Economic Growth and Circular Economy: A Statistical Approach to Resource Management

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Abstract. *The circular economy has become an fundamental framework to achieve sustainable economic growth by decreasing dependence on limited natural resources and by mitigating environmental effects. This study examines the association between circular economy metrics, as defined by the National Institute of Statistics and Romania's economic performance, specifically regarding Gross Domestic Product (GDP). Starting from a top-down analysis, we have initially examined which variables have a significant relationship with GDP and afterwards what other factors influencing these variables. The results indicate a robust positive association between GDP and the growth of environmental technology as well as renewable energy. This outcome underscores how important sustainability-oriented economic initiatives are. Nevertheless, higher GDP is also associated with increased material consumption, which highlights the difficulties of reconciling economic expansion with resource efficiency. The second step was to determine which factors influence these variables. The findings indicate that higher gross value added in environmental technology could be achieved by increasing the amount of raw materials imported, of recyclable materials import and of raw materials export. When it comes to the share of renewable energy, it has been established that the most is used for electricity and the least for transportation. In term of material footprint, with found a negative significant correlation with material and natural resource productivity, as well as with green sector employment and with share of renewable electric heating and cooling. On contrary, material footprint has a positive relation with share of renewable energy use transport and share of renewable electric energy. The fourth examined variable is domestic material consumption, which decreases with higher amount of green sector employment, higher natural and material resource productivity, lower material intensity as well as lower material footprint. All our findings indicate that the transition to sustainability would require policy-driven investments, infrastructural improvements and behavioral changes.*

Keywords: Sustainability, Gross Domestic Product (GDP), Romania, Economic Prosperity, Sustainable Economy.

Introduction

The circular economy has become an important way for achieving sustainable economic growth in an era of resource shortages and environmental issues. This economic model diminishes

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environmental effect while simultaneously supporting economic resilience by reducing dependance on raw material extraction.

Less-developed economies face challenges in implementing circular economy strategies, requiring increased investments in sustainability, innovation, and circular business models. Sustainability-focused industries facilitate economic prosperity which leads to higher Gross Domestic Product (GDP). However, this economic growth is also connected to greater material consumption, material footprint and domestic material consumption. The development of environmental technologies and renewable energy sources would create a more sustainable world, but at the same time their creation is associated with a higher material footprint (Cioca et al., 2019). On the other hand, more employees in the environmental industries lead to a decrease in material footprint and domestic material consumption. Moreover, improvements in resource productivity and natural resource productivity significantly reduce material footprint. As resource efficiency increases, material consumption and waste generation decrease, highlighting the need for optimizing industrial processes to minimize environmental impact (Grdic et al., 2020; Pâslaru et al., 2008).

This study aims to analyze the correlation between the circular economy metrics, as presented by the National Institute of Statistics (NIS), and GDP. Therefore, a top-down analysis was performed. The first step consists of identifying which indicators have a significant correlation to GDP. In the next step, an in-depth analysis of those significant indicators was performed. The reason behind this was understand how those affect economic performance.

The present research fills some gaps in the specialized literature. While existing studies focus on general sustainability strategies, few have analyzed the direct correlation between circular economy indicators and GDP specifically in Romania. This study provides a data-driven approach, identifying key indicators influencing economic performance. Moreover, it analyzes the correlations between relevant indicators, such as material footprint, domestic material consumption, and resource productivity.

The paper aligns with previous research indicating that circular economy principles can support economic resilience but highlights the challenges of implementation in developing economies. It particularly builds upon EU-level research by providing country-specific insights for Romania, while confirming the need for strategic investments and infrastructure development identified in broader literature. By quantifying specific relationships between circular economy metrics and economic performance, this research provides an empirical foundation for future studies and policy decisions aimed at creating more sustainable economic models in Romania and similar economies.

The paper is structured as follows: section 2 covers the literature review, section 3 presents the methodology, section 4 releases the results and discussion, while section 5 shows the conclusions.

Literature review

Circular Economy creates long-term economic resilience, which would imply resource efficiency, waste reduction, and material reuse, while also minimizing environmental impact. Therefore, countries and enterprises that adopt circular concepts can improve their competitiveness with the help of innovation, collaboration, and sustainable product design (Bhatta et al., 2023). One of the biggest benefits of the circular model is the formation of new jobs, especially in industries centered on recycling, remanufacturing, and sustainable supply chain (Ivascu et al., 2021). Economic benefits of circular practices include innovation opportunities, new business models, job creation, and significant cost savings. These outcomes demonstrate the compatibility of environmental stewardship with economic growth. By optimizing resource use and minimizing waste, circular practices strengthen both environmental sustainability and economic resilience. This transition is essential for ecosystem health, community wellbeing, and intergenerational equity (Ikponmwosa Aiguobarueghian et al., 2024).

