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Research Article

Challenges Of Social And Individual Responsibility: Pollution And Life Expectancy

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Abstract

A significant scourge of our age is pollution. The evolution of pollution has generated both environmental problems, such as climate change, and human health problems, such as increased mortality rates and reduced life expectancy. Pollution has become a global problem. The impact of pollution on human health is considerable. Given that air pollution and ambient air pollution remain at worrying levels, it is considered that current regulations do not provide the expected effectiveness and impact. Thus, in order to ensure a healthy environment and thus increase the life expectancy of the population, measures to reduce the level of air pollution and environmental pollution based on social responsibility and individual responsibility are needed. The aim of this research was to analyze the impact of air pollution and environmental pollution on the life expectancy of the population. For this purpose, both an exploratory and a statistical, quantitative research was carried out. The exploratory research aimed to identify and explore the relationship between the pollution factors considered and cancer mortality and life expectancy. The quantitative analysis aimed to identify and characterize the correlation between pollution factors and life expectancy factors, at the level of Romania. Through exploratory research, the literature was reviewed to identify and select influencing factors. Factors were selected that characterize both air pollution and ambient pollution, as well as factors that characterize the life expectancy of the population. The factors with the highest frequencies of occurrence were selected from the literature reviewed. The influencing factors were grouped into two categories: air pollution factors and environmental pollution factors. For life expectancy, inversely proportional factors were identified, the life expectancy factor and the cancer mortality factor. To describe the relationship between the factors, specific indicators were analyzed. The indicators considered were: CO2 emissions, NOx emissions, fossil fuel consumption, renewable energy consumption, PM2.5 particulate matter, tobacco consumption and cancer mortality and life expectancy. The indicators were taken from World Bank Statistics for 10 countries worldwide. The quantitative analysis aimed to identify and characterize the correlation between pollution factors and life expectancy factors. The following variables were analyzed for air pollution: CO2 emissions, NOx emissions, fossil fuel consumption, renewable energy consumption, PM2.5 particulate matter. For environmental pollution the variable tobacco consumption was analyzed and for life expectancy the variables life expectancy and cancer mortality were considered. The quantitative analysis was performed for Romania. The result of the research was the development of an econometric model that could provide a synthetic representation of the impact of the level of air pollution and ambient pollution on the life expectancy of the population. The econometric model was built based on data obtained for Romania from the World Bank Statistics website. The data were structured by years, from 2000 to 2020. The method used was linear regression. The research carried out measured the level of influence of factors specific to air pollution and environmental pollution on life expectancy. It was found that the factor of renewable energy consumption has a low impact on cancer mortality and reduced life expectancy, while all other factors considered have a significant impact on increased cancer mortality and reduced life expectancy. The result obtained by the research can provide significant contributions to shaping a sustainable development model based on social and individual responsibility. It can be argued that reducing the level of cancer mortality and thus increasing the life expectancy of the population depends both on the actions of all entrepreneurs and on the behavior of the population.

Keywords: air pollution, environmental pollution, cancer mortality, life expectancy, social responsibility, individual responsibility

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Introduction

Over the ages, technological progress and innovation have played a significant role in the evolution of humanity. They are also pillars in achieving the United Nations 2030 Sustainable Development Goals (SDGs) (Kim, 2023). At the same time, technological and industrial progress has often been associated with increased pollution. The Industrial Revolution marked the beginning of an era of rapid development, but also of increasing air pollution. The intensive use of fossil fuels such as coal and oil led to massive emissions of carbon dioxide (CO_2) and other greenhouse gases (Walker, G., et al., 2005). In the pursuit of profit and economic growth, many industries neglected environmental impacts. The absence of stringent regulations has allowed the uncontrolled release of pollutants into the atmosphere and ecosystems (Jones, 2008). For example, developing countries have faced massive pollution due to non-environmental industrial processes (Anser, M. K., 2020). The industrial sector is responsible for about 24% of global CO_2 emissions (IPCC, 2021). Transportation accounts for about 14% of total emissions (Dechezleprêtre, et. al., 2019). Air pollution causes over 7 million premature deaths annually (WHO, 2023). China, one of the global leaders in industrialization, has experienced rapid growth, but this progress has come at great environmental costs. Cities such as Beijing have become symbols of extreme air pollution (Marks, R. B. 2017).). Air pollution and ambient air pollution have a significant impact on human health, directly influencing life expectancy. Numerous studies have demonstrated a clear correlation between exposure to pollutants and a decrease in longevity, caused by various diseases and cancers. Air pollution, in particular fine particulate matter (PM2.5 and PM10), nitrogen dioxide (NO_2) and carbon dioxide (CO2), are major factors in reducing life expectancy. Prolonged exposure to these pollutants has been associated with chronic diseases, which contribute significantly to reduced life expectancy. Exposure to air pollutants is a major cause of lung cancer (Chowdhury, S., et al., 2022). The Global Burden of Disease study (2019) estimates that air pollution shortens global life expectancy by about 2 years, affecting densely populated urban areas in particular (GBD, 2019). On the other hand, a negative effect of urbanization on health status is cancer, which has become one of the leading causes of mortality. This is largely due to the characteristics of our modern lifestyle, alcohol consumption and smoking and increased exposure to a mixture of pollutants and environmental factors (Vineis P., 2005).

Based on research there is reasonable cause for concern that air pollution may increase the risk of lung cancer, particularly in combination with other known risk factors such as active and passive smoking and occupational exposures (Vineis P,). According to the World Health Organization (WHO), the tobacco industry generates 84 million tons of CO_2 annually, equivalent to the emissions of 17 million cars (Goshua, A., et. al., 2022). Social responsibility requires individuals, companies and society as a whole to make decisions that promote the common good and protect the environment. Smoking has a significant impact on the environment, and social responsibility involves action by both tobacco companies and consumers. Reducing tobacco consumption and strict regulation are essential to combat pollution caused by tobacco products. Cigarette smoke releases dangerous chemicals such as carbon monoxide (CO), nitrogen dioxide (NO_2) and fine particulate matter (PM2.5) into the atmosphere. They contribute to air pollution (Schripp et al., 2013). Passive smoking affects indoor air quality, endangering the health of those around us (U.S. Surgeon General, 2010). They contribute to air pollution (Schripp et al., 2013). Passive smoking affects indoor air quality, endangering the health of those around us (U.S. Surgeon General, 2010).

United Nations Sustainable Development Goal (SDG) 8 aims to promote sustained, inclusive and sustainable economic growth, quality employment and a decent work environment for all. A key aspect of this goal is to reduce pollution and minimize the environmental impact of economic activities (Weiland, S.,et al., 2021). Developed and developing countries are investing in renewable energy sources to sustain economic growth without increasing pollution (IEA, 2022). The European Union has implemented policies such as the European Green Pact, which aims for climate neutrality by 2050 (European Commission, 2019). Companies are adopting sustainable practices to meet environmental requirements and remain competitive (Porter & Kramer, 2011). Germany has promoted the energy transition (Energiewende), focusing on renewable energy and energy efficiency (Agora Energiewende, 2020). Sweden implemented carbon taxes, leading to a significant decrease in emissions without compromising economic growth (OECD, 2016).

Based on these considerations, the paper aims at analyzing the interdependencies between pollution and some key components of life expectancy in the context of sustainable development, with a particular focus on the current EU Member States. The paper is structured in 4 sections. The first section is devoted to the literature on the link between pollution and factors that reduce life expectancy. The second section presents the methodology of the research carried out in order to construct an econometric model that is relevant to the current state of pollution and suitable for analysis from the perspective of indicators specific to sustainable development, based on social and individual responsibility. The third section is dedicated to the presentation of the research results, and the last section concludes the research, not mentioning limitations and future research directions.

