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Envisioning Romania's Path to Sustainable Development: A Prognostic Approach

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Abstract: The objectives of sustainable development aim to find a balance between economic, social, and ecological plans through which to reduce the use of the planet's resources without somehow affecting human well-being. As we have already entered the second half of the time allotted to achieve these goals, it is necessary to note what progress has been made and to have a future analysis of what may happen to see what can be done to bring this plan to an end. Hence, the aim of this paper is to assess the extent to which Romania is projected to attain its sustainable development goals. In order to be able to forecast the route that some of the sustainable development objectives are heading towards (among which there are elements related to agriculture, energy poverty, pollution, innovation, youth education, etc.), values were forecast for a period of three years using the ARIMA method, having as historical data the period 2015–2021. According to the analysis carried out, for some objectives, the situation seems to be flourishing, but this is not the case for all the analyzed indicators. Thus, it should be taken into account that, at the European level, Romania occupies, in many cases, low positions in terms of the progress made and that it is possible that some of the objectives will not be met.

Keywords: sustainable development; life quality; climate change; energy poverty

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1. Introduction

The three pillars that underpin sustainable development are the economic, social, and ecological dimensions, with the objective of achieving a harmonious balance among them. However, the goals of the economic plan can sometimes clash with those of the ecological plan, as increased production may result in higher levels of pollution. Consequently, it becomes imperative to identify alternative approaches that can yield positive outcomes on both fronts, whether it pertains to pollution arising from energy provision [1,2] or water contamination [3]. It is precisely for this reason that the percentage of energy coming from renewable sources is wanted to increase significantly, being one of the targets of the seventh objective of sustainable development; one of the methods of reaching this target is the use of solar energy [4,5].

Climate change is becoming easier to see and harder to bear. In his summary of Nicholas Stern's book [6], Neher [7] points out certain aspects and the urgency of taking action against these changes. Climate change is presented as a threat to human well-being, proposing a new energy industrial revolution that aims not only to reduce these changes but also poverty, thus having more efficient and clean cities, all of which are targets provided in the objectives of sustainable development.

People's inability to keep their homes warm is one way of measuring energy poverty. According to the study by Galvin [8], there is a direct link between income inequality and the cold homes of EU citizens. When the GINI index increases, there is an increase in the percentage of people who cannot heat their homes. Regarding GDP/capita, an inverse

relationship is noted, indicating that the higher the average national income of the country, the lower the percentage of people with cold houses.

Although all Sustainable Development Goals (SDGs) are important and interconnected, it should be noted that the goal that starts the 2030 Agenda refers to the eradication of poverty. Thus, there is an urgent need to determine those policies through which people can escape the poverty trap. Thus, according to the study conducted by Akimoto [9], the author considers corruption, mortality, and fertility rates, together with economic development, as elements that can increase/decrease poverty. Based on the theoretical study carried out by him, it is found that the implementation of a policy of increasing wages in the public sector (to reduce corruption) in conjunction with increasing health spending (to reduce the mortality rate) is necessary for a less developed country to escape from the poverty trap.

In the case of the study conducted by Mehedintu et al. [10], an assessment and projection of renewable energy consumption were carried out, comparing indicators at the European Union (EU) level with those of Romania, one of its member states. The research spanned a historical period of 16 years, from 2004 to 2019. The findings reveal an upward trajectory in both cases, indicating a positive trend in renewable energy consumption during the analyzed period. Furthermore, the study employed various forecast models to predict values within the 2020–2030 timeframe, and the results consistently exhibited an upward trend in renewable energy consumption [10]. Oprea et al. [11] proposed a new method for analyzing energy consumption in the context of sustainable development and observed that more than 23% of the peak consumption could be reduced by simply shifting it to off-peak hours. Furthermore, other studies went beyond the analysis of electricity consumption and proposed a method for detecting suspicious consumers [12] or anomaly detection [13]. Various solutions for electricity consumption are proposed, both for individuals [14] and commercial-type consumers [15] or for markets as a whole [16–19].

Energy poverty is an important aspect of sustainable development. It refers to a situation in which a household is compelled to limit its energy consumption below the minimum required level due to the inability to afford the associated expenses [20]. The COVID-19 pandemic has exacerbated energy poverty, not only within the EU countries but globally as well [21]. According to short-term estimates by Carfora et al. [22], the situation is expected to worsen until 2022, with increases of over 10% compared to pre-pandemic levels. The authors' scenarios for the year 2025 indicate a similar trend, with countries such as Bulgaria, Lithuania, and Portugal experiencing the most significant impacts of energy poverty. Agriculture plays a crucial role in sustainable development as it contributes to several key objectives of the 2030 Agenda, particularly to "Zero Hunger". Within the European Union (EU) community, it was proposed that, by the end of 2030, at least 25% of the agricultural area should produce organic crops. However, the lowest percentages of the land area cultivated organically for the year 2020 are found in Romania, Bulgaria, Ireland, and Malta. According to Ursu and Petre [23], in the time frame 2020–2030, for Romania, the agricultural area per capita will increase to 0.708 ha. The increment is primarily due to population reduction rather than agricultural development. The ability of individuals to sustain themselves depends on their purchasing power for essential food items. Thus, in the case of Russia, the price of sugar was forecast for the period 2020–2023, with historical data for the period 2011–2019 by Tatarintsev et al. [24]. The study utilized a Seasonal Autoregressive Integrated Moving Average (SARIMA) model to predict the impact of price increases on demand, with the findings suggesting a decline in domestic rail transport of sugar, resulting in higher sugar prices [24].

Based on the selected studies, we can underline the interconnectedness of agricultural development, energy efficiency, and economic development factors within the framework of sustainable development.

The increased interest of researchers in determining the progress made by European countries on the implementation of sustainable development can be observed in the analysis conducted by Hametner and Kostetckaia [25]. The authors present 14 studies that approach the classification of EU member states through the lens of the achieved progress. Thus,

according to this overview, in most of the cases presented, Romania was at the bottom of the rankings. However, following their research, the strongest short-term progress was found in Eastern and Southern European countries, including, in particular, Romania. Being at the bottom of the European rankings in terms of the coverage percentage of sustainable development objects, Romania still has time to reach these objectives; but it is necessary that the policies that will be implemented are carried out in such a way as to take into account the interconnectedness of the objectives; thus, the achievement of one objective will help the progress of another.

