

Article

How Supportive Are Romanian Consumers of the Circular Economy Concept: A Survey

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Abstract: The aim of this paper is to investigate consumer behavior regarding the environment and the adoption of new patterns of behavior and responsible consumption in the promotion of a Circular Economy (CE) in Romania. With this goal in mind, a questionnaire survey was performed on-line on a nationwide scale to explore consumers’ behaviors and attitudes, which was distributed in all four of Romania’s macro-regions and interviewing 642 respondents. The results indicate that the consumers have a positive attitude towards the importance of the environmental protection, in general and it also measures the frequency of adopting eco-friendly behaviors by the consumers, showing that the consumption behavior is not very consistent with the general attitude regarding environment. As a parallel, consumers are aware of the importance of CE business models, in general, both for the economy and for the environment, but the adoption of consumption patterns specific to CE business models, necessary for the development and the success of the CE business models, has a low probability in the absence of direct or indirect incentives and benefits fostering the adoption of these consumption patterns. In conclusion, the development of CE business models in Romania requires a national strategy, which includes means to sustain the adoption of necessary new consumption behaviors, besides awareness raising and educational campaigns for explaining to consumers the liaison and the impact of their behavior to the environment and to the economy.

Keywords: circular economy; sustainable production; sustainable consumption; business models; questionnaire

1. Introduction

1.1. The Sustainable Development and the Circular Economy

The continual decrease of the quantity of non-regenerative resources worldwide, alongside with the continuous increase in the number of global population puts pressure for finding new approaches

to production and consumption. In this framework, a gradual step from a linear to a circular economy would have a good impact, from economic, social and environmental points of view [1].

According to the United Nations' forecasts, if current trends in the increase of the ecological footprint continue, humankind will need the resources of two Earths by 2030 and of three Earths by 2050, to properly function, as visually presented in Figure 1 [2].

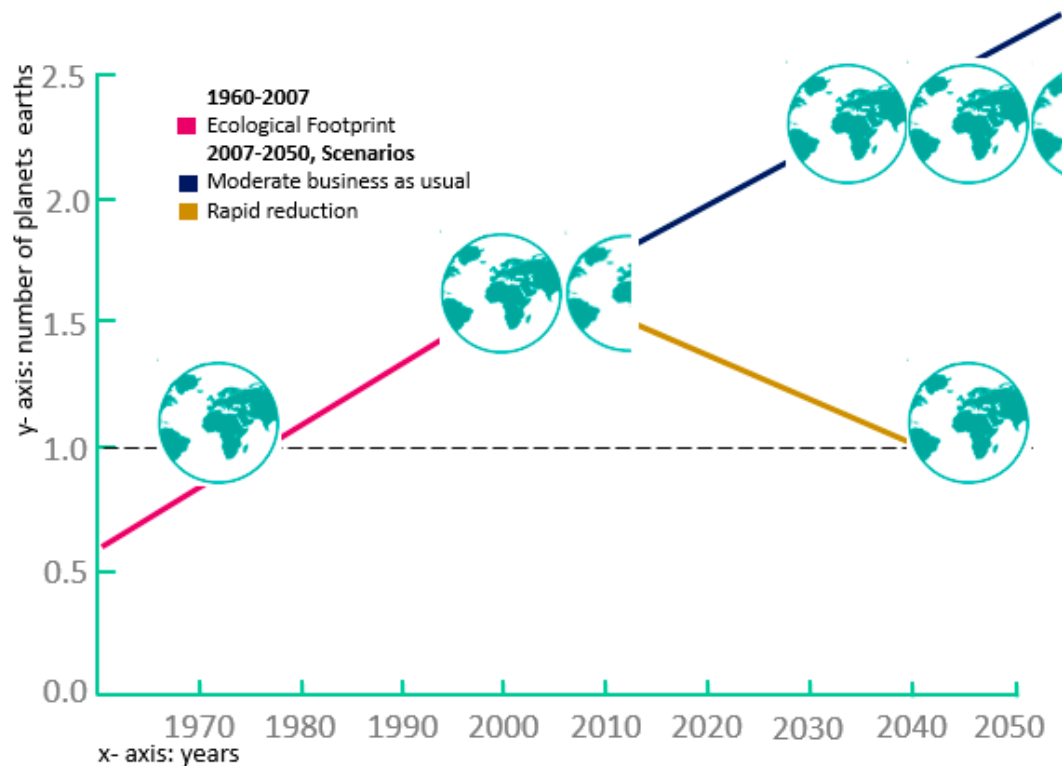


Figure 1. Global Footprint Network-Ecological footprint of the global economy [2].

Under these circumstances, the United Nations underlined the importance of the sustainable development, which UN defined, in Principle 3 of the Rio Declaration, as the right of the countries to develop only with taking in consideration “to equitably meet developmental and environmental needs of present and future generations” [3].

In order to promote sustainable development, new business models, taking in consideration the sustainable development principles, are a must. A series of new business models have been proposed by the research literature, belonging to the framework of the circular economy.

The circular economy, as put forward by K. E. Boulding (1961) [4], is based on the sustainable development principles, contrary to the linear business model used so far, characterized by “resources’ use → products making → waste obtaining”. The new model is universally cherished and valued for its increased efficiency in the utilization of the ecological resources, reducing the environmental pollution and tackling the long-standing contradiction among the resources’ shortage, the environmental pollution and the economic growth [5].

