EASTERN EUROPEAN JOURNAL OF TRANSNATIONAL RELATIONS

Developing Circular Economy in Belarus: Barriers and Challenges

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Abstract. The purpose of this research is to better understand the obstacles and limits that Belarus faces in moving to a circular economy (CE). Three separate studies were used to achieve these goals. In the first study, a research-based questionnaire was created to collect data on the business operations of Belarusian enterprises and their use of circular business models. In the second study, we used an interview-based assessment of the Belarusian economy's circularity. In the final section, we used the analytic hierarchy process (AHP) method to analyze the impediments to the circular economy in the Republic of Belarus. The overall findings of this three-part study indicate that businesses are interested in and working to adopt various CE activities like waste management, resource efficiency, cost savings, and carbon emissions. However, Belarus lacks planning possibilities and CE-related initiatives due to a lack of consistent legal standards or frameworks. This is one of the earliest CE-focused

Citation: Adamchyk, P., Dessoulavy-Śliwiński, B., Ashraf, R.U., & Bronowska, M. (2023). Developing Circular Economy in Belarus: Barriers and Challenges. *Eastern European Journal of Transnational Relations*, *7*(2), 91-104.
https://doi.org/10.15290/eejtr.2023.07.02.09

Academic Editor: Andrzej Jackiewicz

Publisher's Note:

studies on Belarus, focusing on the country and giving policy recommendations for the country's transition to a CE.

Keywords: Circular Economy, Sustainability, Business Models, Barriers, Belarus.

JEL Classification: D20, D40, H10, H30.

INTRODUCTION

The purpose of this research is to investigate the theoretical elements of the circular economy while taking into account the challenges, opportunities, and barriers to adoption in the Republic of Belarus. The circular economy is a rising social phenomenon that has piqued the interest of researchers and academics, but the number of studies on implementation attempts remains insufficient (Merli et al., 2018). The primary goal is to obtain an understanding of how businesses approach various parts of the circular economy concept. Because the interviewee's opinion is subjective, it only provides preliminary information about the many components of circular economy concepts in Belarusian enterprises and the country itself (Murray et al., 2017).

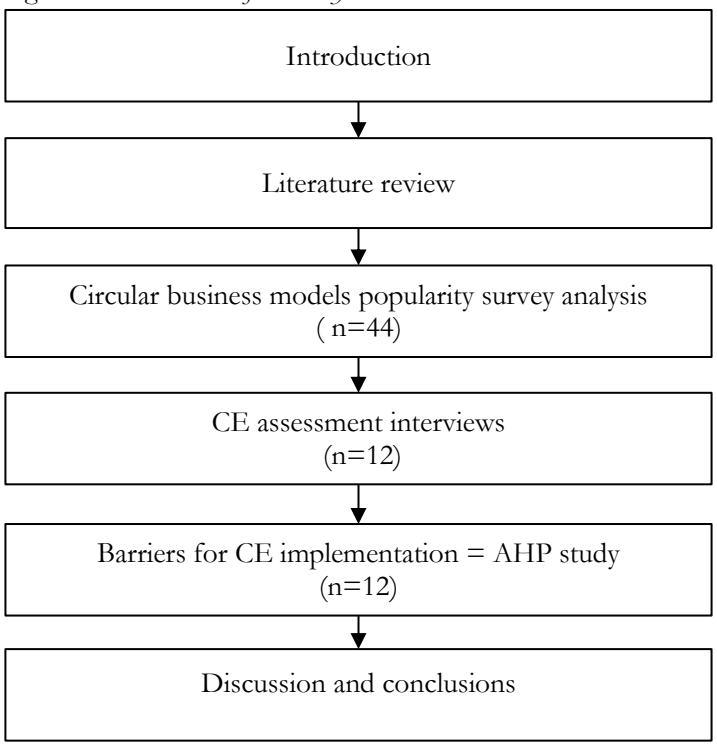
The study is based on Belarusian businesses that produce ferrous metallurgy, robotics, plastic waste recycling, chemical manufacturing, meat processing factories, and software. The study looks at chances to promote Belarus' growth in the circular economy as well as difficulties with it. What is the current state of the circular economy in Belarus? is the key research question posed in this paper.