At the European Union level, a series of papers have analyzed various aspects related to the SDG in different countries, such as Italy [26–29], Germany [30,31], France [32], and Spain [33,34]. Since the mentioned countries are part of a union, it should also be noted that many studies focus on determining the sustainability of the European Union [25,35–37].

As for the areas of the topic under study, the following areas have been identified in the scientific literature: agriculture [38,39], climate [40,41], innovation, and renewable energy [42–44].

In a recent paper, Ciucu-Durnoi [45] analyzed the EU context regarding the status of each component country in terms of sustainable development. In this sense, 17 targets were chosen, each related to an SDG through which the EU's progress ranking was identified. What stood out was the fact that Romania has among the lowest recorded values in terms of government support to agricultural research and development, but also patent applications to the European Patent Office by inventors' country of residence; it also has the second highest percentage of young people neither in employment nor in education and training. All these indicators, together with others, will be predicted in the current article, which is a continuation of the study carried out by the previously mentioned authors, in which an attempt has already been made to predict some targets related to the SDG.

In this context, the main objective of the study is to forecast the values of the selected indicators in the context of sustainable development for the period 2022–2024 using historical data in the case of Romania. Therefore, the purpose of the paper is to determine to which extent it is predicted that Romania will achieve its sustainable development goals. To this purpose, the following research questions are aimed to be answered through the current research:

RQ1: What changes are anticipated in Romania's research and development goals over the upcoming period?

RQ2: How are the projected developments in Romania's environmental and climate goals expected to unfold in the near future?

RQ3: What transformations are foreseen in Romania's objectives related to human well-being during the upcoming period?

The remainder of the paper is structured as follows: Section 2 presents the research methodology, which encompasses the description of forecasting models suitable for non-seasonal data, such as the Auto Regressive Integrated Moving Average (ARIMA). Section 3 discusses the results obtained through the use of the ARIMA model for forecasting the achievement of sustainable development objectives in the case of Romania. The paper ends with concluding remarks and references.

2. Materials and Methods

The equation of the ARIMA model employed in this paper writes as [46]:

$$y'_t = c + \phi_1 y'_{t-1} + \ldots + \phi_p y'_{t-p} + \theta_1 \varepsilon_{t-1} + \ldots + \theta_q \varepsilon_{t-q} + \varepsilon_t \quad (1)$$

The autoregressive part takes into account the past values of y, while for the moving average model, the past errors define the present values.

ARIMA models are written in the form ARIMA (p, d, q), where p describes the order of the autoregressive part, d defines the degree of first differentiating involved, and q shows the order of the moving average part.

In order to determine which model is the best that can help predict the data, the formula by which the difference between the actual and predicted values is minimal is required. There are several error measurement formulas, among which RMSE (Root Mean Squared Error), MAE (Mean Absolute Error), and MAPE (Mean Absolute Percentage Error) can be mentioned. According to some studies [47,48], one of the most suitable methods is RMSE because special attention is paid to outliers. RMSE calculates the standard deviation of the residuals. The formula for this is [49]:

$$\mathrm{RMSE} = \sqrt{\frac{\sum_{t=1}^{n}(y_t - \widehat{y_t})^2}{n}} \tag{2}$$

where y_t represents the actual value, and $\widehat{y_t}$ is the predicted value at time t.

To determine whether or not the model is better than guessing, Theil's U test is calculated, whose formula and values are reproduced below [50]:

$$\mathrm{U} = \sqrt{\frac{\sum_{t=1}^{n-1}\left(\frac{\widehat{y_{t+1}} - y_{t+1}}{y_t}\right)^2}{\sum_{t=1}^{n-1}\left(\frac{y_{t+1} - y_t}{y_t}\right)^2}} \tag{3}$$

- when the value is less than 1, the prediction is better than guessing;
- when the value is equal to 1, the prediction is as good as guessing;
- when the value is greater than 1, the prediction is worse than guessing.

The Durbin–Watson test is used to determine the autocorrelation of the errors at lag one. The values of this test are between zero and four, and their meaning is as follows [51]: When the value is less than 1, the errors are positively correlated. If the value is 2, there is no autocorrelation. If the value is greater than 3, then the errors are negatively correlated.

The test formula is [52]:

$$\mathrm{DW} = \frac{\sum_{t=2}^{n}(e_t - e_{t-1})^2}{\sum_{t=1}^{n} e_t^2} \tag{4}$$

where e_t is the difference between $\widehat{y_t}$ and y_t, n is the number of periods.

3. Results

In this section, indicators related to the well-being of Romanian citizens will be analyzed, among them the percentage of the population unable to properly heat their homes, air pollution (PM2.5), the income share of the bottom 40% of the population or the percentage of young people neither in employment nor in education and training, adding to them other relevant indicators for the sustainable development of the country. The way of grouping the objectives of sustainable development in the three social, economic, and ecological categories differs from study to study, but common elements remain among these researches [28,53]. Thus, the indicators analyzed in this study were chosen according to other criteria, as follows: research and development (OB2, OB9, OB17), environment and climate (OB11, OB13, O14), and human well-being (OB7, OB8, OB10).

Table 1 provides an overview of the sustainable development objectives and their respective units of measurement. It covers various aspects related to the quality of human life by measuring pollution, the ability of people to keep their homes heated, and the participation of young people in the labor market or in a training program. Data on the field of research and development or innovation can also be found.

Table 1. Indicators.