With the aim of promoting the circular economy business models, EU released, in December 2015, an “ambitious new Circular Economy Package to stimulate Europe’s transition towards a circular economy which will boost global competitiveness, foster sustainable economic growth and generate new jobs” [6]. Among the key actions included in the Circular Economy Package, we will name the following ones [6]:

- Actions to reduce food waste, including a common measurement methodology, improved date marking and tools to meet the global Sustainable Development Goal of halving food waste by 2030;
- The necessity of developing quality standards for secondary raw materials, in order to increase the confidence of operators in the single market;
- Measures in the Eco-design working plan for 2015–2017, for promoting reparability, durability and recyclability of products, in addition to increasing energetic efficiency;
- The necessity to revise the regulation on fertilizers, in order to facilitate the recognition of organic and waste-based fertilizers in the single market and for supporting the role of bio-nutrients;
- A strategy on plastics in the circular economy, addressing issues of recyclability, biodegradability, the presence of hazardous substances in plastics and the Sustainable Development Goals target for significantly reducing marine litter.

The aim of the proposed actions is to “close the loop” of the products’ lifecycle, through promoting the recycle and reuse of products [7] at their end of life. In the same optic, the European Commission made proposals for legislative revisions with regard to waste’s treatment and set clear targets for the reduction of waste and established paths for waste management and recycling [8,9].

Even if the principles of the circular economy seem to be accepted, step by step, at a continuously enlarging level, the business models which the circular economy implies have to be well-known and understood at large scale, in order that this new business thinking perspective can make a real change. In other words, comprehensive knowledge of designing circular business models is needed for stimulating and fostering the implementation of the circular economy on a micro-level [10,11].

Literature and practice provide a series of classification of the business models which can be included under the umbrella of circular economy. We will present here the key areas where the principles of circular economy can be integrated in the business models, as proposed by Laubscher and Marinelli [12], cited by Lewandowski [13]:

- with regard to the sales model, a shift should take place from selling volumes of products towards selling services and retrieving products from customers, after first life;
- with regard to product’s design and material composition, the change could concern the way products are designed and engineered, in order to maximize a high quality reuse of the product and of its components and materials;
- with regard to IT and data management, the resources’ optimization is enabled if a key competence is present, the ability to keep track of products, components and material data;
- with regard to supply loops, a shift would be done by turning towards the maximization of the recovery of own assets, where profitable and to maximize the use of recycled materials/used components, in order to gain additional value from products, components and materials flows;
- with regard to the strategic sourcing for own operations, building trusted partnerships and long-term relationships with suppliers and customers, including co-creation would be a plus;
- with regard to HR incentives, a shift needs to adequately adapt the organizational culture, in order to continually develop HR’ capabilities, enhanced by training programs and rewards.

Starting from the ways of circular value creation [14], Renswoude, ten Wolde and Joustra propose a segmentation of circular business models, presented in Table 1.

All of these circular economy models will, surely, have a good impact on the decrease of natural resources’ use. However, even if the concept is not new, not all of the circular economy models will be functional in every country, mainly due to differences in mentality. In this framework, the authors made a research with regard to the mentality towards green consumption and production behaviors in Romania.

Table 1. Circular business models [14].

Type of Cycle	Circular Business Model	Short Description of the Model
1. Short cycle	Pay per use	One-time payment to use product or service
	Repair	Product life extension by repair services
	Waste reduction	Waste reduction in the production process
	Sharing platforms	Products and services are shared among consumers
2. Long cycle	Progressive purchase	Pay periodically small amounts before purchase
	Performance based	Long term contract and responsibility with producer
	Take back management	Incentive to ensure product gets back to producer
	Next life sales	Product gets a new life
3. Cascades	Refurbish and resell	Product gets a new life after adjustments
	Upcycle	Materials are reused and their value is upgraded
	Recycling (waste handling and repurpose)	Materials are cascaded and reused, recycled or disposed
4. Pure cycles	Collaborative production	Cooperation in the production value chain leading to closing material loops
	Cradle to cradle	Product redesign to 100% closed material loops
5. Demateria-lized services	Circular sourcing	Only sourcing circular products or materials
	Physical to virtual	Shifting physical activity to virtual
6. Product on demand	Subscription based rental	Against a low periodic fee, consumers can use a product or service
	Produce on order	Only producing when demand is present
	3D printing	Using 3D printing to produce what is needed
	Customer vote (design)	Making customers vote which product to make

1.2. Short Introduction in the Romanian Context

The present analysis focuses on Romania, a country with one of the highest growth rates in the European Union (EU) in 2015, of 3.7%, mainly stimulated by domestic demand [15].

With a population of 22 million inhabitants and with a population density of 84.4 pop./km², Romania is the second largest market in Central Europe and the gross domestic product (GDP) per capita in Romania is situated at 54% of the EU-28 average [16].

Considered, in the past, Europe's bread basket, agriculture plays an important role in Romania. However, this sector requires continuous development. At present, the situation is a lot less positive: in a Romania which has the highest percentage of rural population in the EU (45%), the incidence of rural poverty is the highest (70%) and there is a large gap with regards to the living conditions between the rural and the urban areas [17].

Romania is geographically positioned at the crossroads of major trade routes, it has an advantage related to navigation due to the Black Sea seaside, it still has important natural resources and it has qualified workforce. These are all important factors for attracting foreign businesses to Romania.

1.3. Romanian Consumers' Attitudes towards the Environment's Protection and towards Sustainable Consumption Practices

In accordance with the Europe's 2020 Strategy [18], by 2020, Romania must recycle 50% of its waste. At present, it recycles only 3% of its municipal waste, being at the last place in the European Union. Thus, waste recycling is one of Romania's key priorities, striving to reach the average level of the European Union's countries with regard to the value of this indicator of sustainable development.

