiness» increases as GDP per capita rises to at least \$15,000 per person.

Economic growth has the indirect potential to combat poverty as a result of a simultaneous increase in opportunities.

Economic growth has the indirect potential to alleviate poverty by simultaneously increasing employment opportunities and productivity. A study by researchers at the Overseas Development Institute (ODI) of 24 countries that have experienced growth found that poverty has been alleviated in 18 cases. In some cases, the quality of life factors, such as health outcomes and educational attainment and social and political freedoms, does not improve as the economy grows. Also, higher productivity does not always translate into higher wages.

Economists distinguish between short-term economic changes in production and long-term economic growth. Short-term changes in economic growth are called the business cycle. As a rule, economists link ups and downs in the business cycle to fluctuations in aggregate demand. The economic growth associated with the long-term trend in production is due to structural causes such as technological growth and factor accumulation.

Economic inequalities. Some theories developed in the 1970s suggested possible ways in which inequality could have a positive impact on economic development. Savings of the rich, if they increase with inequality, are thought to compensate for lower consumer demand.

More recent analysis, which is a political economy approach developed by Alesina and Rodrik (1994) and Persson and Tabellini (1994), highlighted the negative impact of inequality on economic development; inequality generates pressure to adopt redistributive policies that have adverse effects on investment and economic

growth. Nevertheless, empirical tests of an extended version of the Alesina and Rodrik model by Lee and Zou showed that «income inequality is a positive and in most cases a significant factor associated with economic growth».

The imperfect credit market approach, developed by Galore and Zeira (1993), argued that inequality in an imperfect credit market has a lasting detrimental effect on human capital formation and economic development.

Also, in the late 20th century there was the notion that high inequality reduces growth, perhaps because it increases social and political instability; however, changes in the degree of inequality have relatively little effect on growth.

Robert Barro's study found that there is «a small overall correlation between income inequality and the rate of growth and investment». According to Barro, high levels of inequality reduce growth in relatively poorer countries but promote growth in richer countries. Research by Princeton economist Roland Benabou shows that population inequality does not matter for growth, but that «inequality in the relative distribution of income and political power» does.

According to Andrew Berg (Assistant Director, IMF Research Division, 2011) and Jonathan Ostry (Deputy Director, IMF Research Division, 2011) wealth and income inequality interact negatively with subsequent economic growth.

Economists Dirk Herzer and Sebastian Vollmer also found that increasing income inequality reduces economic growth, but growth itself also increases income inequality in the long run. In 2013, the French economist Thomas Piketty suggested that in systems where the average annual rate of return on investment in capital (r) exceeds the average annual growth of economic output (g), inequality will increase. According to Piketty, this is because wealth already held or inherited, which is expected to grow at the rate of r , will grow faster than wealth accumulated through labor, which is more closely related to g . A proponent of reducing levels of inequality, Piketty proposes a tax on wealth in the world to reduce the disparity in wealth caused by inequality.

Critics, particularly the Club of Rome, argue that a narrow view of economic growth creates a scenario where we may see a systemic collapse of our planet's natural resources.

Concerns about the negative environmental consequences of growth capital have led some people to advocate more modern levels of growth or to reject growth altogether. For academic purposes, concepts such as non-economic growth, sustainable economics, and degradation have been developed to achieve this. Politically, green parties

adopt the Green Global Charter, recognizing that «...the committee of economic growth at all costs and excessive and wasteful use of natural resources without regard to the carrying capacity of the earth causes excessive damage to the environment and extinction of species» [4].

Those who are more optimistic about the ecological effects of growth believe that while local ecological effects may occur, large-scale ecological effects are insignificant. The argument, as stated by commentator Julian Lincoln Simon, is that if these global ecological effects exist, human ingenuity will find ways to adapt to them.