Objective Label	Name	Unit of Measure
OB2	Government support for agricultural research and development	Euro per inhabitant
OB7	Population unable to keep home adequately warm	Percentage
OB8	Young people neither in employment nor in education and training	Percentage
OB9	Patent applications to the European Patent Office by inventors' country of residence	Per million inhabitants
OB10	Income share of the bottom 40% of the population	Percentage
OB11	PM2.5 air pollution, mean annual exposure	Micrograms per m^3
OB13	Population covered by the Covenant of Mayors for Climate & Energy signatories	Percentage
OB14	Bathing sites with excellent water quality by locality	Coastal water excellent—%
OB17	High-speed internet coverage	Percentage

Among the targets of the second objective of sustainable development (OB2), entitled "Zero Hunger", are the doubling of agricultural productivity, the maintenance of the genetic diversity of seeds and cultivated plants, but also the provision of sustainable food production systems and the implementation of resilient agricultural practices (Sustainable Development Department, 2022). To achieve the sustainable development objectives mentioned earlier, financial support from the government plays a crucial role. Increasing the values provided to farmers is an important indicator for facilitating progress in this direction. However, based on the available historical data and forecasts for the upcoming years, it may not be evident that sufficient investment is being made in the agricultural sector to reach the proposed targets for 2030 (Figure 1).

Figure 1. OB2—Forecast chart.

According to Table 2, the lowest value for RMSE is attributed to the moving average model of order 1 for which the value of Theil's U test is also the smallest, being able to state that the prevention model is correct, and the value for the Durbin–Watson test is close enough to 2 to be able to say that the errors are not autocorrelated.

Table 2. OB2—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	0.74	1.05	1.36	
2023	0.75	1.06	1.37	
2024	0.75	1.06	1.37	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(0,0,1)	Best	0.16	0.50	1.81
Single Exponential Smoothing	2nd	0.20	0.66	1.96
Damped Trend Non-Seasonal	3rd	0.20	0.66	1.96

According to Figure 2, the downward trend of the population unable to keep home adequately warm can be noted, with the exception of the last year under analysis, where an increase of approximately one percent is noted. It is concerning to observe a decrease in the forecasted values for the first year and only a slight increase in subsequent years for the indicator related to people dying of cold in their homes. This indicates a persistent issue that needs urgent attention from the government and relevant authorities.

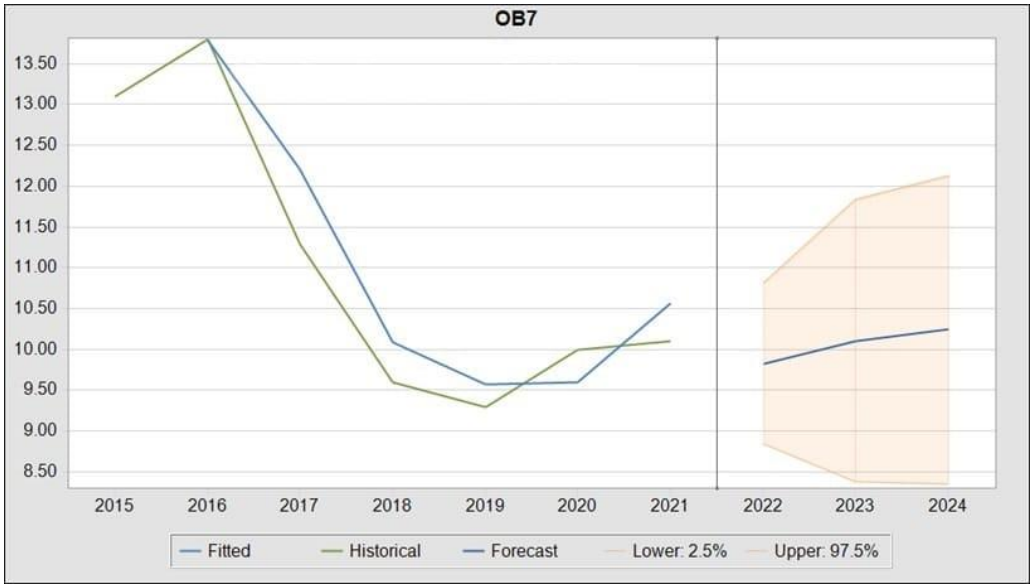

Figure 2. OB7—Forecast chart.

For this indicator, the ARIMA(1,1,2) model provides the best results, reaching the lowest RMSE value. Also, Theil's U test value is acceptable (0.41 << 1), while the Durbin–Watson test value is close to 2, showing that the errors are not significantly autocorrelated (Table 3).

Table 3. OB7—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	8.84	9.83	10.82	
2023	8.38	10.11	11.83	
2024	8.36	10.25	12.13	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(1,1,2)	Best	0.50	0.41	1.50
Damped Trend Non-Seasonal	2nd	1.25	0.93	1.80
Single Moving Average	3rd	1.31	1.00	1.39

The fifth target of the eight-goal of sustainable development aims at the full and productive employment of people, especially young people, while among the measures to be implemented within the National Recovery and Resilience Plan is also the reduction of the discrepancy between education and the needs of the labor market to create new jobs, but also specialists to fill them. Thus, the predominantly decreasing trend in the analyzed period is an encouraging one, even if in the last one we analyzed, there is a significant increase in the percentage of these people. The predicted trend is also a decreasing one for the last two years, a sign that the methods implemented so far have been effective, but the measures taken should not stop here; however, it would be necessary for the state to achieve what it set out to do from these two big international projects (Figure 3).