On the other hand, the biggest challenges refer to technological innovation, regulatory support and changes in customer behavior. By incorporating circular solutions into economic frameworks, a more sustainable and resilient future is promoted. Without a doubt, this scenario would lead to harmonizing economic growth while also taking into account environmental aspects (Busu & Trica, 2019; Cisma et al., 2023).

At the European Union level, GDP is increasing, whereas resource consumption and waste generation display varied patterns. The material footprint shows marginally declining and the resource productivity marginally ascending trends. This suggests modest advancements in efficiency while maintaining material dependency. Similarly, municipal waste is slowly declining, but packaging waste is increasing, which underscores the difficulty posed by the demand. In terms of recyclable materials, imports are decreasing while exports remain consistent. Simultaneously, private investments and employment in circular sectors are increasing; nevertheless, the trend of their synergy is marginally decreasing, suggesting a deceleration in economic integration (Kaivo-Oja et al., 2022).

Moreover, the EU roadmap for resource efficiency has stimulated innovation and strategic advancement; yet its immediate effect on diminishing resource consumption is still limited. One of the main issues is that the emphasis of the roadmap is regulating the output flows instead of decreasing the input flows. Additionally, there is a lack of proper policies because most of them only supplement instead of replacing old ones. All in one, a truly circular and resource efficient economy can only be achieved by aligning national strategies through taxation, infrastructure and innovation (Domenech & Bahn-Walkowiak, 2019).

Nowadays, Romania is undergoing a critical shift towards circular economy. The country seeks to diminish reliance on finite resources and mitigate environmental effects. Nevertheless, several interconnected factors hinder Romania's progress toward a circular economy: delayed implementation of EU directives into national legislation, which creates regulatory uncertainty; insufficient infrastructure for waste collection, sorting, and recycling throughout the country, particularly in rural areas; a lack of comprehensive standards and technical norms for certain waste streams such as biowaste and construction materials; limited public awareness and education about proper waste management practices; and insufficient economic incentives for businesses operating in the circular economy sector (Topliceanu et al., 2023). Moreover, the national policies are inadequate in reducing the environmental consequences of the urban expansion. Therefore, the establishment of stronger regulations and new technologies is required. It is important to differentiate between initial increases of emissions due to investment in technology development and long-term strategies. Meaning, by implementing sustainable sources, emissions could decrease over the time (Delcea et al., 2024).

Surprisingly, some scholars argue that economic growth has a low impact on green development. Nonetheless, the circular economy substantially decreases CO_2 emissions over time, which emphasize the importance of recycling and sustainable logistics in reducing environmental damage. Moreover, municipal waste generation remains a major driver of CO_2 emissions, which highlights the importance of effective recycling policies and technological advancements (Sikder et al., 2024).

The strategies by which the circular economy will raise include introduction of sustainable product certifications and awareness campaigns to build up customer engagement, public-private collaboration to drive innovation and a monitoring system enhancing environmental footprint to ensure transparency (Chen & Pao, 2024).

Methodology

The data for this study was downloaded from the NIS dataset and it covers the period 2008 – 2022 or 2023, depending on data availability. The considered indicators are the ones established and assessed by NIS in relation to the Sustainable Development - 2030 Targets, particularly within the Circular Economy subcategory. These are: material resource productivity (total quantity of raw materials used directly by an economy), natural resource productivity (amount of raw materials) needed to produce final products used directly by an economy), employment in the environmental sector (all persons involved in EGSS production activities), share of renewable energy (share of renewable energy consumption in gross final energy consumption), share of Gross Value Added (GVA) in environmental technologies (contribution of environmental technology production activities to gross domestic product), waste generation (total amount of waste generated), import and export of raw materials (material goods that are exchanged between other countries and Romania for consumption or processing within the country), import and export of recyclable raw materials (recyclable goods that are exchanged between other countries and Romania for consumption or processing within the country), material intensity (reflects the dematerialization of the economy and the impact on the environment, in terms of the use of natural resources), material footprint (quantity of materials needed to produce final goods used by households, public administration or non-profit institutions serving households or used for gross capital formation), and domestic material consumption (total quantity of materials used directly in the economy).

