Kokand University

QO‘QON UNIVERSITETI XABARNOMASI

ILMIY-ELEKTRON JURNALI
1-SON

KOKAND UNIVERSITY HERALD | 2023

VOLUME №1

WWW.HERALD.KOKANDUNI.UZ
NSSS: 2161-1695

QO‘QON UNIVERSITETI XABARNOMASI

1-SON

KOKAND UNIVERSITY HERALD

VOLUME 1

ВЕСТНИК КОКАНДСКОГО УНИВЕРСИТЕТ

ВЫПУСК 1

1/2023

QO‘QON UNIVERSITETI XABARNOMASI

Ilmiy-elektron jurnali

Qo‘qon universiteti xabarnomasi (“Вестник Кокандского университета – Kokand University Herald”) ilmiy-elektron jurnali Qo‘qon universiteti Kengashining qarori-ga asosan tashkil etilib, 2020-yil 10- oktabrda O‘zbekiston Respublikasi Prezidenti Administratsiyasi huzuridagi Axborot va ommaviy kommunikatsiyalar agentligi tomonidan №1138 raqami bilan ro‘yxatidan o‘tkazilgan, shuningdek davlatlararo standartlar talabi asosida O‘zbekiston Milliy kutubxonasidan jurnal uchun 2181-1695 ISSN-raqami olingan.

Tahririyat manzili:

150100, Farg‘ona viloyati, Qo‘qon shahri, Turkiston ko‘chasi, 28 a-uy, 1-xonadon

Mundarija:/Outline:

KOKAND UNIVERSITY HERALD SCIENTIFIC E-JOURNAL
ISSN: 2181-1695

QO‘QON UNIVERSITETI XABARNOMASI
KOKAND UNIVERSITY HERALD
ВЕСТНИК КОКАНДСКОГО УНИВЕРСИТЕТА

OAK: 01-08/1819/6

HERALD
www.herald.kokanduni.uz

THE IMPACT OF POPULATION GROWTH ON THE COUNTRY'S ECONOMIC DEVELOPMENT

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MAQOLA HAQIDA

Qabul qilindi: 24-mart 2023-yil
Tasdiqlandi: 26-mart 2023-yil
Jurnal soni: 1
Maqola raqami: 2
DOI: https://doi.org/10.54613/ku.v6i6.236

KALIT SO‘ZLAR/ Ключевые слова/ keywords

economic development, population, development index, population well-being

ANNOTATION

This study aims to examine the importance of population growth in our country for economic development. Correlational regression and Durbin-Watson equations were used for data analysis, based on data from the World Bank and the country's economic websites. The results of our research show that the impact of population growth on the human development index is significant.

Introduction. Today, it is no secret that the sharp increase in the number of the world's population and their provision of resources is the cause of urgent discussions. At the same time, the effect of population growth on the economy of countries is often discussed in the studies of economists. It is no secret that the population of our country is growing day by day, therefore, the economy of our country is also developing rapidly. The main goal of our research is to determine the extent to which the increase in the population of our country affects the national economy. In this section, we analyze the scientific works of researchers on how the economy of countries changes as a result of population growth.

Literature review. E. Wesley and F. Peterson in their research on "The Role of Population in Economic Development" state that: "Low population growth in high-income countries can cause social and economic problems, and high population growth in low-income countries "growth can slow down their development."

Many analysts believe that economic growth in high-income countries may be relatively slow in the coming years, in part because population growth in these countries will slow significantly (Baker, Delong, & Krugman, 2005). In others, population growth has been and will continue to be problematic because more people inevitably use more of the Earth's limited resources, thereby reducing long-term potential growth (Linden, 2017).

In general, according to scientists, population growth affects many phenomena, such as the age structure of the country's population, international migration, economic inequality, and the size of the country's labor force.

Piketty (2014) develops a series of economic relationships to describe the workings of a capitalist economic system and traces the impact of these relationships on changes in economic inequality. The relationship between economic growth and the rate of return on capital is central to his analysis. He argues that when the rate of return on capital (ρ) is higher than the rate of economic growth (γ) (ρ > γ), the likely result is the concentration of capital ownership, leading to increased inequality. According to him, economic growth is likely to be relatively slow in the future, which is less than the rate of return on capital, because its demographic component is expected to grow very little.