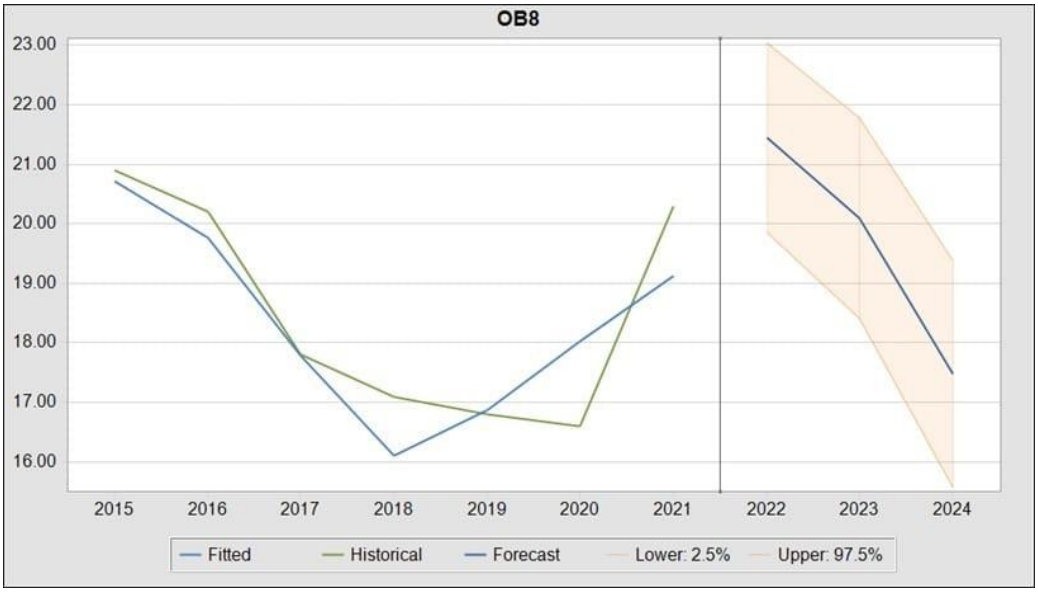

Figure 3. OB8—Forecast chart.

Table 4 shows the indicators that determine the accuracy of the forecast, noting that for ARIMA(2,0,1) the value for the Durbin–Watson test is very close to 2, which shows that the errors are not autocorrelated, while the lowest value recorded for the Theil's U test is 0.48, which means that this model is better than guessing.

Table 4. OB8—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	19.86	21.45	23.04	
2023	18.41	20.10	21.78	
2024	15.57	17.48	19.39	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(2,0,1)	Best	0.81	0.48	2.37
Damped Trend Non-Seasonal	2nd	1.80	0.98	1.18
Single Moving Average	3rd	1.85	1.00	1.03

For the ninth indicator analyzed, the downward trend from 2018 to the end of the period under observation is noted, the pre-valued trend being an upward one. The fifth target of the ninth sustainable development objective involves technological modernization and the increase of research in the industrial field; thus, increasing the values of this indicator is an encouraging thing to achieve this goal (Figure 4).

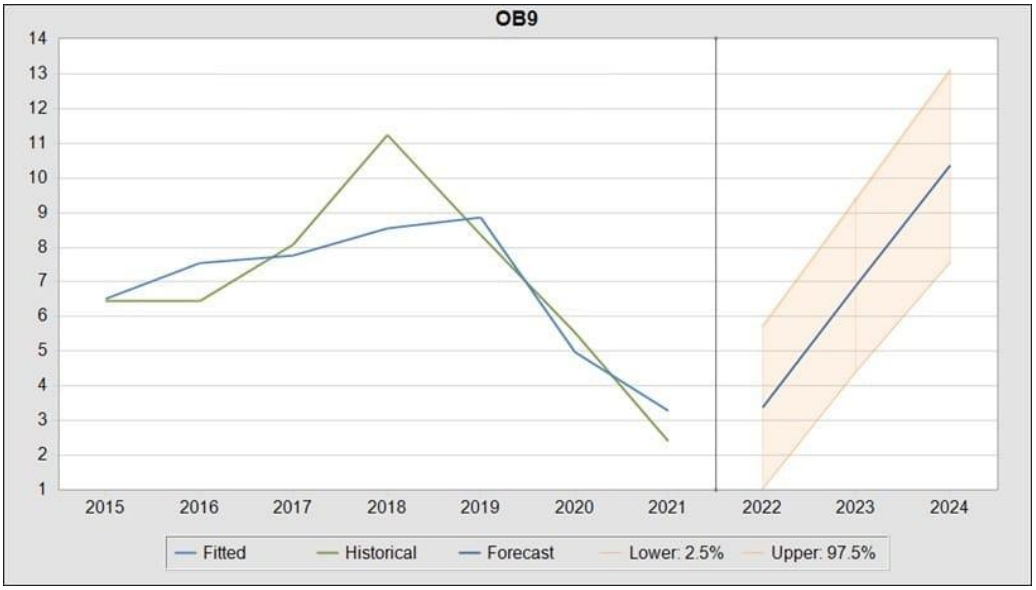

Figure 4. OB9—Forecast chart.

The model with the lowest value of RMSE is autoregressive of order 2 and moving average of order 1, so an ARMA(2,1) for which the value of the Durbin–Watson test is 2.26, meaning that the model errors are not autocorrelated, and for Theil's U test, its value is much lower compared to 1, and it can be stated that forecasting is better than guessing (Table 5).

Table 5. OB9—Forecast results.

Forecast Results:			
Date	Lower: 2.5%	Forecast	Upper: 97.5%
2022	1.05	3.39	5.72
2023	4.40	6.90	9.40
2024	7.59	10.35	13.11

Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(2,0,1)	Best	1.19	0.49	2.26
Damped Trend Non-Seasonal	2nd	2.35	0.79	1.72
Single Moving Average	3rd	2.55	1.00	1.08

The first target of the tenth objective concerns the progressive increase in the incomes of these people (the bottom 40% of the population). Although the analyzed period is a short one, the trend of this indicator abounds in periods of successive increases and decreases. Regarding the forecast, there is an annual increase in the values of this indicator (Figure 5).

