

# Recommending a Strategy for the Transition Towards Circular Economy Based on the Views of Environmental Students

Evangelia Karasmanaki<sup>1</sup>, Eleni Lympiridou<sup>1</sup>, Konstantinos Bletsas<sup>1</sup>, Achilleas Kontogeorgos<sup>2</sup> and Georgios Tsantopoulos<sup>1</sup>

<sup>1</sup> Department of Forestry and Management of Environment and Natural Resources, Democritus University of Thrace, 193 Pantazidou Street, 68 200 Orestiada, Greece

<sup>2</sup> Department of Agriculture, International Hellenic University, 57001 Thessaloniki, Greece

## Abstract

Circular economy provides a highly promising economic model, which involves, inter alia, using resources efficiently and increasing products' lifetime. The transition towards circular economy requires much dedication and careful establishment of supporting policies. To contribute to this effort, this study investigates the views of undergraduate environmental students on circular economy and proposes a strategy based on respondents' views. It was indicated that even though students were not interested in circular economy jobs, they were highly interested in attending training programs on circular economy bringing forward the need for environmental departments to provide courses on circular economy. Moreover, most students perceived that circular economy can contribute to waste reduction, reduction in waste management cost and lower the environmental footprint of companies. Informing the public about circular economy, allocating funds for R&D and establishing supporting policies were the highest ranked measures to facilitate the transition to circular economy. Certain gaps in students' knowledge about circular economy could be the areas on which curricula and information campaigns should focus.

## Keywords

Circular economy, environmental policy, sustainable development.

## 1. Introduction

The traditional linear economy model follows the strict course of 'supply-production-waste', which, in essence means that products become waste once they reach the end of their useful life. At the same time, population growth and the increased per capita affluence have resulted in higher demand for raw materials leading to the depletion of natural resources [1]. The excessive use of resources that characterizes linear economy does not comply with sustainable development, but most economies are still based on linear economy models.

As population and product demand continue to increase, it is necessary to leverage resources in eco-efficient ways in order to reduce or stabilize resource use. Producers can support this by ensuring that their activities comply with circular resource use on the macro-level. The transition towards circular economy presents a unique opportunity to create competitive advantages on a sustainable basis [2]. The concept of circular economy is often confused with recycling despite the prominent differences between them. In the former, a used product is decomposed so that the constituent raw materials are retrieved to be used in the production of new products whereas in circular economy the product is designed to be remade and reprocessed, and used as a new product [3,4]. This design cuts back on the amount of natural resources because circular economy utilizes the same resources repeatedly and not only once.

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EMAIL: evkarasm@fmenr.duth.gr (A. 1); elenlybe1@fmenr.duth.gr (A. 2); konsble@fmenr.duth.gr (A. 3); akontoge@ihu.gr (A. 4); tsantopo@fmenr.duth.gr (A. 5)

ORCID: 0000-0002-6192-2709 (A. 1); 0000-0002-4186-0379 (A. 4); 0000-0003-0273-3235 (A. 5)



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In order to facilitate the transition towards circular economy and to establish it as the new economy model, it is necessary to develop strategies that will facilitate the implementation of circular economy. To that end, it is meaningful to examine the current understanding of circular economy as this will point to areas where policy efforts need to be directed. As circular economy seems to be a key component of a sustainable future, it is meaningful to investigate the views of younger consumers on circular economy because as future consumers they can support the transition to circular economy. Hence, this study aims to propose a strategy to facilitate the transition to circular economy by investigating the views of environmental students on circular economy.

## **2. Methodology**

In order to achieve the aim of this study, a questionnaire consisting of 22 closed-ended items was designed and in this paper a part of this wider research is presented. Respondents were the students majoring in the Department of Forestry and Management of the Environment and Natural Resources, at the Democritus University of Thrace in Greece. All items took into account the findings of previous research works and were specifically designed to examine students' attitudes to circular economy-related topics. To ensure that the questionnaire would be effective, it was pilot tested on a limited scale leading to a few minor changes. In total, the questionnaire was filled in by 160 undergraduate students. The sampling method was the multistage sampling, and the collected data were scrutinized using the Statistical Package for the Social Sciences (SPSS). To analyze the data and draw meaningful conclusions, different statistical tests were performed including the non-parametric Friedman test.

### **2.1. Results**

The sample involved 160 environmental students and female respondents (53.1%) slightly outnumbered their male counterparts. Students' family background was examined in terms of occupation and education level. Regarding the year of study, first-year students presented the lowest participation, while the third (28.8%) and fifth (28.8%) years of study were higher represented in the sample. Significant shares of students' fathers were public employees (33.1%) and free lancers (25%) while most students' mothers were public employees (23.1%), private employees (18.8%) or were housekeepers without being engaged in paid work (21.9%). As for their education level, considerable shares of students' fathers were high school graduates (37.1%) and university graduates (33.1%) whereas most students' mothers were university graduates (45.6%).