A poll conducted by the European Commission concluded that 82% of the Romanian citizens consider that they may play a role in protecting the environment and that most of them act and behave from an ecological perspective. With regard to recycling habits, 32% of Romanian consumers show concern related to recycling, 34% show interest in reducing energy consumption and 29% in reducing water consumption.

In conclusion, the average Romanian consumer shows interest in protecting the environment through savings of energy and water and through selective waste behaviors. However, to what extent this leads to the adoption of sustainable consumption patterns? Moreover, which are the Romanian consumers' attitudes towards the development of sustainable production and of the business models based on products' reuse and recycling (or CE business models)? Answering these questions would help us appreciate to what extent the Romanian consumer is probable to adopt consumption behaviors characteristic to CE business models. The conceptual scheme used in our study is presented in Figure 2.

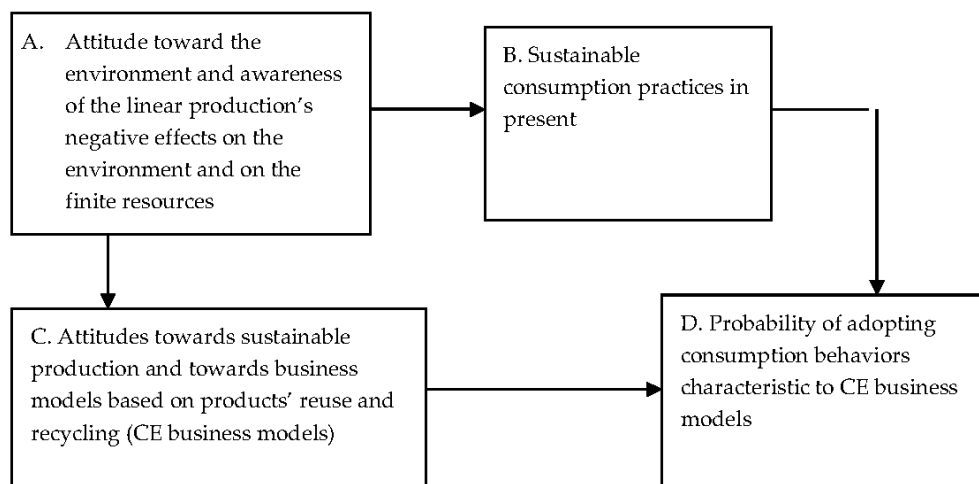


Figure 2. Probability of adopting consumption behaviors characteristic to CE business models.

The conceptual scheme used in the study is considered being helpful in assessing the probability that Romanian consumers will adopt consumption behaviors characteristic to CE business models, making CE business models successful in Romania. The study begins with measuring the consumers' concerns towards the environment and towards the natural resources' depletion, due to the linear way of production and consumption. The following part of the study measures the frequency with which the Romanian consumers adopt a series of eco-friendly activities. These two parts of the study will help investigate the consistency of the behavior with the attitude: high concerns about environment and resources' depletion should lead to adoption of sustainable consumption patterns. The third part of the study investigates the consumers' attitudes towards sustainable production business models and their possible role for the economy and for the environment. Based on the attitude—behavior relationship investigated through the first two parts of the study, the authors will make a parallel for assessing the probability of the consumers' adoption of consumption behaviors characteristic to CE business models, based on the attitude toward sustainable production investigated in part 3 of the study.

The paper consists of five sections. The next section explains the research design and data collection. The research findings are presented in Section 3. In Section 4 are presented the main conclusions of the study. The final section contains discussion related to the study.

2. Methodology

The method of research used is the survey, based on an online questionnaire with 16 items. Detailed information about the study's hypothesis and about the questionnaire design is to be found on link <https://sites.google.com/site/economiecirculara/>.

Based on the conceptual model presented in Figure 2, the following variables have been measured, for each factor considered to influence Romanian consumers' probability to adopt consumption behaviors characteristic to CE business models:

- A *Attitude towards the Environment and Awareness of the Linear Production's Negative Effects on the Environment and on the Finite Resources:*
- 1-1. How important is it for you to show concern for the environment?
 - 1-3. In order to avoid exhaustion of natural resources, do you consider that selective waste collection is important?
 - 1-7. Through energy from waste making, savings on electricity, oil, natural gas and coal can be achieved. Do you consider this issue important?

B *Sustainable Consumption Practices Adopted in Present:*

1-8. Please indicate the frequency of adopting an eco-friendly activity, from the following options:

- I go to the work with a public transport vehicle.
- I go to work by bike.
- I go to work sharing a personal car with colleagues.
- I separately collect paper waste.
- I separately collect plastic waste.
- I collect used cooking oil.
- I take batteries to collection centers.
- I take light bulbs to collection centers.

C *Attitudes towards sustainable production and towards business models based on products' reuse and recycling (CE business models):*

- 1-2. Do you agree with selective waste collection as a basis to produce new goods?
- 1-4. Is it desirable for the future a "zero waste" economy, in which all materials and products are (a) reused; (b) recycled?
- 1-6. To what extent do you agree that the increase of the efficiency of resources' use represents a mean by which the objectives of the sustainable development (economic, social and environmental ones) can be achieved through: (a) Saving; (b) Recycling; (c) Substitution; (d) Use of less resources (Example: the use of fewer resources, by reducing the weight of vehicles)?
- 1-9. Are beneficial for the economy the business models based on: (a) Reuse; (b) Recycling?
- 1-10. Are beneficial for the environment the business models based on: (a) Reuse; (b) Recycling?

The survey also includes questions regarding socio-demographic variables, such as: age, gender, level of educational, region of origin and income.