If population growth and per capita GDP growth were completely independent, higher population growth rates would have led to higher net economic growth rates, Piketty (2014) points out. "It would be true that the growth of GDP per capita would lead to improvement of economic well-being. On the other hand, if population growth affects output growth per capita, then higher population growth rates will affect overall economic growth by the nature of the impact on GDP per capita. helps the swelling to be high or low".

Thomas Malthus (1798) developed one of the earliest and most famous theories showing that population growth harms welfare. According to him, the population tends to grow faster than the food supply, so depopulation due to poverty of various kinds always requires keeping the number of people in proportion to the amount of food available. The implication of the Malthusian model is those average incomes are always reduced by population growth to a level that is sufficient for the population to live.

The main purpose of Malthus' work was to argue against the English Poor Laws. He argues that trying to improve the welfare of the poor is an exercise in futility because higher incomes lead to population growth, which leads to diminishing returns.

Yoo (1994) develops three models to examine the effects of population growth on US economic development. He argues that the large increase in the number of children has slowed economic growth, as resources have been diverted from more productive activities for this large group to education and health. As the baby boom generation transitioned from a dependency phase to a more productive phase of active workers and savings, living standards improved, and even as baby boomers exited the labor force, his models showed that the decline in savings had little impact on the economy. indicates that it does not. prosperity.

Bloom and Canning (2004) also show a positive effect on economic growth as baby boom cohorts join the labor force and save for retirement. Most of these authors emphasize the importance of age structure for economic development. High population growth rates mean that the average age of the population will be young and the dependency ratio will be high.

Nicole Maestas, Kathleen J. Mullen, and David Powell (California 2016) work on The Economic Impact of Population Aging: Labor Force and Productivity. The aging of the US population harms its economic growth, based on statistical data from 1980-2010, and estimates until 2050 are presented. It begins with the observation that many US states have already experienced significant growth in their elderly population and that much of this growth is predicated on historical fertility trends. Projected changes in the rate of population aging across US states between 1980 and 2010 were used to estimate the economic impact of aging on state output per capita. They found that a 10% increase in the share of the population over 60 years old reduces the growth rate of GDP per capita by 5.5%. Two-thirds of the reduction is due to slower growth in labor productivity across the age distribution of workers, and one-third is due to slower growth in the labor force. The results of this scientific work show that the annual growth of the gross domestic product will slow down by 1.2% in this decade and by 0.6% in the next decade due to the aging of the population.

Stefan Klasen, Professor of the Faculty of Economics, University of Göttingen, and Lawson David, Professor, University of Manchester (2007) conducted a research study entitled "Impact of Population Growth on Economic Growth and Poverty Reduction in Uganda". They examine the relationship between per capita economic growth and poverty, using interesting examples from Uganda. This article states, "Although Uganda has recently experienced excellent economic growth

and poverty reduction, it currently has one of the highest population growth rates in the world, driven by its unique demographic momentum. will be preserved for some time. The effects of population growth on per capita economic growth and poverty were examined using aggregated data, combining macro and microeconomic approaches. Theoretical considerations and strong empirical evidence suggest that the current high population growth significantly reduces Uganda's per capita growth prospects. It also contributes significantly to poor poverty reduction achievements and is associated with persistent household poverty and the transition into poverty. This is likely to lead to significant improvements in poverty reduction and per capita growth." it is stated that

After decades of stagnation and recession, Uganda has enjoyed relatively high per capita economic growth since the late 1980s. A return to peace and stability, significant economic and institutional reforms, and substantial foreign aid are the most important factors in this improvement. Sustained per capita growth has also led to a significant reduction in poverty, from 56 percent in 1992 to 39 percent in 2002 (Appleton and Ssewanyana, 2003). However, per capita growth has slowed recently and poverty reduction has stalled. The question to be addressed in this paper is to what extent the very high (and increasing) population growth rate has been (and will be) a constraint on per capita economic growth and poverty reduction in Uganda.). Population dynamics and economic growth Although Uganda may fall into the Malthusian trap of population growth, growth theory suggests that high population growth will have a serious negative impact on Uganda's economic growth per capita. 'secret shows. In the simplest growth model, the Harrod-Domar model, which assumes a production function with a fixed ratio of factors and constant marginal revenue for each factor, a one percent increase in population growth leads to a per capita economic growth of one percent. reduces by a percentage point.