As mentioned before, the scope of the study is to assess the relationship between the indicators and GDP, therefore a top-down analysis was performed. In the first phase, we conducted a top-down analysis using correlation tests to identify statistically significant relationships between GDP and all circular economy indicators. A significance threshold of $p < 0.05$ was established to identify meaningful correlations. The second phase consisted of an in-depth analysis of the four indicators that demonstrated significant relationships with GDP: share of GVA in environmental technologies, share of renewable energy, material footprint, and domestic material consumption. For these indicators, we performed additional correlation analyses with other circular economy metrics to understand their interconnections and dependencies. For specific relationships, particularly between material footprint and productivity metrics, we conducted regression analyses to quantify the impact of resource efficiency on environmental footprint. The regression models allowed us to determine coefficient values and statistical significance, providing deeper insights into how resource productivity influences material consumption. We also calculated descriptive statistics for renewable energy sources across different sectors (transportation, electricity, heating and cooling) to assess Romania's progress in energy transition. Additionally, time series data was analyzed to identify trends in waste generation by economic sector, providing context for the overall circular economy landscape.

For the analysis, statistical software was used to conduct correlation tests and regression analysis.

Results and discussions

The first step was to identify the indicators that have a significant relationship with GDP. A strong positive correlation (τ = 0.850, p = 0.000) between GDP and the share of GVA in environmental technologies and a weak positive correlation (τ = 0.600, p = 0.002) between GDP and share of renewable energy sources was determined. This result highlights the importance of green industries and clean energy in driving economic expansion and builds up the need for continued investment in sustainability-driven innovation and eco-friendly business models. However, as discovered also by other scholars, this growth leads to higher material consumption, as evidenced by the strong correlation between GDP and material footprint (τ = 0.604, p = 0.003) and higher domestic material consumption (τ = 0.600, p = 0.002). The results suggest that Romania's economic prosperity correlates with an increased environmental effect, which indicates a persistent dependence on material-intensive industries. Therefore, Romania's transition towards a sustainable and resource-efficient economy requires the implementation of circular policies and sustainability measures (Table 1. Correlation GDP with circular economy indicators).

Table 1. Correlation GDP with circular economy indicators

Correlations							
			GDP	**Share of GVA in environmental technologies**	**Share of renewable energy**	**Material footprint (thousand tons)**	**Domestic Material Consumption (tons)**
Kendall's tau_b	GDP	Correlation Coefficient	1	.850**	.402*	.604**	.600**
		Sig. (2-tailed)		0	0,041	0,003	0,002
		N	16	14	15	14	15
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Source: National Institute of Statistics data (Analysis by the author).

Next, we had the objective to perform an in depth analysis of the indicators that have a significant relation with GDP: share of GVA in environmental technologies, share of renewable energy, material footprint and domestic material consumption.

Firstly, the share of GVA in environmental technologies was analyzed. In our case we have identified that especially imports and exports affect this indicator. Recyclable raw materials imports (τ = 0.734, p = 0.000) and raw materials exports (τ = 0.711, p = 0.001) increase the share of GVA in environmental technologies, as can be observed. This could suggest that industries that rely on secondary raw material demand environmental technologies, as well as that industries engaging in environmental technologies are active in resource trades. Similarly, the import of raw materials show a positive correlation with the share of GVA in environmental technologies (τ = 0.478, p = 0.022) (Table 2. Correlation Share of GVA in environmental technologies and other circular economy indicators).

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Table 2. Correlation Share of GVA in environmental technologies and other circular economy indicators

Correlations							
			Share of GVA in environmental technologies	**Import of recyclable raw materials (thousand tons)**	**Import of raw materials (tons)**	**Export of recyclable raw materials (thousand tons)**	**Export of raw materials (tons)**
Kendall's tau_b	Share of GVA in environmental technologies	Correlation Coefficient	1	.734**	.478*	-0,198	.711**
		Sig. (2-tailed)		0	0,022	0,342	0,001
		N	14	14	14	14	14
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Source: National Institute of Statistics data (Analysis by the author).

Secondly, the share of renewable energy was investigated. The value of renewable energy in transportation ranges from 1.30% to 8.90%, with a mean value of 5.50%. This result indicates that the renewable energy in the transportation sector is low, which means that policies have to be implemented, and the infrastructure has to be developed in order to create sustainable mobility solutions. On the contrary, the share of electric energy is higher with a mean of 38.36%, a maximum of 43.70% and a minimum of 28.10%. This suggests that a substantial portion of Romania's electricity comes from renewable sources. However, the variation might imply fluctuations in terms of seasonal or policy changes. For this sector to grow, stability is mandatory. When it comes to energy for heating and cooling, the results indicate a mean of 25.76%, with a maxim of 23.20% and a minimum of 27.20%. If we look at the standard deviation, we can say that this indicator is relatively stable. It can be presumed that the countries' investments in energy efficient heating solutions, such as biomass and geothermal hearing, have been effective (Table 3. Share of renewable energy sources).