In the preliminary stage of the study, the questionnaire was pre-tested on 37 consumers, in the period between 25 March and 30 March 2016. Consumers were selected non-randomly, on accessibility basis. The consumers who participated in the questionnaire's pre-test phase have not been included in the final sample. As a consequence of the questionnaire's pre-testing, the authors considered opportune to make changes in the questionnaire, such as regrouping and reformulating some questions, in order to reduce the size of the questionnaire, since the majority of the respondents appreciated the difficulty and the time length to complete the questionnaire a little high.

Given the limitations of time and budget, but also the large geographical area (national level) of the research, the method selected for contacting the statistical population to investigate was the transmission of the questionnaire via e-mail, the questionnaire being accompanied by additional explanations regarding the importance of the research. The questionnaire was accessible online from 11 April 2016 to 23 April 2016.

The final number of respondents was of 642, but 45 responses were incomplete. Therefore, the final sample counts 597 respondents, representing a response rate of 90.19%. The sample covers all four Romanian macro-regions, the demographic structure of the sample being presented extensively in Table 2. In addition, the sample was constituted from respondents from both genders, covered all age categories and all education categories. The detailed categorization of the sample from socio-demographic perspective is listed in Table 2.

Table 2. The socio-demographic composition of the sample.

N (Number) %			N (Number) %		
Sex			Age		
Male	358	59.97	18–24 years	347	58.12
Female	239	40.03	25–34 years	106	17.76
Education			35–44 years	69	11.56
Middle School	15	2.51	45–54 years	49	8.21
Professional school	4	0.67	55–64 years	23	3.85
High School	261	43.72	over 65 years	3	0.50
Post-High School	7	1.17	Region		
Faculty/University College	179	29.98	Macro-region 1 (RO1: NW and Center of Romania)	220	36.85
Post-University Studies	131	21.94	Macro-region 2 (RO2: NE and SE of Romania)	78	13.03
Total	597		Macro-region 3 (RO3: South of Romania and Bucharest)	178	29.90
			Macro-region 4 (RO4: SW and W of Romania)	121	20.22
					100

3. Research Findings

The authors began the data analysis and the drawing up of the “big picture” by hypothesis testing. The results are to be found below. H₀₁—“*The majority of respondents consider that caring for the environment is very important.*”

-hypothesis confirmed thanks to 52.61% percentage of respondents considering it “very important”.

H₀₂—“*The majority of respondents agree with selective waste collection as a basis to new goods production.*”

-hypothesis confirmed thanks to 73.77% share of respondents who “totally agree”.

H₀₃—“*More than 50% of the respondents consider that in order to avoid exhaustion of natural resources, selective collection of waste is very important.*”

-hypothesis confirmed thanks to 58.68% share of respondents who believe that selective collection of waste is very important in order to avoid the exhaustion of natural resources.

H₀₄—“*At least 25% of the respondents consider very important the aspect by which through energy recovery from waste, savings on electricity, oil, natural gas and coal can be achieved.*”

-hypothesis confirmed thanks to 67.48% percentage allotted to the replies “very important”.

H₀₅—“*More than 25% of the respondents always adopt at least one of the eco-friendly specified activities.*”

-hypothesis not confirmed, the share of respondents who “always” make an eco-friendly activity from the specified ones ranges from 1.69% in the case of going to work by bike to 17.02% in the case of going to work by a mean of public transportation.

H₀₆—“*At least 50% of the investigated respondents agree that it is desirable for the future economy of “zero waste”, in which all goods are: (a) reused; (b) recycled.*”

-hypothesis confirmed due to the percentage of 57.06% of respondents «totally agreeing» with goods’ recycling in order to achieve a “zero waste” economy and 41.26% of respondents “totally agreeing” with goods’ reusing in order to achieve a “zero waste” economy.

H₀₇—“*No more than half of the investigated respondents agree that efficiency increasing of using resources represents a mean by which the objectives of sustainable development (economic, social and environmental) can be achieved.*”

-hypothesis confirmed due to the share of respondents “totally agreeing” that the increase of the efficiency of resources’ use represents a means by which the objectives of the sustainable development (economic, social and environmental) through: (a) resources’ savings (39.49%), substitutions (31.93%) and use of less resources (35.73%); The hypothesis has not been confirmed for the case (b), 51.58% of the respondents totally agreeing that the increase of the efficiency of resources’ use represents a mean by which the objectives of the sustainable development (economic, social and environmental) through recycling.

H₀₈—“ At least 25% of the respondents agree that the CE business models are beneficial to the economy.”

-hypothesis confirmed due to the percentage of 32.52% of respondents “totally agreeing” that CE business models based on reuse are beneficial to the economy and 44.63% of respondents “totally agreeing” that CE business models based on recycling are beneficial to the economy.

H₀₉—“ At least 25% of the respondents agree that the CE business models are beneficial to the ecological environment.”

-hypothesis confirmed due to the percentage of 48.69% of respondents “totally agreeing” that CE business models based on reuse are beneficial to the environment and 54.85% of respondents «totally agreeing» that CE business models based on recycling are beneficial to the environment.

As a conclusion of hypothesis’ testing, it can be said that most hypothesis have been confirmed. The interesting result has been brought by H₀₅—“More than 25% of the respondents always adopt at least one of the eco-friendly specified activities”, hypothesis not confirmed, the share of respondents who “always” make an eco-friendly activity from the specified ones ranges from 1.69% in the case of going to work by bike to 17.02% in the case of going to work by a mean of public transportation. In other words, eco-friendly activities are not adopted by consumers as frequent as it could be expected, taking in consideration the importance given to the concern for the environment.