Literature Review

Pollution is a major threat to public health and life expectancy, and tackling it is not only a governmental responsibility, but also a matter of social responsibility of all economic actors and individuals. By implementing sustainable development policies and adopting environmentally friendly practices, we can ensure a cleaner environment, better health and therefore longer life expectancy for all citizens of the planet. In recent decades, concerns about pollution and its impact on human health have become increasingly relevant as most countries face environmental and public health problems. Pollution, in its various forms (air, water, soil), has been linked to decreased life expectancy and the development of chronic diseases such as cancer, cardiovascular, or respiratory diseases. This phenomenon brings into question the need to implement sustainable development policies that protect the environment and, consequently, the health of the population. Air pollution is one of the most serious forms of pollution, with a direct impact on human health. According to the World Health Organization (WHO), air pollution is responsible for an estimated 7 million premature deaths annually from respiratory and cardiovascular diseases (WHO, 2021). Many of these deaths are associated with exposure to fine particulate matter (PM2.5) and nitrogen oxides (NOx), emissions largely from the energy industry, transportation and fossil fuel combustion. Air pollution is a major health concern for Europeans. In 2020 in the European Union, 96% of the urban population was exposed to levels of fine particulate matter above the health-based guideline level set by the World Health Organization (European Environment Agency, 2022).

The impact of air pollution on life expectancy

Air and ambient pollution is one of the most serious threats to human health in the 21st century. As urbanization and industrialization increase, the effects of pollution are becoming increasingly evident, with pollutant emissions increasingly affecting the global population, reducing life expectancy by increasing the incidence of respiratory, cardiovascular and cancer diseases (WHO, 2021). The World Health Organization (WHO) estimates that approximately 7 million deaths are caused by air pollution each year, highlighting the need for urgent action (WHO, 2021).

Air pollution includes fine particulate matter (PM10 and PM2.5), nitrogen oxides (NOx), sulphur dioxide (SO_2) and volatile organic compounds (VOCs). The main sources are fossil fuel combustion in transport and industry, and emissions from agriculture. Prolonged exposure to these substances is associated with multiple adverse health effects (Chowdhury, S., et al., 2022). Fine PM2.5 particles penetrate deep into the respiratory and circulatory system, causing chronic inflammation and oxidative stress. According to a study by the Harvard T.H. Chan School of Public Health, prolonged exposure to PM2.5 reduces life expectancy by about 1-2 years in areas with high pollution levels (Dominici et al., 2017). NO_2 pollution is also correlated with an increased risk of chronic diseases.

People living in polluted urban environments are more likely to develop different types of cancer, which contributes to a decrease in longevity (Turner, M. C., et al., 2020). The life expectancy of the population is directly influenced by pollution levels, particularly in urban regions where pollutant concentrations are much higher than in rural areas. For example, in large cities in South and South-East Asia, such as Beijing, New Delhi or Jakarta, life expectancy is significantly lower compared to cities in developed countries due to intense pollution (Cohen et al., 2017). Studies suggest that reducing air pollution by 50% could extend overall life expectancy by 2-3 years (Anenberg et al., 2019).

The impact of environmental pollution through tobacco consumption on life expectancy

Environmental pollution from smoking is a significant public health problem with direct effects on the life expectancy of both actively and passively exposed individuals. Smoking is a major source of air pollutants, and prolonged exposure to tobacco smoke can lead to a range of serious life-shortening diseases.

Active smoking contributes to indoor air pollution and passive smoking affects outdoor air quality. Tobacco smoke contains a number of toxic substances, including carbon monoxide, tar, ammonia and carcinogenic compounds, which not only harm smokers but also people who inhale the smoke indirectly. This contributes to increased concentrations of pollutants in ambient air, adversely affecting public health and the environment. Passive smoking is recognized as a significant risk factor for chronic, respiratory and cardiovascular diseases (U.S. Department of Health and Human Services, 2006). Studies show that smoking has a major impact on life expectancy. According to the World Health Organization (WHO), smoking is responsible for an estimated 8 million deaths globally each year, and people who smoke may lose 10 to 15 years of life compared to non-smokers (WHO, 2021). Smoking directly affects the cardiovascular and respiratory systems and is a major factor in the development of heart disease, stroke and lung cancer. Exposure to secondhand smoke has also been associated with increased risks of lung cancer, cardiovascular disease and chronic respiratory diseases (Liu et al., 2018). Life expectancy can vary significantly depending on the prevalence of smoking and the measures taken to reduce smoking exposure. In regions where smoking is more prevalent and anti-smoking measures are less effective, the mortality rate from smoking-related diseases is higher, leading to a decrease in life expectancy. For example, studies in the United States and Europe show a significant incidence of smoking-related diseases, and regions with strict smoking control policies have observed improved public health and increased life expectancy (Jha et al., 2013).

Pollution and individual and social responsibility

Although pollution is a global problem, responsibility for tackling it is shared between individuals, communities and governments. Awareness of this responsibility and the adoption of sustainable practices are key to reducing negative environmental impacts. Air pollution is perhaps the most visible and dangerous form of pollution, and is associated with respiratory and cardiovascular diseases (WHO, 2018).

At the societal level, responsibility involves implementing green policies, investing in green technology and promoting a circular economy. Governments and organizations play a key role by setting strict regulations on industrial emissions and incentivizing the transition to renewable energy sources. Companies also have a moral and legal obligation to adopt sustainable practices and minimize pollution caused by their activities (Zhang, D., et al., 2017). Every individual has a role to play in reducing pollution by changing everyday behaviors. Actions such as recycling, saving energy and using public transportation can have a significant impact. Adopting a 'zero waste' lifestyle can reduce the amount of waste produced and therefore reduce pollution (Johnson, 2017). Individual responsibility also includes continued education about the environmental impact of personal activities, such as reducing tobacco consumption. Pollution is a complex challenge that requires a collective effort from individuals, communities and institutions. Individual and social responsibility are interdependent, and awareness of the impact of our actions on the environment is essential to ensure a sustainable future. Every small gesture counts, and through collaboration and commitment, we can help reduce pollution and protect the planet for future generations.

Impact of pollution on life expectancy	
Advantages	Reducing the occurrence of chronic disease Increasing quality of life Increase life expectancy Reduce health care costs Protect ecosystems
Disadvantages	High implementation costs Economic restructuring Regulatory difficulties Lack of appropriate technologies and accurate data

Figure 1. Impact of pollution on life expectancy

The literature reviewed shows that the impact of pollution on life expectancy of the population is a topic of great interest, but at the same time it also reveals that, at the moment, there is rather a correlation between life expectancy and specific indicators of pollution. Poluarea atmosferică și ambientală amenințări majore la adresa sănătății globale, cu un impact direct asupra speranței de viață. Deși măsurile de control al poluării sunt costisitoare, beneficiile pe termen lung, precum și reducerea bolilor și protejarea mediului, depășesc aceste dezavantaje. O abordare echilibrată și globală este esențială pentru a combate această problemă.

Research Methodology

The aim of this research is to analyze the impact of air and environmental pollution on the life expectancy of the population. As a first step, the literature has identified the factors influencing the level of air pollution and the level of environmental pollution. Research in the field has shown that pollution is determined by air pollution factors and environmental pollution factors and these have a significant negative effect on the health status and, consequently, on the life expectancy of the population (Raaschou-Nielsen et al., 2013).