#### **2.1.1. Respondents' views on circular economy**

First, students' general views on circular economy were examined. It was shown that the majority of respondents were not interested in working in areas of circular economy or circular economy practices in the future. Despite this low interest, the majority of students (63.8%) expressed their interest in participating in educational programs and trainings on circular economy. In addition, most respondents (61.3%) perceived that circular economy can be a solution for the efficient use of resources whereas an appreciable share (35%) disagreed with this statement. A division of opinion within respondents was also observed for the effect of circular economy on the economy of the country. In specific, 46.3% perceived that circular economy can have a positive economic impact whereas 45.6% expressed their uncertainty on this effect.

#### **2.1.2. Respondents' views on the advantages and implementation measures of circular economy**

Respondents were asked to evaluate the advantages of transitioning towards circular economy. The non-parametric Friedman test was conducted to evaluate differences among students' evaluations. In Table 1, it can be seen that the reduction of waste/decongestion of landfills (mean rank 4.86) and

reduction in waste management costs (mean rank 4.38) received the highest rankings whereas the increased product value received the lowest ranking (mean rank 3.09).

**Table 1**  
Results of the Friedman test for the advantages of circular economy

|  | Mean rank |
|--|-----------|
| Reduced consumption of natural resources                                   | 3.94      |
| Creation of new job positions  | 3.83      |
| Increase in product value  | 3.09      |
| Reduction in the environmental footprint of businesses                     | 4.13      |
| Enhanced competition among businesses implementing circular economy models | 3.77      |
| Reduction in waste management costs  | 4.38      |
| Reduced waste volume/landfill decongestion                                 | 4.86      |
| <i>N=160 Chi-Square=99.784 df=6 p&lt;0.001</i>                             |           |

Respondents were then asked to assess various measures which, if implemented, can induce businesses to adopt circular economy. The non-parametric Friedman test was performed to detect differences among responses and as shown in Table 2, the information of the public about circular economy and its benefits (mean rank 2.85) emerged as the most important measure followed by funding for research and development (R&D) on circular economy (mean rank 2.60). The application of tax exemptions for businesses that adopt circular economy was the lowest ranked measure.

**Table 2**  
Results of the Friedman test for measures to increase the adoption of circular economy by businesses

|  | Mean rank |
|--|-----------|
| Tax exemptions for businesses that adopt circular economy                          | 2.17      |
| Establishment of legislation that supports the transition towards circular economy | 2.38      |
| Funding research and development (R&D) for the development of circular economy     | 2.60      |
| Public information of circular economy and its advantages                          | 2.85      |
| <i>N=160 Chi-Square=47.803 df=3 p&lt;0.001</i>                                     |           |

### 2.1.3. Respondents' purchase criteria, environmental behavior and choice of information sources

Respondents' buying criteria were also examined and the Friedman test was conducted to assess differences among criteria. As shown in Table 3, the quality (mean rank 5.14) was the most important criterion in purchasing products. The second most important criterion was resilience (mean rank 4.79) and the third was price (mean rank 4.58). Conversely, the least important criterion was the environmental policy followed by the company that manufactured the products (mean rank 3.08).

**Table 3**

Results of the Friedman test for buying criteria

|  | Mean rank |
|--|-----------|
| Price  | 4.58      |
| Brand  | 3.24      |
| Quality  | 5.14      |
| Resilience   | 4.79      |
| Repairability  | 3.75      |
| Free repair service in case of damage                                      | 3.42      |
| Environmental policy followed by the company that manufactures the product | 3.08      |

*N=160 Chi-Square=188.117 df=6 p<0.001*

Next, respondents' environmental habits were investigated with the application of the non-parametric Friedman test. As shown in Table 4, the use of reusable grocery bags (mean rank 6.38) followed by recycling paper (mean rank 6.30) and recycling plastic packaging (mean rank 6.26) were the practices that students mostly follow in their daily life. However, repurposing old things (mean rank 4.61) was the least followed daily practice.

**Table 4**

Results of the Friedman test for respondents' environmental habits

|  | Mean rank |
|--|-----------|
| Repairing home appliances                      | 4.93      |
| Repurposing old things                         | 4.61      |
| Extending the useful life of products          | 4.98      |
| Recycling glass packaging                      | 5.74      |
| Recycling metal packaging                      | 5.88      |
| Recycling plastic packaging                    | 6.26      |
| Recycling paper                                | 6.30      |
| Reusing packages                               | 5.24      |
| Using reusable grocery bags at the supermarket | 6.38      |
| Avoid using single-use materials               | 4.68      |