The results of the survey will also be discussed starting from the components of the conceptual model, which the authors described. More exactly, the first step will be the presentation of the results regarding the consumers’ attitudes toward the environment (point “A” of the conceptual model). The second step will be the presentation of the results of the items reflecting the sustainable consumption practices, which the respondents show in the present (point “B” of the conceptual model). The third step will be the presentation of the results of the items reflecting the attitudes the respondents have with regard to sustainable production and towards business models based on products’ reuse and recycling (CE business models) (point “C” of the conceptual model). Step four will consist in discussing the probability of respondents’ adopting consumption behaviors characteristic to CE business models (point “D” of the conceptual model), on the basis of the results at the items from points A, B and C.

Point A. Attitude towards the environment and awareness of the linear production’s negative effects on the environment and on the finite resources is represented by three items: interests related to the environment, personal attitude towards waste’s sorting and depletion of resources. The findings are presented below.

3.1. Interests Related to the Environment

Question 1-1. How important is for you the care for the environment, measured on a 1 to 5 importance scale, where {1} = not important at all, {3} = neither important or unimportant and {5} = very important.

The results showed that 95.71% of the respondents consider that the care for the environment is important or very important for them. Moreover, 52.80% of respondents consider the concern for the environment very important. These aspect strengthen the results of the study done by the European Commission in 2014, which shows that over 51% of the Romanian respondents consider environmental protection as being very important and 40% consider it as being important [15].

3.2. Attitude towards Waste’s Selective Collection

Question 1-3. In order to avoid exhaustion of natural resources, do you consider that the selective collection of waste is important, measured on a 1 to 5 importance scale, where {1} = not important at all, {3} = neither important or unimportant and {5} = very important.

The results showed that 96.01% of the respondents consider that selective collection of waste is important in order to avoid the exhaustion of natural resources. The selective collection of waste for avoiding exhaustion of natural resources was considered very important by more than 80% of the respondents in the 25–44 age category, as can be seen in Table 3.

Table 3. Selective collection of waste is very important for avoiding exhaustion of natural resources—share of answers, by age category.

Question: In Order to Avoid Exhaustion of Natural Resources, Do You Consider Important the Selective Collection?		
Answer: Very Important		
18–24 years	50.43% (175)	100% (347)
25–34 years	89.62% (95)	100% (106)
35–44 years	84.06% (58)	100% (69)
45–54 years	26.53% (13)	100% (49)
55–64 years	43.48% (10)	100% (23)
Over 65 years	0.00% (0)	100% (3)

It should be noted that the results reveal only the consumers' opinion regarding the importance of separate waste collection for the environment. Stressing this is important in the context in which only 33% of Romanians collected waste selectively in 2014 [19].

Among the most visible side effects related to consumption is waste generation. The first steps taken by Romania in this direction took place in 2014, when the selective collection of waste became mandatory for paper, metal, plastic and glass. This approach is necessary in order to meet the objectives of the Framework Directive of the European Union by 2020, Romania targeting to 50% recycling by then [8].

3.3. Resources' Depletion and Energy Production from Waste

Depletion of natural resources is a debated topic, and a new study published by the Sustainability Global Institute argues that a number of countries in the European Union will face a "critical shortage" of natural resources. According to the report, at the end of 2013, the estimations were that Romania still has oil reserves for 19 years, reserves of natural gas for 9.3 years and coal reserves for 9 years. According to the eight edition of the Living Planet Index 2012 [20], Romania has an average ecological footprint (meaning the use of resources for food, fuel, clothing and construction materials) of 2.7 hectares per capita. In comparative terms, the planet can offer only 1.8 hectares of land and water. Natural capital includes resources from the Earth's crust (e.g., minerals, oil), resources produced by humans (synthetic substances), as well as the resources of the biosphere. Equitable access to natural capital is also a component of sustainability [21].

An alternative to capitalizing of the materials (through recycling) is the recovery of the energy contained in waste. This can result in significant environmental benefits, particularly for materials that have a high calorific value.

Regarding the quantities of biodegradable waste generated in Romania, the State of the Environment Report from year 2014 says that, from the total amount of municipal waste, most of it is household waste or similar (76.4%), while about 53.35% of the waste is represented by biodegradable waste [15].

In the Government Decision no. 870/2013 for approval of the National Strategy for Waste Management 2014–2020, the concept of hierarchy of waste was defined, waste management measures being categorized according to their impact of the environment on long term [22].

The Waste Framework Directive 2008/98/EC establishes the targets for 2020 on reusing and recycling of household waste and assimilated at a minimum share of 50% of the waste's weight, for paper, metal, plastic and glass [7,23,24]. For non-hazardous waste, originating from construction and demolition activities, the minimal share is of 70% of the waste's weight.

Given this context, an item measuring the importance given to savings on electricity, oil, natural gas and coal, through energetic valorization of waste, on a 1 to 5 importance scale, where {1} = not important at all, {3} = neither important or unimportant and {5} = very important, was included in the questionnaire. The responses have not been surprising: 94.93% of the respondents consider

that savings on electricity, oil, natural gas and coal obtained from energy production from waste is important or very important. Over 80% of the respondents from 25 to 54 years consider the energy recovery from waste for achieving savings in electricity, oil, natural gas and coal as very important. The share of respondents considering these issues as very important, by age category, is presented in Table 4.

Table 4. Energy production from waste in order to save resources—considered to be very important, by age category.