The main factors considered have been structured into two categories, factors that generate air pollution, i.e. CO2 emissions, nitrogen oxide - NOx emissions, fossil fuel consumption, renewable energy consumption and fine particulate matter PM2.5 and factors that generate environmental pollution, i.e. tobacco consumption. While these factors provide a broad picture of the pollution domain, the main drawback from the perspective of our research is that it does not provide a synthetic, comprehensive pollution characterization factor or indicator for each country or region that can be linked to specific indicators or factors of sustainability or social responsibility.

The article aimed to identify and analyze the relationship between pollution and life expectancy of the population. For this purpose, both an exploratory and a statistical, quantitative research were carried out, which resulted in the development of an econometric model that can provide a synthetic representation of the characterization of the level of atmospheric and environmental pollution.

The descriptive analysis aimed to explore the relationship between pollution factors and life expectancy. Thus, indicators such as life expectancy, cancer mortality, CO2 and NOx pollution, fossil fuel consumption, renewable energy consumption, PM2.5 particulate air pollution and tobacco consumption were analyzed for 10 countries worldwide. The indicators were taken from World Bank Statistics.

Statistical analysis, quantitative analysis aims to develop an econometric model in order to identify both the correlation between pollution level and lung cancer mortality and the correlation between pollution level and life expectancy. The influences of CO2 and nitrogen oxide - NO, fossil fuel consumption, renewable energy consumption, PM2.5 particulate matter as factors of air pollution, as well as the influence of tobacco consumption on cancer mortality and reduced life expectancy were considered, tobacco consumption being considered as a factor of environmental pollution. The econometric model was built based on data obtained from the World Bank Statistics website for Romania. The data were structured by years, starting from 2000 to 2020. The method used is linear regression, through which it was possible to identify and characterize the relationships between the collected variables.

Table 1. presents the data that are used in this research as well as the definition of each variable.

Table 1. Definition of variables

Variables	Definition
CO_2	CO2 emissions (metric tons) per capita
NO_X	NOX Nitrous oxide emissions (thousand metric tons CO2 equivalent) per capita
RE	RE Fossil fuel consumption and renewable energy consumption, % of total final energy consumption
PM2.5	Air pollution by PM2.5 particles means micrograms of annual exposure per cubic meter
HEALTH_EXP	Life expectancy
GBP_CAP	GDP per capita

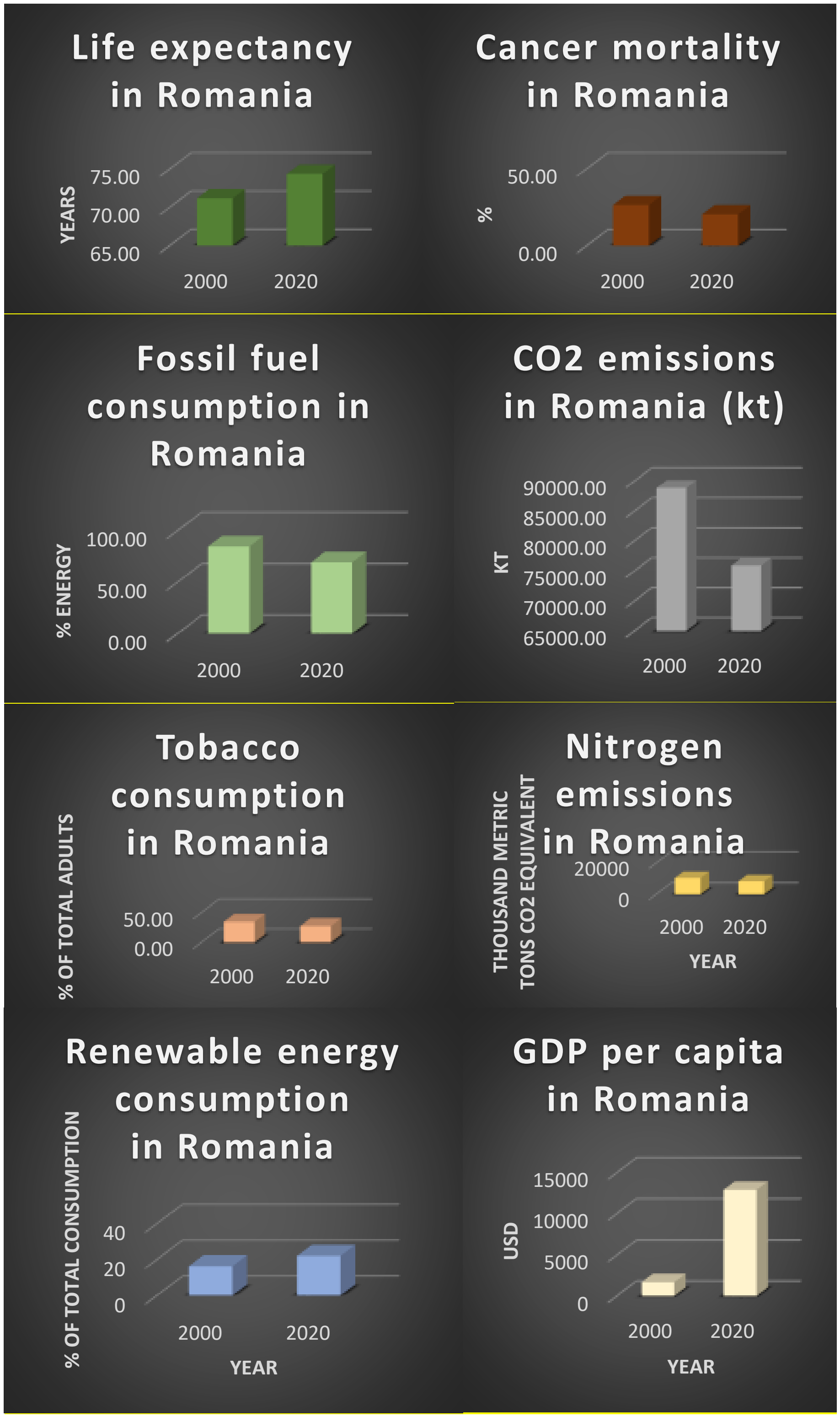

Figure 1: Trends of the variables included in empirical model,
Source: authors' own elaboration

The dependent variables of the study are Cancer mortality and Life expectancy. The independent variables are air pollution through: CO2 emissions (metric tons) per capita, NOx emissions (thousand metric tons CO2 equivalent) per capita and renewable energy consumption and ambient air pollution index of PM2.5, which indicates annual exposure in micrograms per cubic meter and ambient pollution - through tobacco consumption. In order to determine the impact of renewable energy consumption, which ensures lower emissions of pollutant gases as well as reduced cancer prevalence, the renewable energy (RE) variable was included, denoting renewable energy consumption as a share of total final energy consumption.

The objectives of the study were focused on determining the influence (variables) of all factors, included in the two categories, on life expectancy. In relation to the analyzed variables the following hypotheses were formulated:

- There is a negative relationship between CO2 emissions and life expectancy. Low CO2 in the air leads to increased life expectancy and reduced cancer mortality, respectively.
- There is a negative link between NOx emissions and life expectancy. Low NOx in the air leads to increased life expectancy and reduced cancer mortality, respectively.
- There is a negative correlation between fuel consumption and life expectancy. Thus, the lower the fossil fuel consumption, the higher the life expectancy and hence a reduction in cancer mortality.
- There is a positive link between renewable energy and life expectancy. Increased consumption of renewable energy prolongs life expectancy.
- There is a negative correlation between tobacco consumption and life expectancy. If the proportion of adults using tobacco decreases, then life expectancy is higher.