To date, there has been a strong correlation between economic growth and carbon dioxide emissions across emissions from different countries, although there is also a wide divergence in carbon intensity (carbon emissions per GDP). To date, there has also been emissions from different countries, while there is also a wide divergence in carbon intensity (carbon emissions to GDP). emissions from different countries, although there is also a significant divergence in carbon intensity (carbon intensity of GDP). The Stern Review notes predicts that Global emissions will be sufficient to concentration of greenhouse gases to more than 550 ppm of CO₂ by 2050 and over 650-700 ppm by the end of this century. The scientific consensus is that a functioning planetary ecosystem without dangerous risks requires stabilization at 450-550 ppm.

As a consequence, growth-oriented economists have suggested government intervention to switch energy production sources in favor of wind, solar, hydroelectric, and nuclear power. This would greatly reduce the use of fossil fuels used to meet domestic subsistence needs. The Stern Review, published by the U.K. government in 2006, concluded that an investment of 1% of GDP (and then changed by 2%) would be enough to avoid the worst effects of climate change, and that failure to do so could put the climate at risk, and result in costs equal to 20% of GDP.

Canadian economist Peter Victor has proposed an interactive model to explore the potential for achieving a stable but not growing economy. The model demonstrates that even within traditional approaches to economics there are possibilities for achieving a stable state.

But we should also consider that many predictions of resource exhaustion, such as Thomas Malthus' 1798 prediction of an approaching famine in Europe, Population Disease (1968), and the Simon-Ehrlich Bet (1980), have not come true.

Today, the production of most resources has also declined, due to advances in technology and science that have created entirely new, previously



inaccessible resources. In some cases, the replacement of more common materials, such as plastics for cast metals, has reduced the growth in the use of some metals. In the case of the limited resource of land, hunger was relieved, first by the revolution in transportation caused by railroads and steam ships, and then by the Green Revolution and chemical fertilizers, especially the Haber process for synthesizing ammonia.

Resource quality is also an important factor in economic growth. Resource quality depends on a variety of factors, including grade (ore) location, elevation or below sea level, proximity to railroads, highways, water supply, and climate. These capital and operating costs to join the extraction of resources. In the case of minerals, lower grades of minerals are extracted that do not require higher capital and energy costs to extract for processing. Copper ores have declined significantly over the last century. Another example is natural gas from shale and other low permeability rocks, which can be developed at much higher energy, capital, and material costs than conventional gas in previous decades. Offshore oil and gas increase in cost as water depth increases. Some physicists, in particular Al Bartlett, consider constant economic growth to be unsustainable. According to them, there are factors that can limit economic growth (e.g. finite, peak or depleted resources).

Simon Kuznets, Fernand Braudel, Theodore Schultz, Gary Becker, Michael Porter, Nikolai Kondratiev and other scholars have also contributed to growth and development theory.

In 1972, the Limits to Growth model modeled the limits to infinite growth; initially derided, these models have been tested and updated.

Malthusians, in particular William R. Catton, Jr. were skeptical of technological advances that improve the availability of resources. Such advances and efficiency gains, in their view, simply accelerate the reduction of finite resources. Catton argued that increased rates of resource extraction were nothing more than «... stealing from the future».

On the other hand, there is a view that the main condition for long-term economic growth is the favourable nature of political institutions in a country, and that neither climate nor geography, nor the quantity and quality of natural resources play any role, while factors such as the quantity

and quality of labor, efficiency of fixed capital, governance and technology are secondary and are determined by the nature of political institutions.

To summarize, modern growth theory distinguishes between four types of economic growth. There are four types of economic growth:

- uniform growth of the leading countries (observed in the USA, Europe)
- growth miracles» (Japan, South Korea, Hong Kong)
- tragedies of growth (some countries of Central Africa)
- lack of economic growth (e.g. Zimbabwe).

Conclusions and prospects for further research. However, some researchers and governmental organizations have questioned the justification of economic growth in developed countries, arguing that it has not increased the well-being of society in recent decades. They point out that despite an increase in the size of the annual economy, measures of subjective life satisfaction have not increased, which in turn confirms that economic growth does not condition economic development.

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