In a particular parameterization of the model presented by Mankiw, Roemer, and Weil (1992) (using the production function of the Cobb-Douglas economy), a population growth rate of 10% (e.g., 3% to 3.3 %) will decrease the per capita income by 5% in a steady state. Conversely, if Uganda reduced its population growth rate to 10 percent (from 3.4 percent to 3.1 percent), it could expect to increase per capita income by 20 percent in the long run (which countries are expected to be stable countries called). approaching in 30 years or so) and it immediately embarks on an upward path of economic growth per capita to reach a sustainable level of per capita income.

Research methodology. To carry out this study, we relied on the data of the World Bank (UNCTAD) and the data of the site countryeconomy.com, which provides information about the economic indicators of countries. We selected the necessary factors and conducted an econometric analysis. The population of our country, the unemployment rate of gross domestic product per population, and human development indices were selected as research factors. These data are relevant to our country and are selected for the period 2012-2021 (Appendix 1). The main purpose of the selection of these variables is to assess the impact of the population on economic growth and to assess what other factors affect economic growth.

Research results and discussion. To analyze the data, we first performed a correlation analysis to check the relationship between the variables in the Stata program, as well as a regression analysis to determine the factors affecting the GDP per capita between the indicators. In addition, we used the Durbit-Watson test to determine the presence of autocorrelation between variables. The econometric analysis of the factors in our study was determined as follows;

Y – GDP per capita (GDP per capita USD) $

X1 – Population

X2 – The unemployment rate

X3 – HDI indicator

Result

```
. pwcorr Y x1 x2 x3, sig
```

	Y	x1	x2	x3
Y	1.0000			
x1	-0.6717	1.0000		
	0.0334			
x2	-0.7722	0.7149	1.0000	
	0.0089	0.0201		
x3	-0.7017	0.9712	0.7156	1.0000
	0.0237	0.0000	0.0200	

Figure 1. Correlation analysis

In our analysis, we will first consider the relationship between the variables. As you can see, there is an inverse and average relationship between the variables, and all of them have a significant p-value (less than 0.5), so they can be used in models. We create the model that is most optimal for us. For this, we need to find the regression relationship between the variables.

```
. reg Y x1 x2 x3
```

Source	SS	df	MS
Model	1078956.77	3	359652.258
Residual	581771.627	6	96961.9378
Total	1660728.4	9	184525.378

Number of obs	=	10
F(3, 6)	=	3.71
Prob > F	=	0.0807
R-squared	=	0.6497
Adj R-squared	=	0.4745
Root MSE	=	311.39

Figure 2. Liner model (Linear model)

```
. reg Y x1 x2 x3 a2
```

Source	SS	df	MS		
Model	1311777.19	4	327944.296	Number of obs	= 10
Residual	348951.214	5	69790.2429	F(4, 5)	= 4.70
				Prob > F	= 0.0602
Total	1660728.4	9	184525.378	R-squared	= 0.7899
				Adj R-squared	= 0.6218
				Root MSE	= 264.18

Y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
x1	.0002378	.0002529	0.94	0.390	-.0004124	.000888
x2	-180.3643	98.25553	-1.84	0.126	-432.9382	72.20959
x3	1577222	874748.5	1.80	0.131	-671390.7	3825834
a2	-1138162	623147.3	-1.83	0.127	-2740013	463689.7
_cons	-550165.1	309115.6	-1.78	0.135	-1344772	244441.9

Figure 6. Quadratic model

The above regression results showed that the most optimal model for us is the quadratic model.

Y^=0.000237*x1-180.364*x2 + 1577222*x3-1138162*a2-550165.1+e

The model we built is almost close to the actual values. We refer to the Durbin-Watson test to check whether there is autocorrelation between the variables. We calculate residuals and check autocorrelation using Stata software.

. predict ehat, res

. ac ehat, gen(rk)

. Durbin-Watson d-statistic(5, 10) = 2.477046

In the figure below, we can see that the 95% confidence band appears in the shaded area. It can be seen that there is no autocorrelation.