After performing the regressions, the model thus obtained was tested. The WHITE test was used to validate the hypotheses. The data were processed using the EViews program.

Results and Discussion

Descriptive analysis

The descriptive analysis aimed to explore the relationship between pollution factors and life expectancy and lung cancer mortality. Lung cancer being considered on the one hand as the main consequence of pollution and on the other hand as the main cause of reduced life expectancy. Thus, indicators such as life expectancy, cancer mortality, pollution through CO2 and NOx emissions, fossil fuel consumption, renewable energy consumption, air pollution with PM2.5 particles through tobacco consumption were analyzed for 10 countries worldwide. The indicators were taken from World Bank Statistics.

In order to analyze the evolution of life expectancy between 2000 and 2020, a graph has been produced (Figure 1). The columns marked in dark green show values for the reference year, 2000, and those marked in light green show values for the year at the end of the period, 2020. Thus, life expectancy shows an upward trend for most countries. Significant fluctuations between 2000 and 2020 are also observed for South Africa, the Arab Republic of Egypt and the Russian Federation.

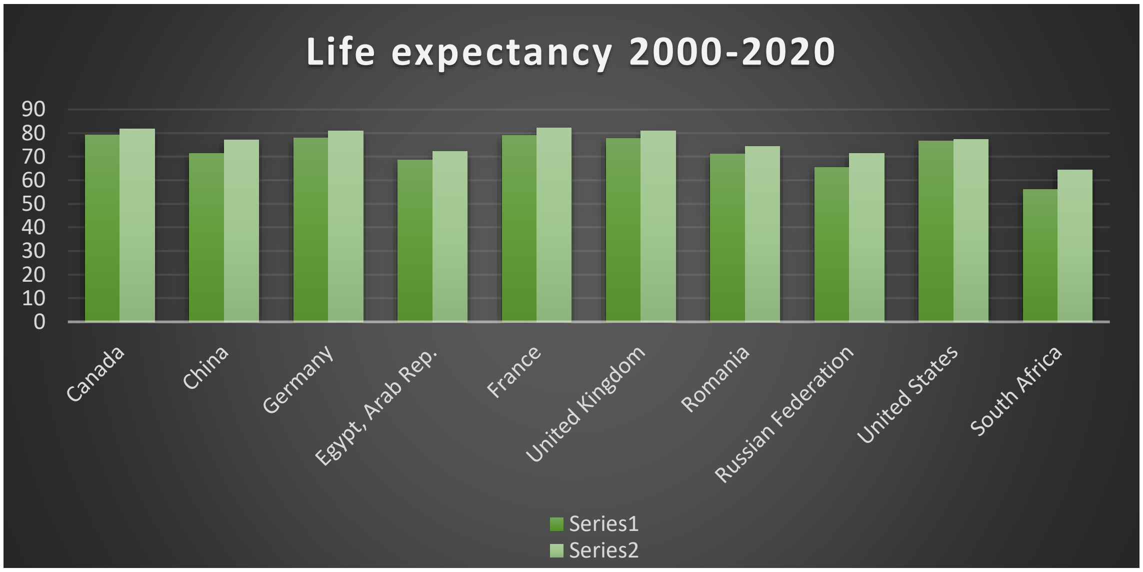

Figure 3: Source: authors' own elaboration based on data from World Bank Statistics

Following the analysis of the factors considered, the following assessments can be made:

Cancer is the leading cause of death worldwide, accounting for almost 10 million deaths in 2020. The graph in Figure 4 on the mortality rate in Europe and the World Bank Statistics Annual Report were analyzed.

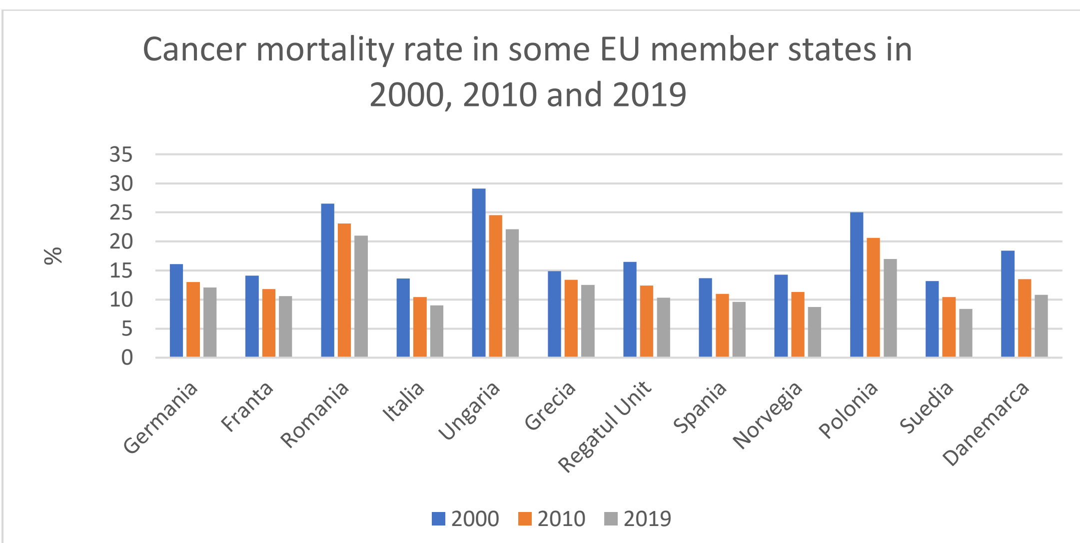

Figure 4: Cancer mortality (% of deaths,) Source: authors' own elaboration based on data from World Bank Statistics

World Bank Statistics' annual report on the state of cancer shows that mortality rates from all cancers combined continue the decline that began in 2000. For the United States for example, over the past 20 years, from 2001 to 2020, cancer death rates have declined by 27%. Over time most cancer deaths have been recorded in the Russian Federation and South Africa, with Russia having the highest estimated cancer death rates.

Fossil fuels are the cornerstone of our modern industrialized world and play a dominant role in global energy systems. About 70% of global final energy consumption still comes from resources such as oil, natural gas and coal. The burning of fossil fuels is a major contributor to global warming and pollution and therefore contributes to cancer which leads to millions of premature deaths each year.

Many human activities release what are known as greenhouse gases into the atmosphere. The main greenhouse gas of concern is carbon dioxide or CO2, which is released when we burn fossil fuels such as coal, oil and gas. Overwhelming evidence shows that levels of these gases in the atmosphere are rising.

In addition to the indicators described above, carbon dioxide emissions recorded from 1990 to 2018 were analyzed. Global emissions of carbon dioxide (CO2) from fossil fuels and industry have increased considerably since 2000 and reached a record 36.7 billion metric tons of CO2 in 2018. Significant increases have been observed for the country that is considered the world's biggest polluter, namely China. During the 20 years the amount of carbon dioxide emissions has increased 5 times for this country.

The representative indicator for air pollution is the PM2.5 index. Fine particulate matter (PM2.5) is an air pollutant and is a human health concern when air levels are high. Countries with a significant evolution of this indicator are China and Egypt. In recent years, however, China has made significant progress in reducing air pollution. The pollution index, PM2.5 has decreased by 33% from 2013 to 2017 in 74 cities. Overall pollution in China has further decreased by 10% between 2017 and 2018. In Egypt however, there was an increase in this indicator until 2015, since then it has remained steady but high.