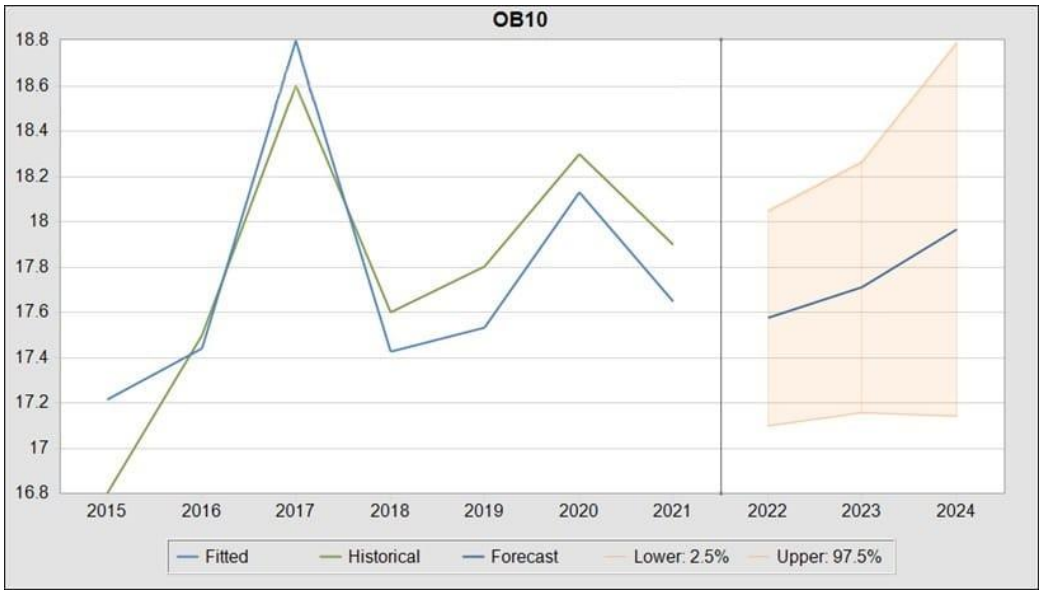

Figure 5. OB10—Forecast chart.

According to Table 6, the model that describes this forecast is an ARIMA(2,0,2) for which the RMSE value is small, and Theil's U test value is much smaller compared to 1, a sign that the model is relatively correct.

Table 6. OB10—Forecast results.

Forecast Results:			
Date	Lower: 2.5%	Forecast	Upper: 97.5%
2022	17.10	17.58	18.05
2023	17.16	17.71	18.27
2024	17.14	17.97	18.79

Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(2,0,2)	Best	0.24	0.27	1.12
Single Moving Average	1st	0.16	0.27	2.52
Damped Trend Non-Seasonal	3rd	0.69	0.97	1.70

For exposure to PM2.5 air pollution, there was a significant increase in 2018, followed by a decrease in the following years. For the prediction part of the model, an increase is observed, followed by constant values for the last two years. The transition to the green economy requires the creation of a new environmentally friendly production model through which people are no longer so exposed to pollution, whether we are talking about air, water, soil pollution, etc. For the 11th sustainable development goal, target six aims to reduce the negative impact of pollution on citizens. According to the forecast provided based on historical data, the situation is not exactly encouraging, so the state should take new measures so that these values decrease considerably (Figure 6).

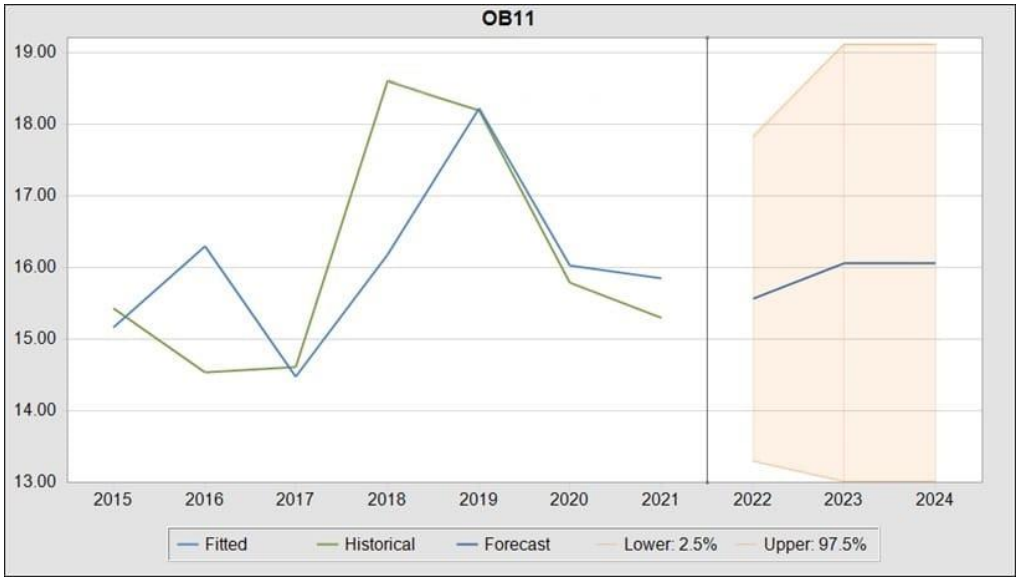

Figure 6. OB11—Forecast chart.

The method that best describes these data is the moving average model of order 1 for which the Durbin–Watson test value is equal to 2, the errors are not autocorrelated, and Theil's U test value is the smallest and is less than 1, a sign that the model is a good one (Table 7).

Table 7. OB11—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	13.30	15.57	17.85	
2023	13.02	16.07	19.12	
2024	13.02	16.07	19.12	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(0,0,1)	Best	1.16	0.66	2.03
Single Exponential Smoothing	2nd	1.79	0.89	1.16
Damped Trend Non-Seasonal	3rd	1.79	0.8	1.16

According to Figure 7, the initial trend of this indicator was an upward one until 2019, when a significant decrease was observed, and then the values increased until the end of the analyzed period. For the forecast, there is an upward trend in the first two years, followed by a decrease in the last forecast year.