Table 3. Share of renewable energy sources

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Share Renewable energy use Transport	15	1,30	8,90	5,50	2,51381
Share Renewable Electric Energy	15	28,10	43,70	38,36	5,79172
Share Renewable Electric Heating and Cooling	15	23,20	27,20	25,76	1,07756
Valid N	15				

Source: National Institute of Statistics data (Analysis by the author).

Thirdly, the material footprint indicator was investigated. The results show a significant negative correlation (τ = -0.473, p = 0.019) between green sector employment and material footprint, which indicates that as employment in environmental industries increases, the total material footprint decreases. This could suggest that sustainability-focused industries contribute in reducing resource intensity and support the transition to a circular economy. Conversely, renewable energy use in transport (τ = 0.589, p = 0.004) and electricity (τ = 0.464, p = 0.021) are positively correlated with material footprint, meaning that as renewable energy adoption grows, material footprint also increases. The reason behind this could be the resource-intensive nature of renewable energy infrastructure, which requires significant raw materials. However, renewable energy use for heating and cooling (τ = -0.420, p = 0.037) is negatively correlated with material footprint, suggesting that this sector may be more efficient in reducing material consumption compared to others (Table 4. Correlation Material Footprint and other circular economy indicators).

Table 4. Correlation Material Footprint and other circular economy indicators

Correlations						
Kendall's tau_b		**Material footprint (thousand tons)**	**Green sector employment**	**Share Renewable energy use Transport**	**Share Renewable Electric Energy**	**Share Renewable Electric Heating and Cooling**
Material footprint (thousand tons)	Correlation Coefficient	1,000	-.473*	.589**	.464*	-.420*
	Sig. (2-tailed)		0,019	0,004	0,021	0,037
	N	14	14	14	14	14
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: National Institute of Statistics data (Analysis by the author).

Additionally, a regression analysis between material footprint and material resource productivity was performed. This studies the relation between the economic output per unit of resource used and the total environmental impact of material use. The results show a significant negative relation (B = -400,790.693, p = 0.001) between resource productivity and material footprint, meaning that as resource productivity increases, material footprint decreases. It can be confirmed that efficient use of material resources lowers the environmental impact (Table 5. Regression Analysis: Material footprint and Material Resource Productivity). Likewise, a regression analysis between material footprint and natural resource productivity was performed. A significant negative relation (B = -344,213.279, p = 0.000) has been established, which means that as natural resource productivity increases, the material footprint decreases substantially as natural resource productivity increases, the material footprint decreases substantially (Table 6. Regression Analysis: Material footprint and Natural Resource Productivity). This suggests that more efficient use of natural resources leads to a lower total consumption of materials, thereby reducing environmental impact. Both findings support the importance of transitioning toward resource-efficient economic models, where industries extract more value from fewer resources, minimizing waste and environmental degradation.

Table 5. Regression Analysis: Material footprint and Material Resource Productivity

Coefficients[a]						
Model				Standardized Coefficients	t	Sig.
				Beta		
1	(Constant)	1045851,740	135046,777		7,744	0,000
	Material Resource productivity (thousands of lei per ton)	-400790,693	87734,737	-0,797	-4,568	0,001
a. Dependent Variable: Material footprint (thousand tons)						

Source: National Institute of Statistics data (Analysis by the author).

Table 6. Regression Analysis: Material footprint and Natural Resource Productivity

Coefficients[a]						
Model				Standardized Coefficients	t	Sig.
				Beta		
1	(Constant)	1028622,685	122152,091		8,421	0,000
	Natural Resource productivity (thousands of lei per ton)	-344213,279	70077,637	-0,817	-4,912	0,000
a. Dependent Variable: Material footprint (thousand tons)						

Source: National Institute of Statistics data (Analysis by the author).