Tobacco consumption is one of the biggest public health threats the world has ever faced, killing more than 8 million people a year worldwide. More than 7 million of these deaths are the result of direct tobacco consumption, while about 1.2 million are the result of non-smokers' exposure to second-hand smoke. Over 60% of these deaths were caused by cancer.

Another significant indicator for the proposed analysis is the percentage of the adult population that uses tobacco (Figure 5). In all the countries analyzed in 2000, more than 20% of adults were tobacco consumptionrs. The state with the highest percentage is the United Kingdom, where almost 40% of people aged 18 and over are smokers. In 2020, only 15.4% of adults in the UK will use tobacco, which represents a major change. There is also a decrease in the percentage of the adult population using tobacco for all countries analyzed. This shows that by 2020 a smaller percentage of the adult population is subject to this risk factor for cancer.

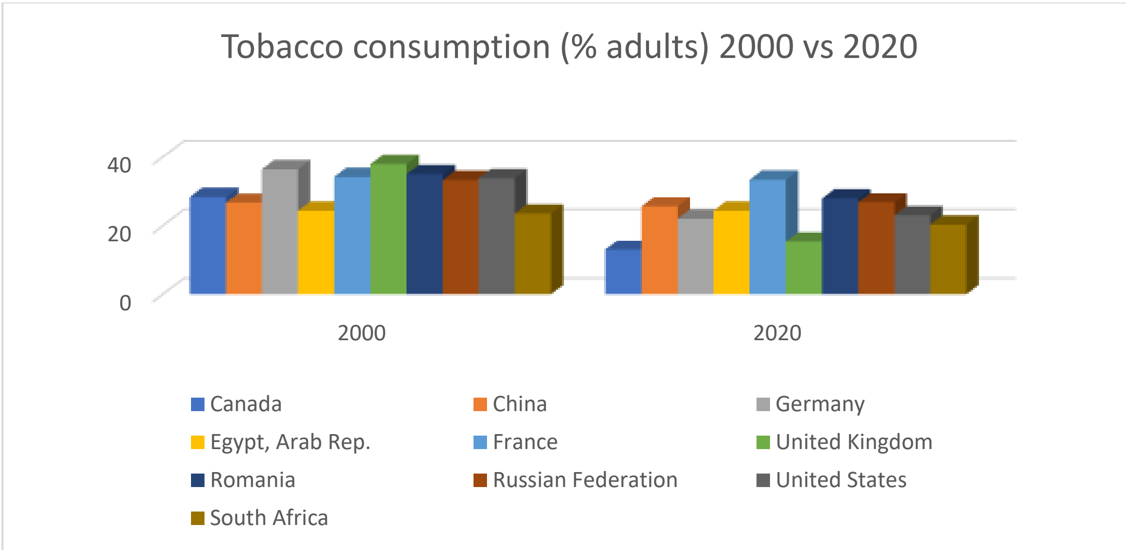

Figure 5: Tobacco consumption (%adults,)
Source: authors' own elaboration based on data from World Bank Statistics

Statistical Analysis

The statistical analysis aimed to measure the impact of the considered factors on cancer mortality rate and life expectancy. The statistical analysis was performed at the Romanian level.

By means of a quantitative analysis, the level of influence of the five air pollution and environmental pollution factors was measured. The influence of all factors on the life expectancy of the population was also analyzed.

Cancer mortality and life expectancy were considered as dependent variables, while CO_2 emissions, NO emissions, fossil fuel consumption, renewable energy consumption and tobacco consumption were considered as independent variables.

The impact of the above mentioned factors on cancer mortality was analyzed as follows: Influence of CO_2 and NO emissions respectively on cancer mortality: Influence of fossil fuel and renewable energy consumption on cancer mortality; Influence of tobacco consumption on cancer mortality: Influence of all factors on life expectancy.

Influence of CO_2 and NO emissions respectively on cancer mortality

The influence of CO_2 and NO emissions respectively on cancer mortality is represented by the multifactorial regression model: $Yt = \alpha + \beta 1 * X1 + \beta 2 * X2$, where Y = cancer mortality, X1 = CO_2 emissions, X2 = NO emissions.

Sample: 2000 2020
Included observations: 21
MORTALITATEA_PRIN_CANCER___=C(1)*EMISII_CO2_KT_ +C(2)
*EMISII_DE_NO___MII_DE_TONE_METRICE_ECHIVALENT_CO2
_ + C(3)

	Coefficient	Std. Error	t-Statistic	Prob.
Emisii CO2	0.000113	4.35E-05	2.602618	0.0180
Emisii NO	0.000842	0.000485	1.736799	0.0995
Mortalit.cancer	6.185625	2.451117	2.523594	0.0212

R-squared	0.763266	Mean dependent var	23.47619
Adjusted R-squared	0.736963	S.D. dependent var	2.192465
S.E. of regression	1.124453	Akaike info criterion	3.204034
Sum squared resid	22.75911	Schwarz criterion	3.353252
Log likelihood	-30.64236	Hannan-Quinn criter.	3.236418
F-statistic	29.01743	Durbin-Watson stat	0.793230
Prob(F-statistic)	0.000002		

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.873651237
R Square	0.763266483
Adjusted R Square	0.736962759
Standard Error	1.124453185
Observations	21

ANOVA

	df	SS	MS	F	Significance F
Regression	2	73.37898585	36.68949293	29.0174304	0.0000023
Residual	18	22.75910939	1.264394966		
Total	20	96.13809524			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	6.185625418	2.451117	2.523594498	0.021238874	1.03601965	11.33523118	1.03601965	11.33523118
Emisii CO2	0.000113226	0.000044	2.602618024	0.018000013	0.00002183	0.00020463	0.00002183	0.00020463
Emisii de NO	0.000841983	0.000485	1.736799006	0.099504966	-0.00017652	0.00186049	-0.00017652	0.00186049

Figure 5. Authors' compilations in Eviews.
Authors' output in excel. Regression

Interpretation of coefficients: The regression model computed above shows that cancer mortality depends on CO2 emissions for a significance level of 5% and NO emissions influence cancer mortality at a significance level of 10%. Thus, as CO2 emissions increase, cancer mortality increases. Prob also shows that the parameters are statistically significant. HO - cancer mortality depends on CO2 and NO. H1 - cancer mortality does not depend on CO2 and NO

Model validity testing: Significance F is 0.000002 (value less than 0.05= ? = considered or imposed significance level of the test), then we reject H0 at the 5% significance level and conclude that the data favor the alternative hypothesis H1, i.e. the constructed regression model is statistically valid. In the regression model presented, the independent variables are CO2 Emissions and NO Emissions, with Cancer Mortality Rate as the dependent variable.

CO2 Emissions: The coefficient for CO2 Emissions is 0.000113226. This means that, on average, for each unit increase in CO2 Emissions, the Cancer Mortality Rate is expected to increase by about 0.000113226 units. The positive coefficient suggests a

positive association between CO_2 Emissions and Cancer Mortality Rate.
NO emissions: The coefficient for NO Emissions is 0.000841983. It indicates that, on average, for each unit increase in NO Emissions, the Cancer Mortality Rate is expected to increase by about 0.000841983 units. The positive coefficient suggests a positive association between NO Emissions and Cancer Mortality Rate.

The statistical significance of the coefficients is crucial for understanding the reliability of the relationships.