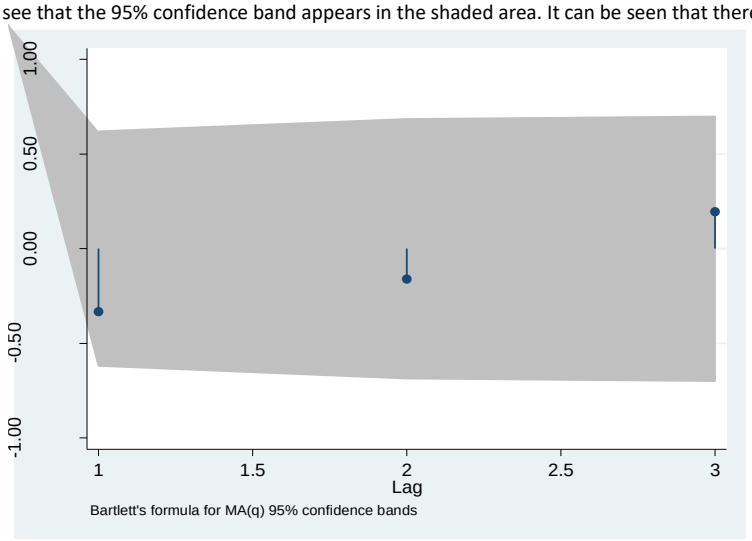

Figure 8. Durbin-Watson test results

The next step is to check the normal distribution of the residuals. We do this using the .hist ehat, norm command. From the graph below, we can see that the residuals are almost normally distributed.

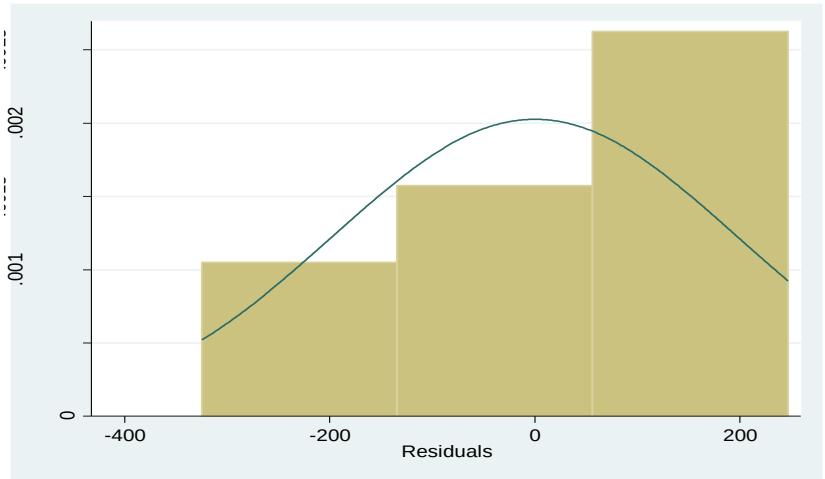

Figure 9. Normal distribution of residuals

At the next stage of forecasting, we find the next values of all variables. We calculate the lag values of each variable. For this, we find the regression of each variable and its lag.

We give the command reg x1 L.x1 and find the value of variable x1 in the last year 2021 using the formula di _b[_cons]+_b[L1.]*34081448. We find the forecast value by the lag value of the remaining variables.

Before finding the forecast value for the next year, we perform the last regression command. reg Y x1 x2 x3 a2 we find through each lag value.

dib[_cons]+_b[x1]*34644493+_b[x2]*6.49+_b[x3]*0.729+_b[a2] *0.531=2332.9658

According to our forecasts, GDP per capita for 2022 will be $2,332,965.

Summary. Most of the literature reviewed in this article supports the view that population growth is an important factor in overall economic growth and can even contribute to per capita output growth in some cases. In general, according to scientists, population growth affects many phenomena, such as the age structure of the country's population, international migration, economic inequality, and the size of the country's labor force.

A higher population can mean that a country can produce and consume more goods and services, leading to economic growth. However, this can only happen when employment opportunities are available and people have access to the education and training they need. A larger population can help the next generation's production of human capital overcome the potential diminishing returns to this generation's human capital, as greater population growth leads to greater specialization and a larger market that increases the returns to human capital and knowledge. emits

It can be concluded from our research that as the population of our country increases, it is important to have positive changes in the human development index. This means that people's way of life will also develop along with the number of people. This, of course, indicates the development of science.

Limits

The shortcomings of our research are that the significance of the selected variables is very low. It can be concluded from this that it would be appropriate to add indicators of other factors, such as the number of employees, and income of the population, to the number of factors selected for our research.