Since the study is primarily explanatory and requires an understanding of the circular economy, its environment, and business models, various methods were used to answer the research questions. The empirical part of the research consists of qualitative research methods such as the survey, structured interviews, and the AHP method for data analysis.

The researchers conducted a total of twelve interviews with individuals from various organizations, including industrial enterprises, IT companies, the chemical industry, and environmental organizations, lasting between 35 and 100 minutes. The respondents' information is useful for the research, and it is crucial to answer the aforementioned research questions in light of their varied experiences. Additionally, it allowed us to view the implementation process from various angles.

This study was divided into four parts. The thesis introduces the basis of the topic, discusses the needs in the field, and increases knowledge about the topic being studied. In addition, it states the objectives of the study. The second part presents a comparative analysis of the circular economy with the help of a literature review. The third chapter presents the data collected and the results of this research. The last chapter covers the conclusions and limitations of this study.

Figure 1. The structure of the study



Note. Source: own elaboration.

LITERATURE REVIEW

There is a plethora of research on the circular economy and its impact on developing countries. Up until now, the majority of the CE's implementation in low- and middle-income countries (LMICs) has been done so informally. The main driving forces behind it are unemployment and poverty, which involve tasks like recycling, repair, and reuse. The use of renewable technology and materials, remanufacturing, product sharing, enhanced accountability and knowledge among producers and consumers, and the adoption of suitable regulations and tools are therefore among the numerous potentials for cleaner production that have been lost. Furthermore, as LMICs are dealing with an increasing waste dilemma, which has serious ramifications for environmental and health outcomes, the CE may also help with the demands of industry and anti-urbanization. (Wright et al., 2019).

It is underlined that to assist the shift to a more circular economy, national and local governments of LMICs should collaborate to create standards and implement engagement and awareness campaigns. By adopting better recycling practices and properly sorting waste into recycling and compost bins, people, acting as stakeholders, may have an impact on the circular economy. (Halog & Anieke 2021; EEA, 2013).

Another author claims in his study that the biggest obstacles are not understanding the government's sources of assistance and the fact that laws take time to adapt to the needs of society (Bet et al., 2018).

At the same time, we must not forget that we will not be able to build a circular economy through financing alone. Additionally, it is not feasible to duplicate an entire circular economy system from another nation and hope for the best, although there are numerous instances of successful national adoptions of the circular economy concept worldwide. As a result, putting the circular economy idea into practice shouldn't just depend on waiting for government laws, initiatives, and subsidies. Businesses and individuals ought to launch and advocate their own CE initiatives (Grdic et al., 2020).

The inquiry's findings indicate that to encourage Belarus to make the shift to a circular economy, financial incentives should be offered, current legislation should be examined, and a specific support program should be created. The prevailing view among several stakeholders is that the process of transition cannot proceed if Belarus's political agenda does not incorporate the circular economy (Batova et. al., 2021; Shimova, 2019; Tochitskaya et al., 2020).

Funding and state legislative support are important factors, especially in the early stages of development. "Belarus has established a regulatory legal framework in the field of waste management. However, the lack of modern and effective processing technologies and a decrease in the quality of products when using secondary raw materials are the reasons for the lack of investment in this area in the Republic of Belarus" (Mikhalenko et al., 2020; EEA, 2013).

The authors say that the high importance of economic barriers (economic inefficiency, lack of resources for orienting the production process to the use of secondary raw materials and the creation of a collection and processing system) is due to low prices for primary materials and high investment costs for the introduction of circular business models. This made sense to us, so we read their work. This indicates the need to develop new economic instruments and mechanisms to stimulate the use of secondary raw materials" (Batova et al., 2019).

Nevertheless, it is not necessary to say that there is no circular economy in Belarus at all. The circular economy is developing in an ad hoc and non-systematic manner in Belarus. The circular initiatives have not yet been debated at the legislative level, even though some programs are being carried out in different places. The National Plan for the Development of a Green Economy, the National Strategy on the Management of Solid Municipal and Secondary Resources in the Republic of Belarus for the Period until 2035, and the Resolution of the Council of Ministers of Belarus about phasing out the use of polymer packaging are just a few of the initiatives the nation is already implementing when taking into account these projects under the EU Action Plan. (Zenchanka et al., 2020; MER, 2020; CMR, 2017).