Intercept: The intercept is statistically significant (p-value = 0.0212), suggesting that there is a Significant Cancer Mortality Rate when both CO_2 Emissions and NO Emissions are zero.

CO_2 Emissions: The coefficient for CO_2 Emissions is statistically significant (p-value = 0.0180), indicating that these emissions contribute significantly to the model.

NO Emissions: The coefficient for NO Emissions is not statistically significant at the conventional significance level of 0.05 (p-value = 0.0995). Interpretation should be made with caution and the contribution of NO Emissions to the model may be limited.

R-squared value: The R-squared value is 0.7633, indicating that about 76.3% of the variability in the Cancer Mortality Rate is explained by CO_2 Emissions and NO Emissions.

Adjusted R Square: Adjusted R Square (0.73696) accounts for the number of predictors, providing a more accurate measure of the quality of model fit.

In conclusion, the model suggests a significantly positive relationship between CO_2 Emissions and Cancer Mortality Rate. However, the relationship with NO Emissions is inconclusive due to insignificant p-value. The overall fit of the model, indicated by the R-squared and Adjusted R Square values, suggests that CO_2 Emissions play a significant role in explaining the variability of the Cancer Mortality Rate. However, to better understand the relationship with NO Emissions, further exploration and consideration of other factors may be necessary.

To test for heteroscedasticity of the errors, the WHITE test was applied. The WHITE test involves regressing the squared squares of the residuals against all explanatory variables, the squares of the explanatory variables and their cross products, thus the following auxiliary regression model is considered:

$\varepsilon_i^2=\alpha_0+\alpha_1 x_{i,1}+\alpha_2 x_{i,1}^2+\alpha_3 x_{i,2}+\alpha_4 x_{i,2}^2+\alpha_5 x_{i,1}x_{i,2}+\eta_i$, where η_i is a disturbance variable that tests the assumptions associated with the classical linear regression model.

The assumptions are: H0: $\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=0$ (no heteroscedasticity) , $H1$: $(\exists)\alpha_i\neq 0$ (heteroscedasticity exists)

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.540032	Prob. F(5,15)	0.2365
Obs*R-squared	7.123446	Prob. Chi-Square(5)	0.2116
Scaled explained SS	4.647482	Prob. Chi-Square(5)	0.4604

Figure 6. Authors' compilations in Eviews. WHITE -heteroscedasticity test

White showed that in large-volume selections, under the assumption H0, there is no heteroscedasticity (there is homoscedasticity), the test statistic W = nR_a^2 asymptotically follows a χ^2 distribution with degrees of freedom given by the number of regressors in the auxiliary equation: W = $nR_a^2 \sim \chi_{df}^2$, where df=5 => W = $nR_a^2 \sim \chi_5^2$; If $W_{calculat}$= $nR_a^2 > \chi_{critic}^2 = \chi_{\alpha;df=5}^2$ or if the p-value is less than the chosen significance level α, we reject H0 and accept H1. The White test value generated in Eviews is 7.12, and the probability is 0.21=> we accept H0 => the random errors are not heteroscedastic; thus the random errors are homoscedastic and independent of the regressors, and the linear form of the model is correct.

Influence of fossil fuel and renewable energy consumption on cancer mortality

The multifactor econometric model has the following form: Yt = α + β1 * X1 + β2 * X2 , where Y = cancer mortality, X1 = fossil fuel consumption, X2 = renewable energy consumption

Sample: 2000 2020
Included observations: 21
MORTALITATEA_PRIN_CANCER___=C(1)*CONSUM_COMBUSTIBIL_FOSIL___ENERGIE_ +C(2)*CONSUMUL_DE_ENERGIE_REGENERABILA____DIN_CONSUMUL_TOTAL_ + C(3)

	Coefficient	Std. Error	t-Statistic	Prob.
cons. comb.fosili	0.257084	0.060581	4.243643	0.0005
cons enrgei regener...	-0.132887	0.112705	-1.179067	0.2537
mortalitatea prin can...	6.150361	6.895647	0.891919	0.3842

R-squared	0.916258	Mean dependent var	23.47619
Adjusted R-squared	0.906953	S.D. dependent var	2.192465
S.E. of regression	0.668781	Akaike info criterion	2.164844
Sum squared resid	8.050829	Schwarz criterion	2.314061
Log likelihood	-19.73086	Hannan-Quinn criter.	2.197228
F-statistic	98.47252	Durbin-Watson stat	1.200417
Prob(F-statistic)	0.000000		

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.957213488
R Square	0.916257662
Adjusted R Square	0.906952958
Standard Error	0.668781182
Observations	21

ANOVA

	df	SS	MS	F	Significance F
Regression	2	88.0872664	44.04363	98.47252	0.00000
Residual	18	8.050828841	0.447268		
Total	20	96.13809524			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	6.150360768	6.895646786	0.891919	0.384205	-8.336855547	20.6375771	-8.336855547	20.63757708
Consum combustibil fosil	0.257083944	0.060580796	4.243643	0.000489	0.129808069	0.38435982	0.129808069	0.384359818
Consumul de energie regenerabilă	-0.132888694	0.112705122	-1.17907	0.253722	-0.369671618	0.10388773	-0.369671618	0.103897731

Figure 7: Output generated in Eviews and Excel by the authors. Multifactor regression

Interpretation of coefficients: The previously generated regression model shows that cancer mortality depends on fossil fuel consumption for a significance level of 5. Thus, the higher the fossil fuel consumption, the higher the mortality increases. Prob also shows that the parameter for fossil fuel consumption is statistically significant.

Testing the validity of the model: Significance F is 0.000 (value less than 0.05 = ? = considered or imposed significance level of the test), then we reject H0 at the 5% significance level and conclude that the data favor the alternative hypothesis H1, i.e. the constructed regression model is statistically valid. In the regression model presented, the independent variables are Fossil Fuel Consumption and Renewable Energy Consumption. The dependent variable is the Cancer Mortality Rate.

Fossil Fuel Consumption: The coefficient for Fossil Fuel Consumption is 0.2571, indicating that, on average, for each unit increase in Fossil Fuel Consumption, the Cancer Mortality Rate is expected to increase by about 0.2571 units. This relationship is statistically significant, with a p-value much lower than the usual significance level of 0.05 (p-value = 0.0005). The positive coefficient suggests a positive association between Fossil Fuel Consumption and Cancer Mortality Rate.

Renewable Energy Consumption: The coefficient for Renewable Energy Consumption is -0.1329. This implies that, on average, for each unit increase in Renewable Energy Consumption, the Cancer Mortality Rate is expected to decrease by about 0.1329 units. However, this relationship is not statistically significant, with a p-value greater than 0.05 (p-value = 0.2537). The negative coefficient suggests a possible negative association, but caution is needed in interpreting the insignificant result.

Statistical Significance: The ANOVA table provides a general assessment of the statistical significance of the regression model. The F-statistic is 98.4725, and the p-value is 0.0000, indicating that at least one of the independent variables is significantly associated with Cancer Mortality Rate. This supports the overall statistical significance of the model.

Overall Model Fit: R-squared: The R-squared value is 0.9163, suggesting that about 91.6% of the variability in the Cancer Mortality Rate is explained by Fossil Fuel Consumption and Renewable Energy Consumption. Adjusted R Square, which accounts for the number of predictors, is 0.9070.