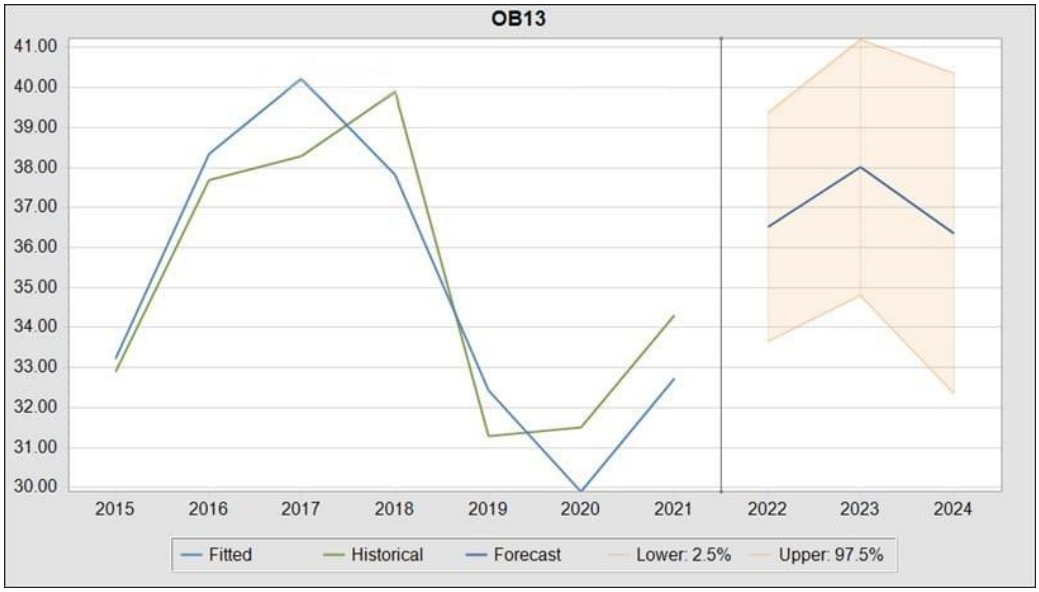

Figure 7. OB13—Forecast chart.

The method for which the RMSE has the lowest value is ARMA(2,2), for which the value of the Durbin–Watson test indicates that the errors are not autocorrelated and the value of Theil's U test is much smaller compared to 1; it can be stated that the forecast is better than guessing (Table 8).

Table 8. OB13—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	33.66	36.52	39.38	
2023	34.81	38.01	41.20	
2024	32.36	36.36	40.36	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(2,0,2)	Best	1.46	0.39	2.38
Single Exponential Smoothing	2nd	4.09	0.9952	1.00
Damped Trend Non-Seasonal	3rd	4.09	0.9952	1.00

For the 14th indicator, fluctuations in the trend are observed for the analyzed period, so this is also noticeable in the case of the forecast. However, overall, the trend is upward, with values increasing from 30% in 2015 to more than 80% at the end of the period under analysis (Figure 8).

According to the data provided in Table 9, it is noted that the lowest values recorded for RMSE and for Theil's U test are associated with the ARIMA(1,1,2) model, having the closest value of 2 (1.87~2) for the test Durbin–Watson.

For the last indicator analyzed, an upward trend can be observed for the analyzed period and a significant increase in the forecast part. Since digitalization is an important aspect both for the 2030 Agenda and the National Recovery and Resilience Plan, it is not surprising that the values show an increase in this indicator because the amounts received from the European Commission for the transition to digitalization are significant, 21% from this Plan being allocated to digitization reforms (Figure 9).

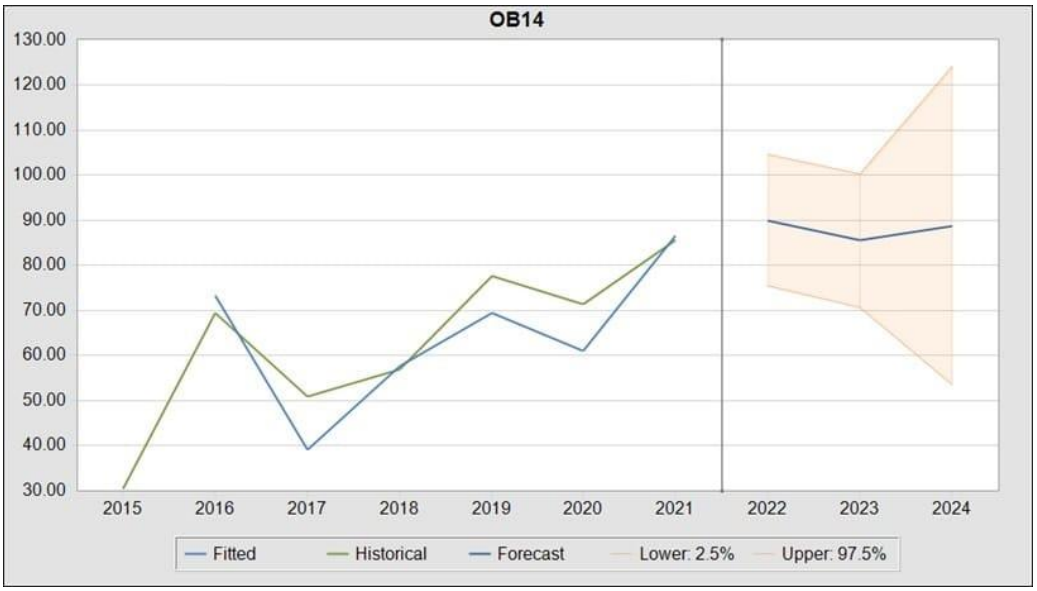

Figure 8. OB14—Forecast chart.

Table 9. OB14—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	75.54	90.10	104.65	
2023	70.77	85.59	100.41	
2024	53.58	88.88	124.18	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(1,1,2)	Best	7.43	0.21	1.87
Single Moving Average	2nd	11.89	0.88	1.64
Damped Trend Non-Seasonal	3rd	16.88	0.94	1.23