Taking into account findings based on the above literature research, we can say that the development of a circular economy is not possible without developing financing programs, regulations, or education sectors (Sohal et al., 2022). Each country has its own way of implementing CE concepts through the engagement of different stakeholders (Salvioni & Almici, 2020). Despite the absence of specific legislation on the circular economy, Belarus has created a regulatory legal framework in the field of waste management (CMR, 2017).

However, we can see the lack of digital and network platforms and the absence of NGOs or wider educational initiatives. This slows down the development of the circular economy in Belarus. In summary, in Belarus, it is necessary to create a single document (roadmap) on the circular economy, which will indicate the state policy, goals, objectives, stages of development, and methods of introducing this phenomenon into society. In this way, the circulation of resources and circular business models within the economy will allow the state to avoid serious dependence on imports, bring added value, and reduce the economic and environmental consequences.

THE CURRENT STATE OF CIRCULAR ECONOMY IN BELARUS: SURVEY ANALYSIS

Understanding the nature and state of the ongoing transition to a CE is essential for developing more effective regulation and business strategies. Various studies and methodologies can be used to better understand the nation's circular economy.

The main objectives of this survey were as follows:

- assessing the degree of involvement in the circular economy among surveyed companies,
- identifying the use of circular models in the operation of companies.

Methods for Survey Analysis

In the following section, we have used the concept from the research on the sustainability of Romanian Small and Medium-Sized Enterprises (SMEs) (Oncioiu et al., 2018). After identifying businesses from selected industries, contact was made with their representatives to determine who should be interviewed, obtain an agreement to participate in the survey, and establish the details of the meeting. The survey questionnaire was designed according to four objectives:

- activities related to the circular economy carried out.
- sources of funding used for these activities.
- participation in the acquisition of skills related to resource efficiency,
- environmental innovation, and circular economy.

In the first phase, the survey was sent to more than 300 different companies from all spheres of the economy, from large industrial firms to small organizations. A chosen sample (based on a web search) received this survey by email and it was in the Russian language. There were forty-four completed and returned surveys in all. The polls were carried out between May 12, 2021, and June 4, 2021.

Survey Analysis Results

Below are the results of the survey for the first general part of the course.

Table 1. Survey Metrics

Number	Questions	Percentage of responses
1	Number of Employees	-
	0–9 people (micro-enterprises)	13. 6%
	10–49 people (small enterprises)	13. 6%
	50–249 people (medium enterprises)	20. 5%
	> 250 people (large enterprises)	52. 3%
2	What position do you hold or have held in your last workplace?	-
	Top manager	22. 7%
	Middle manager (head of the department)	31. 8%
	Specialist	43. 2%
	Worker	2.3 %
3	The company's field of activity?	-
	Agriculture, forestry, and fishing	2. 3%
	Industry	36. 4%
	Construction	6. 8%

Number	Questions	Percentage of responses
	Trade	15. 9%
	Hotels and restaurants	4. 5%
	Transport	2. 3%
	IT	13. 6%
	Other	18. 2%
4	How many years of operation	-
	5-9 years	15. 9%
	9-14 years	18. 2%
	>15 years	65. 9%

Note. Source: own elaboration (n=44).

As can be seen from the table above, most of the subjects were from large companies in the industrial and commercial industries. It should also be pointed out that the vast majority of respondents (65.9%) have more than 15 years of experience, indicating the depth of their experience and knowledge. Then there were more specific questions about the circular economy.

Table 2. Survey results heatmap - activities related to the CE

	YES, have been realized	YES, they are underway	No, but they are included in future strategies	They are not included in future strategies	I do not know
Strengthening consumer guarantees for online purchasing of goods					
Intelligent and ecological product design and energy labeling					
Use of advanced manufacturing facilities that generate clean production					
Application of innovative techniques for the use of secondary/alternative raw materials					
Turning waste into energy or recycling biowaste into organic fertilizers					
Preventing waste generation, stimulating recycling, and reducing resource use					
Reuse of wastewater safely					

		YES, have been realized	YES, they are underway	No, but they are included in future strategies	They are not included in future strategies	I do not know
	Use of energy from renewable sources					
	Frequency < 20%					
	20 ⩽ Frequency < 40					
	40 ⩽ Frequency < 60					

Note. Source: own elaboration based on Oncioiu et al. (2018) (n=44).