Standard Error: The standard error is 0.6688, indicating the average variability of the observed values from the estimated values. A smaller standard error is desired, and this value is relatively low.
We can thus say that the model shows a significantly positive relationship between Fossil Fuel Consumption and Cancer Mortality Rate. However, the relationship with Renewable Energy Consumption is not statistically significant. The high R-squared value and the overall statistical significance of the model indicate that Fossil Fuel Consumption is a strong predictor of Cancer Mortality Rate. Caution is needed in interpreting the insignificant relationship with Renewable Energy Consumption. To test the heteroscedasticity of the errors we apply the WHITE test here as well.

Null hypothesis: Homoskedasticity

F-statistic	1.682223	Prob. F(5,15)	0.1995
Obs*R-squared	7.544852	Prob. Chi-Square(5)	0.1832
Scaled explained SS	2.961773	Prob. Chi-Square(5)	0.7059

Figure 8. Output generated by the authors in Eviews. Test of heteroscedasticity - White test

The White test value generated in Eviews is 7.54, and the probability is 0.18=> we accept H0 => the random errors are not heteroscedastic; Thus the random errors are homoscedastic and independent of the regressors, and the linear form of the model is correct. HO - cancer mortality is less dependent on renewable energy consumption. H1 - cancer mortality is not more dependent on fossil fuel consumption

Influence of tobacco consumption on cancer mortality

There is a direct and positive link between tobacco use and cancer mortality. Thus, the higher the percentage of adults who use tobacco, the higher the cancer mortality, and the lower the percentage of adults who use tobacco, the lower the cancer mortality. The regression equation shows that annually cancer mortality increases by 0.96 percent.

The unifactorial econometric model has the following form: $Yt = \alpha + \beta 1 * X1$, where Y = cancer mortality, X1 = tobacco consumption

Sample: 2000 2020
Included observations: 21
MORTALITATEA_PRIN_CANCER___=C(1)*CONSUM_DE_TUTUN__A
DULTI_ +C(2)

	Coefficient	Std. Error	t-Statistic	Prob.
Consum tutun	0.944017	0.067709	13.94220	0.0000
Mortalit. cancer	-6.278317	2.139153	-2.934954	0.0085

R-squared	0.910959	Mean dependent var	23.47619
Adjusted R-squared	0.906273	S.D. dependent var	2.192465
S.E. of regression	0.671221	Akaike info criterion	2.130958
Sum squared resid	8.560228	Schwarz criterion	2.230436
Log likelihood	-20.37505	Hannan-Quinn criter.	2.152547
F-statistic	194.3850	Durbin-Watson stat	0.563602
Prob(F-statistic)	0.000000		

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.954441746
R Square	0.910959047
Adjusted R Square	0.906272681
Standard Error	0.671221496
Observations	21

ANOVA

	df	SS	MS	F	Significance F
Regression	1.0000000	87.5778676	87.5778676	194.3849573	0.0000000
Residual	19.0000000	8.5602276	0.4505383		
Total	20.0000000	96.1380952			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-6.2783168	2.1391533	-2.9349541	0.0084932	-10.7556161	-1.8010174	-10.7556161	-1.8010174
Consum de tutun	0.9440167	0.0677093	13.9422006	0.0000000	0.8022995	1.0857339	0.8022995	1.0857339

Figure 9. Authors' compilations in Eviews and Excel. Univariate regression

Interpretation of coefficients: The realized regression model shows that cancer mortality depends on tobacco consumption for a significance level of 5. Thus, the higher the percentage of adults, the higher the cancer mortality and the lower the number of people consuming tobacco, the lower the cancer mortality. Prob also shows that the parameter for tobacco use is statistically significant.

Model validity test: Significance F is 0.000 (value less than 0.05 = ⍰ = considered or imposed significance level of the test), then we reject H0 at the 5% significance level and conclude that the data favor the alternative hypothesis H1, i.e. the constructed regression model is statistically valid. In the regression model presented, the dependent variable is

Cancer Mortality Rate, while the independent variable is Tobacco Consumption.

Relationship between the Independent Variable and the Dependent Variable: The coefficient for Tobacco Consumption in the model is 0.9440. This suggests that, on average, for each unit increase in Tobacco Consumption, the Cancer Mortality Rate is expected to increase by about 0.9440 units. The intercept, which is -6.2783, represents the Estimated Cancer Mortality Rate when Tobacco Consumption is zero. The relationship is positive, indicating that higher levels of Tobacco Consumption are associated with higher rates of Cancer Mortality.

Statistical Significance: The statistical significance of the model is assessed by hypothesis testing, and both the intercept and coefficient for Tobacco Consumption are found to be statistically significant. The intercept has a t-statistic of -2.9350, with a p-value of 0.0085. This indicates that the estimated intercept is significantly different from zero, suggesting that there is an underlying Cancer Mortality Rate even when Tobacco Consumption is zero. The coefficient for Tobacco Consumption has a t-statistic of 13.9422, with a p-value of 0.0000. This highly significant result indicates a robust association between Tobacco Consumption and Cancer Mortality Rate.

Overall Model Fit: The overall model fit is assessed using the R-squared statistic. The reported R-squared value is 0.9110, suggesting that about 91.1% of the variability in the R of Cancer Mortality Rate is explained by Tobacco Consumption. Adjusted R Square, which takes into account the number of predictors in the model, is 0.9063. This high R-squared value indicates a strong fit, signaling that the model provides a good representation of the relationship between Tobacco Consumption and Cancer Mortality Rate.

Thus, the model reveals a positive and statistically significant relationship between Tobacco Consumption and Cancer Mortality Rate. The results suggest that higher levels of Tobacco Consumption are associated with an increase in the Cancer Mortality Rate. The statistical significance of the coefficients, together with the high R-squared value, increases confidence in the model's ability to explain the variability in the Tobacco Use-based Cancer Mortality Rate.

To test the heteroscedasticity of the errors we apply the WHITE test.

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.292918	Prob. F(2,18)	0.7496
Obs*R-squared	0.661933	Prob. Chi-Square(2)	0.7182
Scaled explained SS	0.457611	Prob. Chi-Square(2)	0.7955

Figure 10. Authors' compilations in Eviews. White test

The White test value generated in Eviews is 0.66, and the probability is 0.71=> we accept H0 => the random errors are not heteroscedastic; Thus the random errors are homoscedastic and independent of the regressors, and the linear form of the model is correct. HO - cancer mortality depends on tobacco use. H1 - cancer mortality does not depend on tobacco use

Influence of all factors on life expectancy

The present study focused on analyzing the influence of all the factors introduced in the research on life expectancy. In order to examine the correlations between the variables, a multifactorial econometric model was constructed which has the following form: $Yt = \alpha + \beta1 * X1 + \beta2 * X2 + \beta3 * X3 + \beta4 * X4 + \beta5 * X5$, *where Y = life expectancy, X1 = fossil fuel consumption, X2 = tobacco consumption, X3 = renewable energy consumption, X4 = CO2 emissions, X5 = NO*

The endogenous/dependent variable considered is Life Expectancy and the exogenous/independent variables are fossil fuel consumption, CO_2 emissions, NO emissions, renewable energy consumption and tobacco consumption. The generated regression model shows that life expectancy is influenced by the analyzed variables. Thus, the following statements can be made: There is a negative relationship between CO_2 emissions and life expectancy. Low CO_2 in the air increases life expectancy; There is a negative relationship between NO emissions and life expectancy. Low NO in the air leads to increased life expectancy; There is a negative correlation between fuel consumption and life expectancy. So the lower the fossil fuel consumption, the higher the life expectancy; There is a positive relationship between renewable energy and life expectancy. Increased consumption of renewable energy prolongs life expectancy; There is a negative correlation between tobacco consumption and life expectancy. If the proportion of adults using tobacco decreases, then life expectancy is higher.–