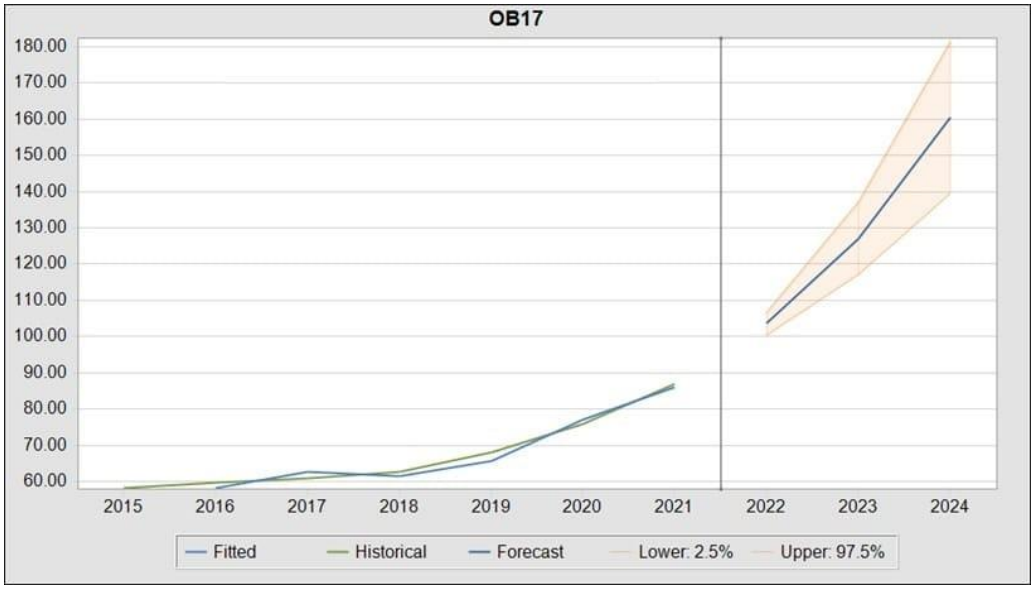

Figure 9. OB17—Forecast chart.

From Table 10, it is noted that the best method in terms of all tests performed is ARIMA(1,1,1) as it has the lowest values for RMSE and Theil's U test, and the errors are not significantly autocorrelated.

Table 10. OB17—Forecast results.

Forecast Results:				
Date	Lower: 2.5%	Forecast	Upper: 97.5%	
2022	100.57	103.65	106.73	
2023	117.19	127.13	137.08	
2024	139.46	160.46	181.45	
Forecast accuracy:				
Method	Rank	RMSE	Theil's U	Durbin–Watson
ARIMA(1,1,1)	Best	1.57	0.29	2.69
Double Exponential Smoothing	2nd	2.36	0.41	0.50
Damped Trend Non-Seasonal	3rd	2.37	0.41	0.499

According to what was presented in the section dedicated to the study of the specialized literature, it was possible to note the tendency for Romania to be ranked at the bottom of the EU ranking in terms of the percentage of achievement of sustainable development objectives. In this sense, the interest given to this country to determine the path towards which it is heading is understandable.

Energy poverty (underlined in the article by the percentage of the population that cannot heat their homes) is one of the most debated topics, especially at the EU level, through the lens of the war near the eastern border because Russia was one of the main energy suppliers, the significant price increases recorded making for this percentage to increase in 2021 (Figure 2). In this sense, the policy implemented by the state was to grant vouchers to people with a modest income to be able to cover energy expenses and reduce the number of people unable to heat themselves adequately. Although the inability of people to keep warm in winter has been analyzed through the lens of this indicator, the cooling capacity of houses in summer should also be discussed. The impact of excessive heat on the human body is devastating, affecting the brain, heart, kidneys, lungs, and skin. In the case of children, there is a direct link between excessive heat and facilitating the occurrence of hand, foot, and mouth disease [54,55]. Because of the small forested areas in the urban environment, the heat is all the more difficult to bear in these areas. Thus, different researchers have tried to realize different scenarios for reducing excessive heat [56,57].

The percentage of young people who are not enrolled in any educational program and do not have a job also increased in 2021. The predicted trend is a downward one, a sign that, based on historical data, the situation is moving towards a normal course. However, the 2030 Agenda wants to significantly decrease this percentage, which is why the state's interest should be focused on this goal, possibly by attracting students to technical high schools and creating partnerships with companies so that they can train future qualified technicians. In this sense, the educational offer should be adapted according to the demand of the labor market so that there is no longer a deficit in certain areas (especially the technical ones). The current trend among young people is to live longer with their parents, and according to an article in The Washington Post, it has been noted, at least among young Americans, that they spend more time in education than working [58]. Thus, it can be stated that their desire to pursue educational goals is correlated with the desire to extend as much as possible the period of stay in the parental home and to avoid the field of work [59].

In order for these objectives to be achieved, however, the competent authorities should take into account the interconnectedness between them since the achievement of one objective can significantly help the progress of another (or several objectives). In this sense, taking as an example the indicators analyzed in this study, the connection between them

can be noted, especially through the correlogram in Table 11. Although the correlation shows a link between the indicators, but not causality, it can be noted that the increase in the income share of the bottom 40% of the population is correlated with the decrease in the percentage of young people neither in employment nor in education and training, but also that of the population unable to keep their home adequately warm (the connections being of medium intensity and inverse).

Table 11. Correlogram.

	OB2	*OB7*	*OB8*	*OB9*	*OB10*	*OB11*	*OB13*	*OB14*	*OB17*
OB2	1.00								
OB7	0.63	1.00							
OB8	0.61	0.74	1.00						
OB9	−0.60	−0.17	−0.55	1.00					
OB10	−0.17	−0.48	−0.61	−0.05	1.00				
OB11	−0.70	−0.69	−0.60	0.63	−0.14	1.00			
OB13	−0.42	0.21	0.05	0.48	0.09	−0.05	1.00		
OB14	−0.05	−0.50	−0.24	−0.40	0.44	0.13	−0.21	1.00	
OB17	−0.06	−0.57	−0.05	−0.69	0.37	−0.01	−0.42	0.75	1.00

Another aspect observed is the strong and inverse relationship between government support for agricultural research and development and exposure to PM2.5 air pollution, thus showing that an increase in funding to R&D in agriculture can lead to a lower degree of pollution, increasing human well-being. Moreover, the field of research and innovation (defined in research by patent applications to the European Patent Office by inventors' country of residence) has to gain when the percentage of young people neither in employment nor in education and training is low, this being an additional reason to invest in the education of young people.