Survey Result Discussion

Concluding the results of the survey, we can conclude that Belarusian companies are familiar with the circular economy concept. Regarding the question about "preventing waste generation, stimulating recycling, and reducing resource use," 27.9% of respondents said that it was implemented 27.9% said that it was in the process of implementation, while only 18.6% said that it was not implemented and not included in future strategies. On the other hand, when asked about the "use of energy from renewable sources", only 9.3% of respondents said that it was implemented, while 41.9% said that it was not and was not expected. It should also be noted that the survey is not a fully reliable source of information since many respondents did not answer the questions objectively because of political pressure (Shchyrakova & Merkis, 2021). To more objectively assess the situation with the circular economy in Belarus, direct interviews were performed.

THE CURRENT STATE OF CIRCULAR ECONOMY IN BELARUS - DIRECT INTERVIEWS

There is a clear research gap in the study of circular business models. In the previous section, we have classified and assessed the frequency of application of various business models in Belarusian enterprises. By using the technique of in-depth interviews, Belarusian entrepreneurs helped to verify the study's findings. The main assumption of the interviews was to obtain a general picture of both the circular economy in Belarus as well as the barriers and problems related to its functioning and implementation.

Methods for Direct Interviews

To evaluate the implementation of CE principles in Belarussian companies, the methodology from Kurkela's (2020) study was implemented. This part of the paper presents the responses from the top-level and middle managers of Belarussian companies. The initial requirements for the selection of respondents were that (1) they use any of the CE concepts actively in their business operations and (2) they have international business activities; for example, they are selling products outside Belarus. The companies were selected by looking for sections and information on sustainability and the circular economy on their websites.

The study was not limited to a specific industry, and 300 companies from different branches were contacted via email. In total, 12 interviews were conducted from May 4, 2021, to June 6, 2021. A total of nine open questions were asked, of which one was metric (position of the respondent) and one was selection (understanding of the CE concept). The other seven questions are summarized below.

Direct Interviews Summary and Discussion

The respondents were selected through convenience sampling (n=12) and came from different fields and positions for this survey.

Most of the respondents have a moderately poor understanding of the circular economy. However after a brief description, they were able to give different concepts of the circular economy present in Belarus and even for the world economy as a whole, with basic conceptual knowledge. One respondent, a manager at a recycling company, for example, commented, that the idea of CE is that the waste would be reused, over and over again, and not get rid of them by throwing them into a landfill. Almost all respondents had diverse viewpoints on company models and circular economy ideas.

All respondents were unanimous in the opinion that the circular economy is poorly developed. First of all, the lack of understanding of the role of CE by the nation (for example, sorting waste) negatively affects environmental issues.

According to one of the participants, in the last ten years, Belarussian companies have begun to collect more secondary raw materials, but it is difficult to discuss the motive to sort waste in the private sector until the state offers the population incentives - e.g. return the bottle and receive twenty cents, as in Germany.

Furthermore, economic sustainability is a significant impediment. According to one participant, Belarus is too poor to build a circular economy, and many businesses must take out loans to maintain the traditional production-sale cycle. Respondents usually view the possibilities for the development of the circular economy in the Republic of Belarus negatively, citing excessive bureaucracy, economic difficulties, and society's unwillingness to make these changes. However, one person noted that it all depends on the kind of an assistance program, otherwise, only the high raw material prices in international markets can shift the economy to a more circular path.

The majority of participants agreed that internal variables such as state incentives and national preparation influence the spread of this legal regulation. External prices are the prices of goods sold in other countries as well as the cost of raw materials on the global market. According to one expert, internal factors include the influence of authorities, the availability of specialists in these fields, and, last but not least, the speed with which people's attitudes toward waste disposal will change; external factors include the variety of funds and raw material prices on the global market.

Managers are concerned with the insufficiently stimulating aspects of the processing and reprocessing of resources, the reduction of subsidies, and the low culture of the people in this field. One of the experts recognized three key problems and potential for the circular economy in the Republic of Belarus: the first issue is a weak legislative foundation and the role of the state in project financing; the second factor is a suitably low degree of culture in the people and manufacturing industry; and the third is that subsidies for renewable reserves are being reduced since the state cannot afford to support this activity.