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KOKAND UNIVERSITY HERALD

ВЕСТНИК КОКАНДСКОГО УНИВЕРСИТЕТА

1 / 2023

ISBN: 2181-1695

Bosishga ruxsat etildi 2022-yil 28-dekabr.
Qog‘oz bichimi 60x84 1/8 «Libre Franklin, Montserrat» garniturasi. Shartli bosma tabog‘i 8. Adadi 20 nusxa.
Buyurtma rakami № . Baxosi shartnoma asosida.
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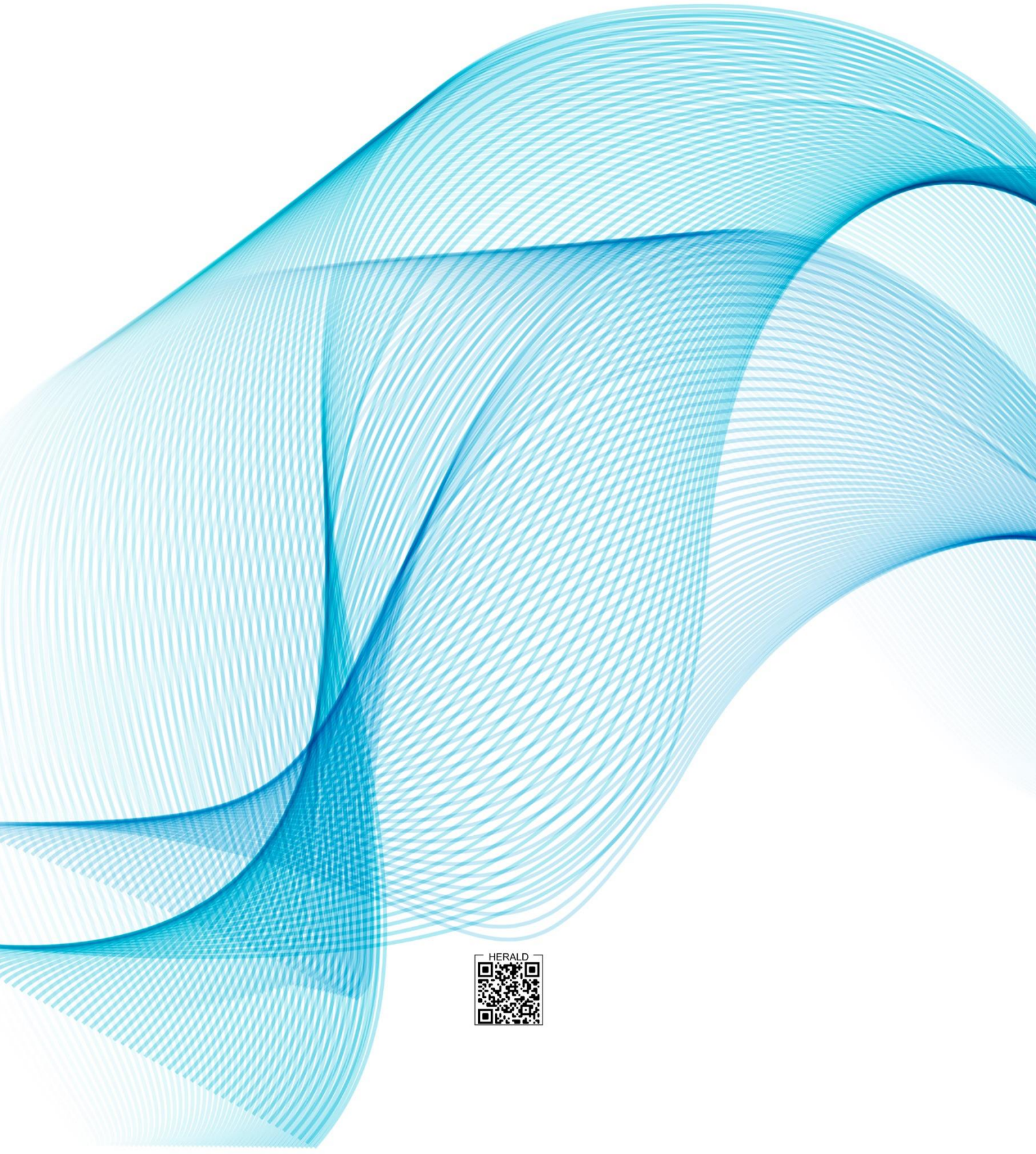
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