Last but not least, a detailed assessment of the domestic material consumption (DMC) was conducted. The findings show a significant negative correlation between DMC and green sector employment ($\tau = -0.538$, $p = 0.007$), which indicates that as employment in environmental industries increases, domestic material consumption decreases. This suggests that sustainability-focused industries could reduce raw material dependency and create green jobs by promoting a resource-efficient economy. Similarly, material resource productivity ($\tau = -0.440$, $p = 0.023$) and natural resource productivity ($\tau = -0.552$, $p = 0.006$) are both negatively correlated with DMC. These findings confirm that greater efficiency in resource use lowers the overall material demand. In contrast, material intensity ($\tau = 0.456$, $p = 0.019$) and DMC are positively correlated, which means that economies with higher material consumption per unit of GDP tend to use more raw materials overall. The strongest positive correlation ($\tau = 0.802$, $p = 0.000$) is between DMC and material footprint, confirming that higher resource extraction and consumption directly increase environmental impact. All these findings confirm again the need of policies that promote resource efficiency, waste reduction and sustainable practices (Table 7. Correlation Domestic Material Consumption and other circular economy indicators).

Table 7. Correlation Domestic Material Consumption and other circular economy indicators

Correlations							
Kendall's tau_b		Domestic Material Consumption (tons)	Green sector employment	Material Resource productivity (thousands of lei per ton)	Natural Resource productivity (thousands of lei per ton)	Material intensity (ton per thousand of lei)	Material footprint (thousand tons)
Domestic Material Consumption (tons)	Correlation Coefficient	1,000	-.538**	-.440*	-.552**	.456*	.802**
	Sig. (2-tailed)		0,007	0,023	0,006	0,019	0,000
	N	15	14	15	14	15	14
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Source: National Institute of Statistics data (Analysis by the author).

Surprisingly, the amount of was the only indicator that did not show any significant relationship with any other indicator. However, since it is so often mentioned in the literature, we looked deeper into the topic. As it is illustrated, there have been fluctuation over the past years, probably due to external factors such as policy changes or economic cycles (Table 8. Share of waste amount per sector). However, if we look at the values by sector, we can see that they remained most of the time constant. The extractive industry is accounting for the highest share. Even though it has fluctuations, it has remained above 80% from 2010 onward. This indicates Romania's continued reliance on resource extraction. At the opposite pole, the sector with the lowest share is wholesale trade of waste and scrap, with values close to 0.0%. This could suggests that the trade of recyclable waste is not a significant part of the economy. Controversy, the agriculture sector had a significant fall in post-2008, subsequently stabilizing at reduced levels. Similarly, the manufacturing industry is also declining. On a more positive note, waste collection and recycling sector, although representing a small share, is showing growth, which could suggest progress in circular economy initiatives (Table 7. Correlation Domestic Material Consumption and other circular economy indicators).

Table 8. Share of waste amount per sector

	Year							
	2008	**2010**	**2012**	**2014**	**2016**	**2018**	**2020**	**2022**
	Share							
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Agriculture, Forestry, and Fishing	10,15	0,30	0,19	0,32	0,29	0,29	0,51	0,40
Extractive Industry	74,38	88,07	89,55	86,51	86,68	87,98	84,29	85,31
Manufacturing Industry	5,85	3,82	2,43	3,82	4,39	3,87	4,65	4,12
Production and Supply of Electricity, Heat, Gas, Hot Water, and Air Conditioning:	3,73	2,92	3,63	4,02	3,87	3,36	3,07	3,44

	Year							
	2008	**2010**	**2012**	**2014**	**2016**	**2018**	**2020**	**2022**
	Share							
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Water Supply, Wastewater Collection and Treatment, and Decontamination Service	0,08	0,08	0,14	0,14	0,24	0,11	0,14	0,10
Waste Collection, Treatment, and Disposal; Recycling Activities	0,29	0,44	0,78	0,88	0,76	0,91	1,82	1,66
Construction	0,17	0,36	0,53	0,59	0,18	0,32	0,86	0,46
Services	1,70	1,43	0,94	1,56	1,27	1,11	1,64	1,70
Wholesale Trade of Waste and Scrap	0,21	0,01	0,00	0,00	0,01	0,01	0,01	0,00
Households	3,44	2,56	1,81	2,16	2,31	2,06	3,01	2,80

Source: National Institute of Statistics data (Analysis by the author).