Secondary resources, in general, are thought to be less expensive than processing ores in their original form. As one expert noted, this increases the life of the product as the same raw materials and income are taken from one raw material many times. However, it will require either good preferences, bonuses, or large investment expenses to plan and build production, particularly in the first years of operation, after which it will be able to profit from this environment after a few years.

Regarding the availability of modern technologies, the respondents answered that even today there is enough technology. They are modern technologies in almost all areas of the economy. Still, it is necessary to improve some of the factors like the percentage of extraction, the number of times processed raw materials are, etc.

Respondents have many comments and ideas for improving Belarus's circular economy. One of the respondents has proposed a potential plan to promote their thoughts, containing five steps:

1) Work with the people to strengthen their culture of circular economy and ecological attitudes in general, in other words, to raise people's awareness of resource reuse.

2) Working with bureaucracy to reduce the number of constant checks and permits required to establish a business and to form organizations comprised of the brightest scientists, businessmen, and authorities who will address commercial problems rapidly rather than waiting months for approval of any conclusion.
3) The establishment of a special coefficient system, allowances for firms that fulfill the rules for the collection of separated waste, and a penalty system if these conditions are not met.
4) Scientific work. Encouraging research institutions to research and develop viable solutions for the country based on secondary raw resources.
5) Establishing a relationship between business and science. This, together with the previous stages, will enable the company to leverage potential technologies and advancements and, in the future, produce a new product that is offered both in the country and abroad.

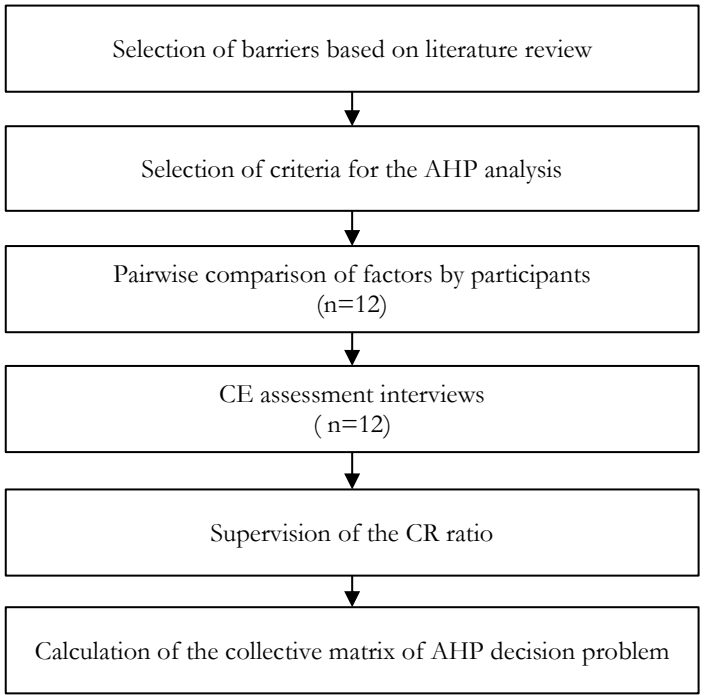
THE CURRENT STATE OF CIRCULAR ECONOMY IN BELARUS – AHP ANALYSIS

The purpose of the last component of this study was to analyze barriers to the development of the circular economy in Belarus using the AHP method (Saaty, 1988). Due to the holistic nature of the CE concept, it loses development opportunities if specific practices or factors are subject to restrictions. Therefore, in the study, we made a preliminary analysis of barriers to CE implementation in Belarus.

AHP Analysis Method

We used Thomas L. Saaty's AHP method, which he developed in the 1970s, to analyze the obstacles to the growth of the circular economy. AHP is the original and, at the same time, the best-known method of decision-making and preference verification, benefiting from the areas of mathematics and psychology as well as quantitative and qualitative methods. It can be applied to the solution of complex, multi-criteria decision-making problems.

Figure 2. The structure of the AHP analysis (Study 3)



Note. Source: own elaboration.