Question: Through Energy Production from Waste, Savings on Electricity, Oil, Natural Gas and Coal can Be Achieved. Do You Consider this Aspect Important?		
Answer: Very Important		
Age Category	Share (No.) of this Answer within the Age Category	Share (No.) of Respondents Per Age Category
18–24 years	55.04% (191)	100% (347)
25–34 years	95.28% (101)	100% (106)
35–44 years	89.86% (62)	100% (69)
45–54 years	81.63% (40)	100% (49)
55–64 years	39.13% (9)	100% (23)
Over 65 years	66.67% (2)	100% (3)

Point B. Sustainable consumption practices at present—is represented in the study by the frequency of adopting an eco-friendly activity, eight eco-friendly activities being considered and which frequencies have been measured on a 5 responses scale, where: {1} = never, {2} = rarely, {3} = sometimes, {4} = frequently and {5} = always. The eco-friendly activities considered were: going to the work with a public transport vehicle, going to work by bike, sharing a personal car with colleagues for going to work, separate collection of paper waste, separate collection of plastic waste, separate collection of used cooking oil, leading used batteries to collection centers and leading light bulbs to collection centers.

The responses to these questions are a lot more divided as the ones considering the importance of caring for the environment (point “A” of the conceptual model).

Of respondents, 48.93% go to work using public transportation frequently or always. Though it may seem a big figure, it still is far away from that of more than 90% considering the concern for the environment as important or very important.

The other response variants counted from a little more than 11% to a little more than 19% each. It is also very probable that the answer is also influenced by the ownership or not of a personal car.

As an alternative to public transportation, going to work by bike is done frequently or always by only 7.37% of the respondents. Actually, 72.39% of the respondents never go to work by bike.

Another eco-friendly way to go to work, a personal car sharing with colleagues, is done on a frequent basis or always only by 25.92% of the respondents.

Among the highest scores at eco-friendly activities, separate collection of paper waste, is done on a frequent basis or always by 46.16% of the respondents.

Also separate collection of plastic waste rates relatively high among the eco-friendly activities, 46.78% of the respondents declaring to separately collecting plastic waste on a frequent basis or always.

Always separately collecting the paper waste and the plastic waste tend to correspond with the national value in the study made by Eco-Rom Ambalaje [25], which was of 12% of the population in 2013, strengthening our research data.

The separate collection of used cooking oil rates pretty low even relatively to the other eco-friendly activities, with only 28.68% of the respondents declaring to make it on a frequent basis or always.

Leading used batteries to special collection centers does not rate much higher than the precedent one, with only 33.89% of the respondents making it on a frequent basis or always.

Neither leading used light bulbs to special collection centers figure does not look any better, with only 21.63% of the respondents doing this eco-friendly activity frequently or always.

Since the responses show consumers' behavior with regard to eco-friendly activities, instead of attitudes, the authors considered important to present the answers' distribution within the paper and they are to be found in Table 5.

Table 5. Eco-friendly activities, by share of respondents and by frequency of making them.

Activity	Choices (Single Choice)	Answers Scale					
		Never	Rare	Sometimes	Often	Very Frequently	Always
Going to the office with a public transport vehicle		16.26%	19.02%	15.80%	11.66%	20.25%	17.02%
Going to work by bicycle		72.39%	13.04%	7.21%	3.53%	2.15%	1.69%
Going to work with personal car together with several colleagues		33.90%	21.32%	18.87%	10.58%	9.05%	6.29%
Collect separately paper waste		13.50%	19.63%	20.71%	18.10%	14.72%	13.34%
Collect separately plastic waste		15.49%	18.10%	19.63%	17.18%	13.34%	16.26%
Collect separately used cooking oil		38.34%	20.09%	12.88%	9.66%	7.21%	11.81%
Lead batteries to the collection centers		32.36%	20.25%	13.50%	10.43%	7.82%	15.64%
Lead the light bulbs to the collection centers		46.78%	19.79%	11.81%	7.52%	5.06%	9.05%

Point C. Attitudes towards sustainable production and towards business models based on products' reuse and recycling (CE business models) is represented by the five items:

- Agreement with selective waste collection as a basis to new goods production, measured on a 1 to 5 scale, where {1} = total disagreement, {3} = neither agreement or agreement and {5} = total agreement.
- Attitude regarding the desirability for the future of a "zero waste" economy, in which all materials and products are (a) reused; (b) recycled, measured on a 1 to 5 scale, where {1} = total disagreement, {3} = neither agreement or agreement and {5} = total agreement.
- Agreement with the proposition: "increase of the efficiency of resources' use represents a mean by which the objectives of the sustainable development (economic, social and environmental ones) can be achieved through: (a) Saving; (b) Recycling; (c) Substitution; (d) Use of less resources (Example: the use of fewer resources, by reducing the weight of vehicles), measured on a 1 to 5 scale, where {1} = total disagreement, {3} = neither agreement or agreement and {5} = total agreement.
- Agreement with the proposition "business models based on: (a) Reuse; (b) Recycling are beneficial to the economy, measured on a 1 to 5 scale, where {1} = total disagreement, {3} = neither agreement or agreement and {5} = total agreement.
- Agreement with the proposition "business models based on: (a) Reuse; (b) Recycling are beneficial to the environment", measured on a 1 to 5 scale, where {1} = total disagreement, {3} = neither agreement or agreement and {5} = total agreement.

The findings are presented below.

3.4. Production of New Goods Based on Selective Collection of Waste

With regard to the selective collection of waste, as a basis to product new goods, 97.39% of the respondents showed agreement or total agreement, an attitude not surprising at all. As shown in Table 6, all age categories, minus people over 65 years, declared a total agreement attitude in a proportion of more than 65% and up to 82% from the respondents of that age category.

Table 6. Total agreement with selective waste collection and with their use in the production of new goods, by age category.