Prob. indicates that the parameters used are statistically significant. Life expectancy=84.91-0.239*Comb. Fossil - 0.778*Tobacco consumption+ 0.15*Renewable energy - 8.92* CO2 emissions - 0.0001*NO

Of the 5 exogenous variables, only CO_2 emissions is a parameter that is not statistically significant, the rest of the variables were found to be statistically significant in the change in life expectancy, as shown by the t-test probability. The coefficient of determination suggests that 95% of the variation in life expectancy is explained by the regression model. When carbon dioxide emissions are increased by 1%, the level of life expectancy will decrease by 8.34 percentage points if all other factors hold unchanged. Significance F is 0.000, which means that we reject H0 at the 5% significance level and conclude that the data favor the alternative hypothesis H1, i.e. the regression model constructed is statistically valid. When expanding the consumption of fossil fuels by one percentage point, the level of life expectancy will decrease by 0.239 percent, all other factors remaining unchanged. When renewable energy consumption expands by one percentage point, the level of life expectancy will increase by 0.15 percentage points, other factors unchanged. When increasing the number of adults using tobacco by one percentage point, the life expectancy level will decrease by 0.778 percentage points, other factors unchanged (see Fig.7).

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.974717126
R Square	0.950073475
Adjusted R Square	0.9334313
Standard Error	0.426058464
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5.0000000	51.8150007	10.3630001	57.0882998	0.0000000
Residual	15.0000000	2.7228872	0.1815258		
Total	20.0000000	54.5378879			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	84.9138418	4.4860175	18.9285577	0.0000000	75.3521217	94.4755618	75.3521217	94.4755618
Consum combustibil fosil	0.2391140	0.1537874	1.5548348	0.0140828	-0.0886761	0.5669042	-0.0886761	0.5669042
Emisii CO2	-0.0000892	0.0000413	-2.1596005	0.0474038	-0.0001773	-0.0000012	-0.0001773	-0.0000012
Consum de tutun	-0.7788322	0.2696689	-2.8881058	0.0112630	-1.3536178	-0.2040466	-1.3536178	-0.2040466
Consumul de energie regenerabilă	0.1502569	0.0750137	2.0030607	0.0435835	-0.0096309	0.3101448	-0.0096309	0.3101448
Emisii de NO	-0.0001206	0.0001960	-0.6155311	0.5474305	-0.0005383	0.0002971	-0.0005383	0.0002971

Figure 11. Excel output, made by the authors. Multifactorial regression

In the presented regression model, the dependent variable is Life Expectancy, while the explanatory variables are CO2 Emissions, NO Emissions, Fossil Fuel Consumption, Renewable Energy Consumption and Tobacco consumption. The aim is to explore the relationships between these explanatory variables and Life Expectancy.

CO2 Emissions: The negative coefficient (-0.0000892) for CO2 Emissions indicates that higher CO2 emissions are associated with slightly lower Life Expectancy. This relationship is statistically significant, with a p-value of 0.0474038.

NO Emissions: The non-significant p-value (0.5474305) for NO Emissions suggests that this variable could not be a significant predictor of Life Expectancy in this model.

Fossil Fuel Consumption: The positive coefficient of Fossil Fuel Consumption (0.2391140) suggests that an increase in fossil fuel consumption is associated with a higher Life Expectancy. This relationship is statistically significant, with a p-value of 0.0140828.

Renewable Energy Consumption: The positive coefficient for Renewable Energy Consumption (0.1502569) suggests that higher renewable energy consumption is associated with an increase in Life Expectancy. This relationship is statistically significant, with a p-value of 0.0435835.

Tobacco consumption (Use): *The negative coefficient (-0.7788322) for Tobacco consumption suggests that higher tobacco consumption is associated with a decrease in Life Expectancy. This relationship is* statistically significant, with a p-value of 0.0112630.

Overall Model Fit: The reported R-squared value of 0.95 indicates that approximately 95% of the variability in Life Expectancy is explained by the combination of Fossil Fuel Consumption, CO2 Emissions, Tobacco consumption, and Renewable Energy Consumption. This high R-squared value highlights that the model fits well in explaining the variation in Life Expectancy based on the selected explanatory variables.

In conclusion, the model suggests statistically significant relationships between Life Expectancy and CO2 Emissions, NO Emissions, Fossil Fuel Consumption, Renewable Energy Consumption and Tobacco consumption. However, the non-significant p-value for NO Emissions indicates that this variable may not be a significant predictor. These findings align with existing economic theories and contribute to a comprehensive understanding of the factors influencing Life Expectancy. The testing shows that 4 out of the 5 listed statements are confirmed.

Testing the validity of the model: Significance F is 0.000 (value less than 0.05= ⍰ = the considered or imposed significance level of the test), then we reject H0 at the 5% significance level and conclude that the data are in favor of the alternative hypothesis H1, meaning that the constructed regression model is statistically valid.

Conclusions and Recommendations

The concept of sustainable development, defined at the Rio Conference in 1992, emphasizes the need to balance economic, social and environmental needs in such a way as to ensure the well-being of the present without compromising the resources and opportunities of future generations (UN, 1992). In this context, companies and governments have a responsibility to implement policies that reduce the impact of pollution on the environment and public health. This may include transitioning to renewable energy sources, implementing stricter regulations on industrial emissions and promoting more sustainable lifestyles at the individual level. Corporate social responsibility (CSR) also plays a key role in tackling pollution. Many organizations around the world have started to adopt green practices and support initiatives that help protect the environment and promote public health. For example, some companies in the automotive industry are investing in the development of electric vehicles, which not only reduce greenhouse gas emissions, but also help to reduce urban air pollution.

It is possible to state that there is a positive relationship between renewable energy use and life expectancy. Increased consumption of renewable energy is associated with longer life expectancy.

In terms of the contribution of CO_2 and NO to life expectancy, we observe that a reduced amount of carbon dioxide in the air results in an increase in life expectancy. The tobacco epidemic is one of the greatest threats to public health globally, causing more than 8 million deaths annually worldwide. Of this figure, more than 7 million are directly caused by tobacco consumption, while about 1.2 million result from exposure of non-smokers to second-hand smoke. Over 60% of these deaths are associated with cancer.

The results of the regression model show that the proportion of adult smokers is positively correlated with cancer mortality rates. The higher the proportion of adult smokers, the higher the cancer mortality. The same principle applies to tobacco-related mortality, where a reduction in the number of smokers leads to a lower cancer death rate.

To reduce pollution and increase the life expectancy of the population, effective and integrated measures such as:

Promoting renewable energy - energy sources such as solar, wind and hydropower can replace fossil fuels, reducing CO_2 emissions and other pollutants.

Improve public transport and cycling infrastructure - reducing the number of private cars and encouraging the use of public transport and clean vehicles can make a significant contribution to reducing air pollution.

Education and public awareness - promoting responsible behavior towards the environment and personal health is key to tackling pollution. Information campaigns can help raise awareness of the risks associated with pollution and encourage more sustainable consumption choices.
By implementing sustainable development policies and adopting environmentally friendly practices, we can ensure a cleaner environment, better health and therefore a longer life expectancy for all citizens of the planet.

Tackling smoking through policy and educational measures is key to reducing the

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associated risks and improving public health, thereby increasing life expectancy.

The econometric model provides clear results that can help to develop and update economic growth directions based on social and individual responsibility.

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