The paper is subject to several limitations stemming from time constraints linked to the data collection period, specifically encompassing the years 2015 to 2021. External factors and unanticipated events that might transpire during the projected timeframe are not factored into the analysis, as the outcomes solely rely on ARIMA projections derived from historical data. Furthermore, the paper exclusively examines a subset of the Sustainable Development Goals (SDGs) and delves into their attainment within Romania's context, thereby confining the applicability of the findings to other nations or regions. Nevertheless, the degree of confirmation of hypotheses and achievement of the goals and objectives of the study are in strict connection with the methodological approach and the selected data.

Regarding the three ways of categorizing the analyzed objectives, it is noted that for human well-being, two of the three analyzed targets are moving in the right direction, while for OB7 (population unable to keep their home adequately warm), the forecasted situation does not appear to meet the requirements of the 2030 Agenda. In the case of environment and climate, the pollution indicator is noted to have a slight increase (OB11), while the percentage of the population covered by the Covenant of Mayors for Climate and Energy signatories increases significantly compared to the last year of the analyzed period (OB13). Also, a slight increase can be observed for OB14. Finally, for research and development, it has been observed that the money offered to agriculture (OB2) does not seem to meet the requirements of the 2030 Agenda. There are still two objectives in this category, namely OB9 and OB17, for which the path is promising.

In light of the aforementioned assertions, it is imperative that the attention of Romanian policymakers be systematically directed toward objectives that have yielded suboptimal outcomes. Consequently, in consonance with prognostications extrapolated from historical data, a substantial peril looms: the escalation in the populace incapable of adequately heating their domiciles. Hence, the imperative arises for decision-makers to formulate novel policy paradigms aimed at arresting or minimally abating this proportion of the populace during the immediate ensuing epoch.

The exigency of this endeavor is accentuated by the prevailing geopolitical context, wherein the ongoing border conflict exacerbates the complexity of this mandate, given the pronounced reliance of Europe upon Russian gas. Mitigation of this risk can be approached through sustained allocation of vouchers, which enable individuals with limited incomes to defray their utility expenses. Moreover, raising the threshold for eligibility to access these funds represents another viable strategy. Concurrently, investment in the exploration of fresh avenues for attaining energy independence, specifically via renewable sources, remains imperative.

Another sphere displaying less-than-promising data pertains to government support for research and development in the realm of agriculture. Romania, endowed with considerable agricultural potential, has in recent years emerged as a prominent producer of corn and sunflowers, securing a position among the foremost exporters of corn and wheat within the EU. Regrettably, the depicted values in Figure 1 fail to manifest a favorable trajectory, a circumstance compounded by the relatively modest level of governmental subsidies extended to the farming sector. Given this trajectory, there exists a tangible prospect that Romania's ascendancy in grain production, as well as its prominent standing, may be imperiled in the foreseeable future.

In light of these imperatives, it becomes incumbent upon the state to adopt policies that robustly buttress agriculture and its practitioners. Such measures would encompass a substantive augmentation of subsidies and the active encouragement of investments within this domain. This strategic course is vital to avert the peril of Romania relinquishing its current standing on the European stage in terms of agricultural output.

Based on the historical data analyzed in the present study, an increase in annual exposure to PM2.5 air pollution is observed. The issue with this indicator is that particles as small as 2.5 μm, or even smaller, can be inhaled into the lungs and occasionally enter the bloodstream. Consequently, it is crucial for the concentration of these particles in the air to remain minimal, thereby preventing symptoms like coughing, breathing difficulties, and chest pain.

The emergence of these particles can be attributed to factors such as car emissions and industrial processes. To mitigate the risk of exacerbating this indicator, a shift towards environmentally friendly production methods is imperative, thus promoting the adoption of green energy sources.

The remaining indicators, which yielded more favorable outcomes in the analysis, should not be overlooked either. Decision-makers in Romania ought to recognize that the country has consistently ranked among the top EU nations, with the highest percentages concerning young individuals not engaged in employment, education, or training. It is imperative to acknowledge that a dearth of educated young populace casts a shadow over the nation's future prospects.

Policymakers should also consider the synergy and interconnectedness among these objectives, thereby mitigating risks in the pursuit of these targets. Thus, by attaining those objectives that contribute to the fulfillment of others, valuable resources are conserved, and the timeframe for achieving these objectives is curtailed. This, in turn, affords the policymakers the opportunity to address the implementation of other pivotal policies conducive to both human and environmental well-being.

4. Conclusions

According to the research carried out on the achievement of the proposed targets for the analyzed Sustainable Development Objectives, the presence of a projected downward trend for the percentage of young people neither in employment nor in education and training is noted, corroborated by an increase in patent applications to the European Patent Office. Added to this is the expected increase in income for the bottom 40% of the population, along with high-speed internet coverage.

A worrisome aspect identified refers to the predicted increase in the percentage of the population unable to keep home adequately warm; this aspect can be attributed to the increase in the price of electricity caused, in part, by the border war.

Also, in terms of pollution, there seem to be problems; the exposure to PM2.5 air pollution forecast shows an increase from 2022 to 2023, and the value maintains its constancy for 2024.

Another aspect that can be noted refers to the constancy of the predicted value for government support to agricultural research and development (of 1.06 euros/inhabitant). Considering the climate changes and, implicitly, the soil, this amount is much too small compared to the needs of the farmers, but not least of all, the people to have access to a source of food from their own country. The central idea of this article refers to the ability of the Romanian state to achieve the objectives of sustainable development by the set date. In this sense, an attempt was made to identify a possible course, foreseen in the short term, in order to see the path on which this country is. Since not all analyzed indicators have the expected results, the competent authorities must take into account the connectivity between the objectives to be sure that they are achieved. Thus, some policies should be implemented to achieve those objectives that can help improve others. In the present study, by means of the correlogram presented in Table 11, the connection between the increase in the income share of the bottom 40% of the population and the decrease in the percentage of young people neither in employment nor in education and training, but also that of the disabled persons is noted to properly heat their homes, this is just one example of how one achieved goal can support two other goals. Situations of this kind are found for all other objectives, so they should not be considered individually but as a whole.

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