Age Level	%	Total
18–24 years	76.37% (265)	100% (347)
25–34 years	82.08% (87)	100% (106)
35–44 years	69.57% (48)	100% (69)
45–54 years	65.31% (32)	100% (49)
55–64 years	69.23% (9)	100% (23)
over 65 years	33.33% (1)	100% (3)

3.5. Sustainable Consumption

The management of consumption of resources by humans is an indirect approach, based largely on information gained from economics. Human impact on the environment can be reduced not only by lower consumption, but also through the development of more sustainable production based on a complete cycle, use and discard.

Herman Daly [26] suggested three general criteria for ecological sustainability: renewable resources should provide a sustainable yield (rate of harvest should not exceed the regeneration rate); for non-renewable resources, there should be an equivalent development of renewable substitutes; waste generation should not exceed the capacity of environment assimilation.

The main determinant of human impact on Earth systems is the consumption of biophysical resources. Human consumption can be considered as determined by three key components: population, levels of consumption (affluence) and the impact on the resources used (which depends on the technology used). By establishing quantitative measures for sustainability, it becomes possible setting goals, management strategies, implementation and measuring progress [27].

Experts define many ways in which consumers can make environmentally responsible choices or responsible toward the society. The only thing over which all agree is that millions of shoppers are willing to pay extra for healthier and safer products. They add millions of consumers who make responsible choices because they are worried about the future of the planet and its inhabitants [10,28–30].

Over three-quarters of respondents agree or totally agree (answers {4} or {5}) that recycling (82.56% of the respondents) and reuse (90.80% of the respondents) are components of a desired “zero waste” economy.

In addition, the share of the respondents who agree or totally agree that the increase of resources’ use is a mean to reach the goals of sustainable development are of 86.57%, for the efficiency increase through resources’ savings, while 90.85% of the respondents think that the increase in efficiency should be done through recycling, 74.62% of the respondents believe that it should be done through resources’ substitution and 73.09% of the respondents think it should be done through using less resources.

The general trend is that higher life standards become less sustainable. As always, population’s growth has a marked influence on the level of consumption and resources’ use [31]. The sustainability goal is to elevate the global standard of living, without increasing the use of resources beyond the global sustainability level, which means not to exceed the consumption “of a planet”.

3.6. Business Models in CE

Of respondents, 83.59% agree or strongly agree that business models based on reuse are beneficial for the economy. In addition, 87.27% of the respondents agree or strongly agree that business models based on recycling are beneficial for the economy.

Of respondents, 88.60% agree or strongly agree that business models based on reuse are beneficial for the environment. In addition, 90.75% of the respondents agree or strongly agree that business models based on recycling are beneficial for the environment.

Measures such as eco-design, waste prevention and re-use can bring companies EU-wide net savings of up to EUR 604 billion or 8% of the annual turnover, reducing, at the same time, the total annual emissions of greenhouse gases by 2%–4% [32].

Overall, the implementation of additional measures to increase the productivity of resources with 30% by 2030 could lead to an increase in GDP by nearly 1%, creating, at the same time, over 2 million jobs in addition to the usual economic scenario [33,34].

A sustainable business is any organization that engages itself in beneficial ways in the life of the society, participates in green or environmentally friendly activities, in order to ensure that all processes, products and manufacturing activities adequately address the current environmental issues and, at the same time, makes a profit. In other words, a sustainable business “meets the needs of the present world, without compromising the ability of future generations to meet their own needs” [35].

A very important initiative of a sustainable business is to eliminate or reduce its negative impact on the environment, which can be caused by harmful chemicals, materials, and waste generated through the manufacturing processes of products and services [36].

The impact of such human activities, as regards the amount of greenhouse gases produced, can be measured in units of carbon dioxide and is referred to as carbon footprint. Sustainable business practices may include the analysis of processes, in order to eliminate or recycle waste, making all products recyclable, as well as the replacing the non-renewable resources by alternative energies.

The European legislative proposals, to which Romania aligned, regarding waste in general, but also waste derived from packaging, establish clear objectives for waste reduction and draw long-term directions for the reintroduction of waste materials in the economic circuit. The key objectives of these proposals include: a common target, at the EU level, for recycling the municipal waste, of 65% by 2030, a common target, at EU level, for packaging waste recycling, of 75%, in the same year.

4. Conclusions and Recommendations

From the results of the survey regarding the attitude towards the environment and adoption of new behavior models and responsible consumption among consumers in Romania, it has been possible to determine the level at which the consumers’ concerns lie toward the effects of the traditional production and consumption of goods in the environment. At the same time, the research has sought to highlight eco-friendly behavior that consumers have, including conservation behavior in daily life. Moreover, the study investigated the attitudes of consumers toward the desirability of business models based on CE.

4.1. Conclusions

The findings of the study will be discussed on the basis of the conceptual scheme presented by the authors in Figure 2. The findings will be discussed point by point.

Point A. Attitude towards the environment and awareness of the traditional (linear) production’s negative effects on the environment and on the finite resources is represented by three items: interests related to the environment, personal attitude towards waste’s sorting and depletion of resources. The findings are presented below.

- 95.71% of the respondents consider that the care for the environment is important or very important for them. Moreover, 52.80% of respondents consider the concern for the environment very important.
- 96.01% of the respondents consider that selective collection of waste is important in order to avoid the exhaustion of natural resources.
- 94.93% of the respondents consider that savings on electricity, oil, natural gas and coal obtained from energy production from waste is important or very important.

As a conclusion related to point A of the conceptual scheme, it is obvious that consumers show positive attitudes concerning the need for caring for the environment and for the finite resources.