In the AHP method, the weights of the index components are generated by comparing selected factors in pairs by experts. To ensure the accuracy of the survey, twelve experts who participated in in-depth interviews were asked to identify the main barriers to the development of the circular economy in Belarus. Based on the results of the interviews and the selection based on the literature review (Garza-Reyes et al., 2018) five main barriers to development have been identified and included in the study.

Table 3. Main barriers to CE

Barrier	Description
Financial	Includes difficulties in stakeholder access to investment capital, and the need to incur higher operational costs (e.g. the more expensive process of obtaining recycled materials) causing lower profits.
Institutional	No incentives created by government and public institutions and governance for the development of the circular economy or incentives supporting the linear economy. Lack of CE-supporting innovation and sustainability policy. Competition legislation inhibits collaboration between companies
Infrastructural	Limited possibility to link circular business models and lack of supportive infrastructures (e.g. information systems, marketplaces of recycled materials, recycling, and logistics facilities). The exchange of materials is limited by the capacity of reverse logistics.
Social	Lack of awareness among the people and organizations, defense mechanisms from existing social and business structures.
Technological	Limited attention to the end-of-life phase in current product designs. Rooting of the linear technologies in the business practice, limited availability and low quality of recycled materials, lack of or limited access to the circular technologies and expertise/experts to implement new circular business models.

Note. Source: own elaboration based on Garza-Reyes et.al. (2018).

Each expert compared pairs of factors, indicating an individual preference for each pair on a scale from 1 (equal preference for both factors) to 9 (strong preference for one of the factors).

Table 4. Importance of values

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one over another
5	Strong important	Experience and judgment strongly favor one over another
7	Very strong importance	Activity is strongly favored and its dominance is demonstrated in practice

Intensity of Importance	Definition	Explanation
9	Absolute importance	The importance of one over another affirmed on the highest possible
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When compromise is needed

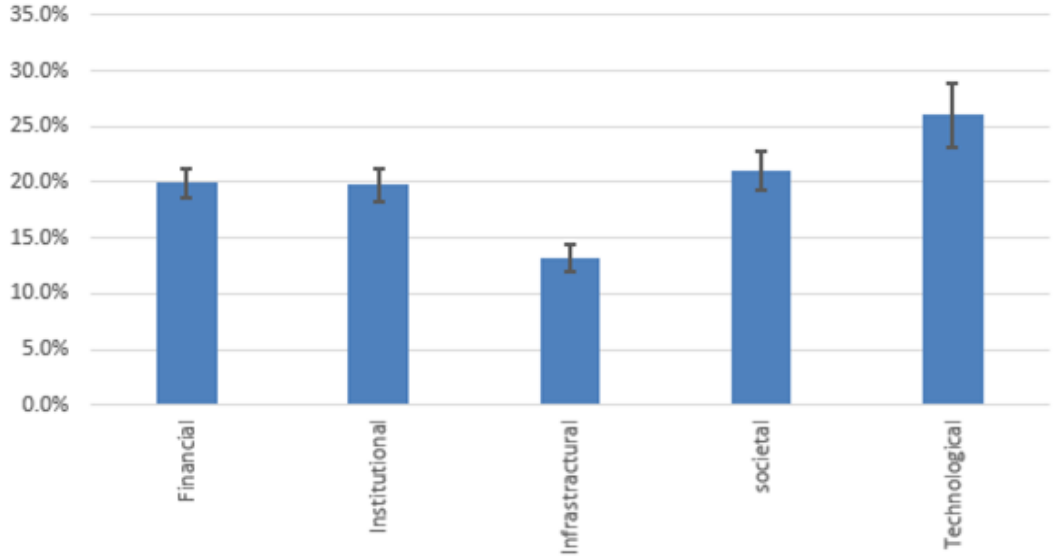
Note. Source: Saaty (1988).

Table 5. Analytic hierarchy process matrix

Matrix		Financial	Institutional	Infrastructural	Societal	Technological	Normalized principal Eigenvector
		1	2	3	4	5	%
Financial	**1**	1	1	1 1/2	1	5/7	19.93
Institutional	**2**	1	1	1 1/3	1	5/6	19.75
Infrastructural	**3**	2/3	3/4	1	2/3	4/9	13.19
Societal	**4**	1	1	1 5/9	1	1	21.06
Technological	**5**	1 2/5	1 1/5	2 1/4	1	1	26.07

Note. Source: own elaboration using AHP Excel template from Goepel (2018).