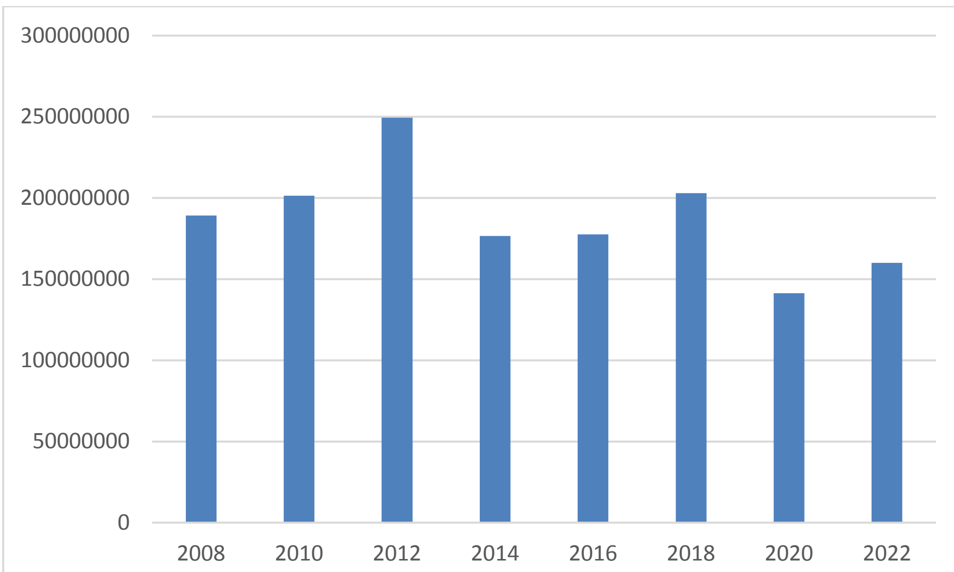

Figure 1. Amount of waste in Romania 2008 - 2022

Source: National Institute of Statistics data (Analysis by the author).

Overall, addressing Romania's circular economy challenges would require a multifaceted approach, including more innovation, investments in sustainable infrastructure, and the implementation of strict regulations. Regulatory alignment and continuous monitoring of environmental performance indicators are crucial to fostering a resilient and circular economy. Moreover, public-private collaborations, research funding, and awareness campaigns play a fundamental role in advancing the circular model. Encouraging innovation through financial incentives and tax benefits for businesses that adopt sustainable practices can drive progress toward a more resource-efficient economic model. Moreover, investment in sustainable infrastructure, such as renewable energy facilities and recycling plants, will be essential for ensuring long-term environmental and economic stability.

Conclusion

This study underscores the importance of integrating circular economy principles into Romania's framework to achieve economic growth. Starting from a top-down analysis, we have initially examined which variables have a significant relationship with GDP and afterwards what other factors influencing these variables.

The results of the first assessment indicate a robust positive association between GDP and the growth of environmental technology as well as renewable energy. This outcome underscores how important sustainability-oriented economic initiatives are. Nevertheless, higher GDP is also associated with increased material consumption, which highlights the difficulties of reconciling economic expansion with resource efficiency.

The second step was to determine which factors influence these variables. The findings indicate that higher gross value added in environmental technology could be achieved by increasing the amount of raw materials import, of recyclable materials import and of raw materials export. When it comes to the share of renewable energy, it has been established that the most is used for electricity and the least for transportation. In term of material footprint, with found a negative significant correlation with material and natural resource productivity, as well as with green sector employment and with share of renewable electric heating and cooling. On contrary, material footprint has a positive relation with share of renewable energy use transport and share of renewable electric energy. The fourth examined variable is domestic material consumption, which decreases with higher amount of green sector employment, higher natural and material resource productivity, lower material intensity as well as lower material footprint.

The study delivers significant value through its data-driven analysis of circular economy indicators in Romania, establishing clear statistical relationships between economic growth and sustainability metrics. Its top-down approach provides both broad insights and detailed sector-specific findings, creating a practical foundation for targeted policy interventions. By quantifying connections between GDP, environmental technologies, renewable energy, and resource productivity, the research bridges theoretical concepts and measurable economic outcomes, offering actionable intelligence for Romania's sustainability transition.

A key limitation of the study is its focus solely on Romania, which means the findings may not be applicable to other countries with different economic structures and development levels. Additionally, other variables should be considered as well, particularly in relation to waste generation. While the research provided valuable insights into several circular economy indicators, expanding the analysis to include more variables could help uncover important relationships that weren't captured in the current framework, especially since waste generation showed no significant correlations despite being a fundamental aspect of circular economy principles.

Future research should focus on assessing the long-term effects of circular economy policies, exploring their impact on specific sectors, and identifying optimal strategies for harmonizing economic and environmental goals. Achieving a truly circular and sustainable economy will depend on Romania's ability to integrate circular principles across all industries, enhance public engagement, and implement strategic investments that support both economic resilience and environmental well-being.

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