*N=160 Chi-Square=98.535 df=9 p<0.001*

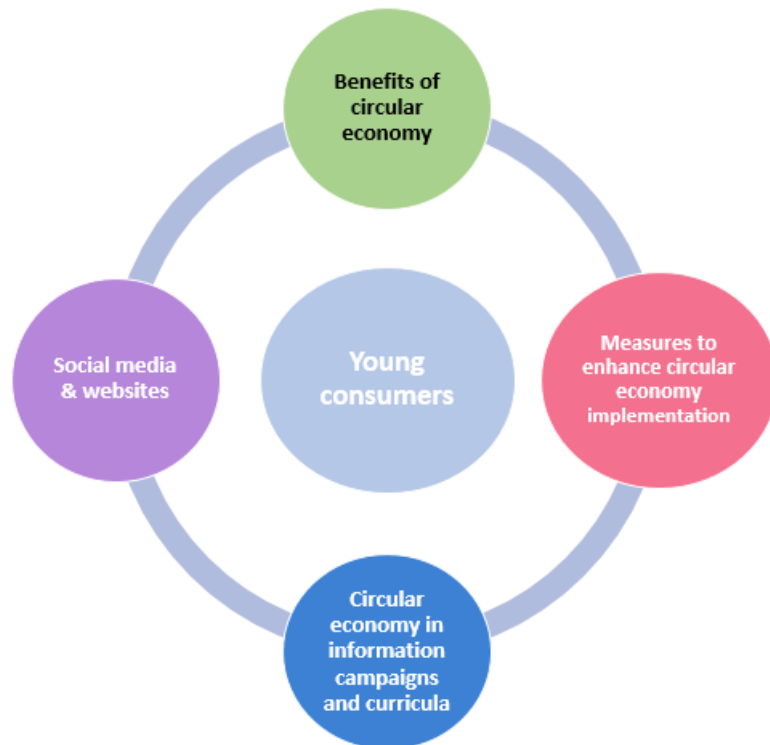
Finally, the information sources that students use for their daily information were examined. According to Table 5, respondents used mostly social media (mean rank 6.76) and websites (mean rank 5.99) to obtain information on a daily basis. Digital media were preferred over printed media such as local and national newspapers which received the lowest ratings (mean ranks of 3.18 and 3.35, respectively).

**Table 5**  
Results of the Friedman test for information sources

|   | <b>Mean rank</b> |
|---|------------------|
| Family and friends                              | 5.96             |
| National television and radio networks          | 4.71             |
| Local television and radio networks             | 4.08             |
| National newspapers                             | 3.35             |
| Local newspapers                                | 3.18             |
| News websites                                   | 5.88             |
| Websites of special interest                    | 5.99             |
| Social media                                    | 6.76             |
| Scientific publications                         | 5.09             |
| <i>N=160 Chi-Square=188.117 df=6 p&lt;0.001</i> |                  |

### 3. Conclusions

This study sought to examine the views of environmental students in order to propose an effective strategy for facilitating the transition to circular economy. Our results showed that even though students were reluctant to pursue a career in circular economy, they expressed a high interest in learning about circular economy through attending training programs. Students, however, had a good grasp of the advantages flowing from circular economy as they recognized its potential to contribute to the reduction of waste, to decongest landfills, to decrease the growing waste management costs and to lower the environmental footprint of companies. Information perhaps in the form of information campaigns would be effective in inducing companies to adopt circular economy. Moreover, since respondents use mostly websites and social media for their daily information, it is recommended to use the Internet in order to effectively disseminate information on circular economy. As the Internet offers an enhanced form of communication, it could help citizens, particularly younger ones, to become more involved and knowledgeable about circular economy. This study has also brought to surface areas on which information should focus; information should focus on the ability of circular economy models to create new jobs, to increase the competition among businesses implementing circular economy models and to increase product value.



**Figure 1.** The proposed strategy to ensure the implementation of circular economy.

Figure 1 presents the proposed strategy for enhancing the implementation of circular economy especially in cases that the target groups are of younger age. It can be seen that the strategy proposes that the effort to enhance circular economy must be a continuous and repeated process. In this process, the benefits of circular economy must be recognized and then proper measures facilitating the implementation of a circular economy model must be put into force. Organizing information campaigns and disseminating relevant information through the Internet are the steps that complement this strategy. The steps must be repeated so that the implementation of circular economy can be ensured in the long run.

#### 4. References

- [1] E. Fytopoulou, S. Tampakis, S. Galatsidas, E. Karasmanaki, G. Tsantopoulos, The role of events in local development: An analysis of residents' perspectives and visitor satisfaction, *Journal of Rural Studies*, 82 (2021) 54–63. doi: 10.1016/j.jrurstud.2021.01.018.
- [2] J. Kirchherr, D. Reike, M. Hekkert, Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, 127 (2017) 221-232. doi: 10.1016/j.resconrec.2017.09.005.
- [3] M. Geissdoerfer, P. Savaget, N.M. Bocken, E.J. Hultink, The Circular Economy—A new sustainability paradigm?. *Journal of cleaner production*, 143 (2017) 757-768. doi:10.1016/j.jclepro.2016.12.048.
- [4] J. Korhonen, A. Honkasalo, J. Seppälä, Circular economy: the concept and its limitations. *Ecological economics* 143 (2018) 37-46. doi:10.1016/j.ecolecon.2017.06.041.