Figure 3. Overall scoring of barriers



Note. Source: own elaboration using AHP Excel template from Goepel (2018).

General Discussion: AHP analysis

The results of the AHP analysis are in part consistent with the opinions expressed in the interviews. One of the most important barriers is the rooting of traditional, linear technologies in the economy and business practices. Perhaps this aspect is overestimated, due to the significant share of people with a technical background in the survey (9 out of 12 respondents), but it is nevertheless a most significant barrier. The least significant barrier is the infrastructural one, its lower importance may at the same time express opinions about the possibility of a relatively simple organization of mechanisms to support the circular economy. On the other hand, during the interviews, respondents often pointed out the social barriers, which is very important in their opinion, because Belarusians are not quite ready mentally for the circular economy, and working with society is a top priority. Financial and institutional barriers were also of great importance, many respondents indicated that without working in these two areas, working only with society and technology is meaningless. The companies still need financial support to build new business models as well as clear and transparent legal regulations. However, it is noteworthy that the group of respondents has a relatively low consensus ratio (CR=49%). This may mean that the respondents are not fully able to identify the barriers to the development of the circular economy due to its underdevelopment in Belarus. The survey thus confirms the low awareness of the problem and possible ways to implement CE practices in the Belarusian economy.

CONCLUSION

The circular economy is a growing phenomenon worldwide, attracting considerable attention from researchers and academia, but there is a shortage of research on the redesign of CEE economies towards better sustainability. The topic of this paper is the circular economy in the Republic of Belarus, with a particular focus on initiatives already taken and barriers to implementation. The study was conducted on the Belarusian international companies involved in manufacturing, robotics fabrication, production of plastic waste recycling, meat processing plants, ferrous metallurgy, and software engineering.

The main reason for the slow development of the circular economy in Belarus are technological barriers and the low engagement of different stakeholders in the building of the circular economy. The results of the study suggest that the most productive way for the creation will be establishing independent associations or NGOs, which would include specialists from different circles: scientists and researchers, officials, businessmen, and just interested people who could promote this direction both in the regulatory and legal regulation and the direct functioning of the enterprise and in society. In addition, it is necessary to work to minimize bureaucracy and implement economic incentives for people and companies to engage in CE projects. The survey results are quite consistent with the literature review.

From the interviews conducted, we can conclude that Belarusian companies are mostly interested in resource efficiency and cost savings. Environmental and image benefits are also recognized as competitive factors. The lack of a common legal regulation of the circular economy does not provide planning opportunities and increases the risk of failure for pro-environmental and CE-related initiatives. The respondents highlighted a decrease in the number of tax breaks and subsidies due to the economic situation, the lack of cooperation within the triple helix (business-academia-government) and quadruple helix (business-academia-government-society), as well as low social attention to the development of a more sustainable economy.

To become more CE-oriented, a coherent state plan must be developed, including a roadmap to a circular economy with particular goals, targets, KPIs, and indicators for the growth of circularity in society. Without such a strategy, the current linear form of the economy will be maintained, as will an increase in the use of raw materials (rather than recycling), as well as the removal of hurdles to circular economy development.

LIMITATIONS

The study's authors would like to emphasize the difficulties in obtaining data, such as the difficulty in obtaining company representatives and the need to ensure respondents' anonymity (during interviews and surveys, there was an agreement not to disclose the identity of respondents and the companies they represented). Nonetheless, an attempt was made to provide the chance to establish broad conclusions and postulate for further research on the development of the circular economy in the Republic of Belarus.

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APPENDIX

Questions Annexure-1

Q1	What position do you hold or hold in your company?
Q2	What do you know about the circular economy, concepts, and business models?
Q3	How do you assess the economy of circulation in the Republic of Belarus?
Q4	In which areas do you think the circular economy will develop faster and in which more slowly?
Q5	What external and internal factors will influence the development of the circular economy?
Q6	What are the opportunities and challenges for Belarusian enterprises that apply circular economy?
Q7	How does profit work in a circular economy?
Q8	Do modern technologies allow you to invest in the circular economy and at the same time reap the benefits and profit?
Q9	What do you think should be done to improve the circular economy in the Republic of Belarus?