Point B. Sustainable consumption practices at present—is represented in the study by the frequency of adopting an eco-friendly activity. The eco-friendly activities considered were: going to the work with a public transport vehicle, going to work by bike, sharing a personal car with colleagues for going to work, separate collection of paper waste, separate collection of plastic waste, separate collection of used cooking oil, leading used batteries to collection centers and leading light bulbs to collection centers.

- 48.93% of the respondents go to work using public transportation frequently or always.
- Only 7.37% of the respondents go to work by bike frequently or always.
- Only 25.92% of the respondents share a personal car with colleagues for going to work.
- Separate collection of paper waste is done on a frequent basis or always by 46.16% of the respondents.
- 46.78% of the respondents declare to separately collecting plastic waste on a frequent basis or always.
- Only 28.68% of the respondents declare to separately collect used cooking oil on a frequent basis or always.
- Only 33.89% of the respondents leading used batteries to special collection centers on a frequent basis or always.
- Only 21.63% of the respondents lead used light bulbs to special collection centers frequently or always.

As a conclusion related to point B of the conceptual scheme, it is observable that the respondents' consumption and recycling behaviors are not as frequent as their positive attitudes concerning the need for caring for the environment and for the finite resources, measured at point A, would theoretically let us expect.

Point C. Attitudes towards sustainable production and towards business models based on products' reuse and recycling (CE business models) is represented by the five items: agreement with selective waste collection as a basis to new goods production, attitude regarding the desirability for the future of a "zero waste" economy, in which all materials and products are (a) reused; (b) recycled, agreement with the proposition: "increase of the efficiency of resources' use represents a mean by which the objectives of the sustainable development (economic, social and environmental ones) can be achieved through: (a) saving; (b) recycling; (c) substitution; (d) use of less resources, agreement with the proposition "business models based on: (a) Reuse; (b) Recycling are beneficial to the economy and agreement with the proposition "business models based on: (a) Reuse; (b) Recycling are beneficial to the environment". The findings are presented below.

- 97.39% of the respondents showed agreement or total agreement with regard to the selective collection of waste, as a basis to product new goods.
- Over three-quarters of respondents agree or totally agree (answers {4} or {5}) that recycling (82.56% of the respondents) and reuse (90.80% of the respondents) are components of a desired "zero waste" economy.
- The share of the respondents who agree or totally agree that the increase of resources' use is a mean to reach the goals of sustainable development are of 86.57%, for the efficiency increase through resources' savings, while 90.85% of the respondents think that the increase in efficiency should be done through recycling, 74.62% of the respondents believe that it should be done through resources' substitution and 73.09% of the respondents think it should be done through using less resources.
- 83.59% of the respondents agree or strongly agree that business models based on reuse are beneficial for the economy. In addition, 87.27% of the respondents agree or strongly agree that business models based on recycling are beneficial for the economy.

- 88.60% of the respondents agree or strongly agree that business models based on reuse are beneficial for the environment. In addition, 90.75% of the respondents agree or strongly agree that business models based on recycling are beneficial for the environment.

As a conclusion to point C of the proposed conceptual scheme, it is observable that the consumers' attitudes regarding CE business models, both for the economy, as for the environment show that these are considered to be very desirable.

Starting from the conclusions to points A, B and C of the proposed conceptual scheme, we will draw a parallel for assessing the probability that Romanian consumers adopt consumption behaviors characteristic to CE business models.

The consumers show high concern about the environment but that does not necessarily imply that they adopt eco-friendly consumption or separate waste collection behaviors.

As a parallel, though the Romanian consumers show attitudes of support for production models characteristics to CE, it is not very probable that the development of CE business models will make consumers adopt new behaviors necessary for the success of these business models.

While the Government establishes ambitious targets in terms of responsibility regarding the promotion of EC, the population does not have information about the role that they should play in it. The majority of respondents are not involved in the promotion of the EC.

The conclusion to point D of the conceptual scheme is that attitudes showing desirability of CE business models do not imply the necessary changes in consumption behaviors.

4.2. Recommendations

Starting from the conclusions of the study presented above, the authors recommend to the authorities to carefully draw up a series of measures for increasing the awareness of the consumers with regard to the effects of their consumption behaviors on the environment and on the economy, with special focus on the new business models proposed by the circular economy.

Moreover, the authorities should define a national strategy on implementation of CE business models, which should also promote a series of benefits and incentives to consumers who adopt new consumption behaviors, which would allow CE business models to become successful.

Government policy cannot be effective without the support and involvement of people, an increased attention should be oriented to motivating the whole society to establish a new culture of the CE.

5. Discussions

The findings of this study have important implications for understanding how the consumers see the CE business models and the probability to adopt new patterns of behavior and responsible consumption.

Respondents from Romania have a high level of awareness regarding environmental care and strongly agree that EC business models are desirable, but that will probably not imply that consumers will make the necessary changes in consumption patterns necessary to make CE business models successful in lack of a series of benefits and incentives. Discussions related to the study's findings could regard the extent to which the sample is representative for the Romanian consumers. Socio-demographic characteristics of the sample have already been discussed.

The sample's volume has also been addressed. The sampling method was based on respondents' accessibility. All these characteristics of the sample have been presented in order to make possible the confrontation of the study's findings, in case of the study's replication on another sample. Still, because the attitudes towards the need for environmental concern in relationship to natural resources' consumption and separate waste collection behaviors are consistent, at national level, with previous studies mentioned within the article, the authors appreciate that there is a high probability that the conclusions of the study are representative for the attitudes and behavior of the Romanian consumers.

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