

CIRCULAR ECONOMY IN BELARUS: VISION AND PROSPECTS (SURVEY RESULTS)¹

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ABSTRACT

The circular economy is considered as one of the most important priorities in the National Strategy for Sustainable Development of the Republic of Belarus until 2035. This opens new opportunities for increasing the competitiveness of traditional sectors of the economy and preserving a favourable environment as well as actualizing the issue of the readiness of the Belarusian business for circular transformation.

The purpose of the study is to explore how Belarusian enterprises assess the possibilities of this transition, as well as to identify the barriers and drivers for the development of a circular economy in the Republic of Belarus.

The information base of the study consists in theoretical and methodological scientific research by domestic and foreign scientists devoted to the circular economy, regulatory and information materials of ministries and departments, as well as information from official sites and other Internet sources.

The article presents the results of a series of surveys of Belarusian business conducted in the 2019-2021 period. The first survey dealt with the issues of waste management in the industry, construction, and trade in Belarus (the first quarter of 2019). The second one was designed to determine the level of understanding of the circular economy concept by Belarusian business. It used diagnostic interviews processed in the software product *rep: grid get things straight* by Dr. Rosenberger (2020). The third survey studied the possibilities of circular transformation in Belarus (2020-2021).

The results of the study show that the circular economy concept has not found widespread application in Belarus, but there are already promising examples of the implementation of circular business models in the country. Representatives of the traditional (linear) business model intend to involve secondary resources in the production process in certain production areas. Enterprises with the elements of a closed cycle focus on the full and efficient use of resources and aim at increasing profits, including through the introduction of circular innovations in any production processes.

Keywords: circular economy, circular business models, barriers, Belarus, survey.

În Strategia Națională pentru Dezvoltare Durabilă a Republicii Belarus până în anul 2035, economia circulară este considerată drept una dintre cele mai importante priorități, ceea ce deschide noi oportunități pentru creșterea competitivității sectoarelor tradiționale ale economiei și menținerea mediului înconjurător favorabil, precum și actualizează pregătirea afacerilor din Belarus pentru transformarea circulară.

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Scopul lucrării prezintă cercetarea modului în care întreprinderile din Belarus evaluează posibilitățile unei astfel de tranziții, evidențierea barierelor și driverelor pentru dezvoltarea unei economii circulare în țară.

Baza informațională a studiului au constituit lucrările științifice teoretice și metodologice ale autorilor autohtoni și străini dedicate economiei circulare, materialele de reglementare și informare ale ministerelor și departamentelor, precum și informații de pe site-urile oficiale și alte surse din internet.

Articolul prezintă rezultatele unui sondaj al întreprinderilor din Belarus realizat în perioada 2019-2021 privind problemele de gestionare a deșeurilor în industrie, construcții și comerț (primul trimestru al anului 2019), determinarea nivelului de percepție a conceptului de economie circulară de către antreprenori din Belarus, realizat prin interviuri diagnostice și procesate în program *rep:grid get things straight* by Dr. Rosenberger, precum și prezintă cercetarea oportunităților de transformare circulară în Belarus (2020-2021).

Rezultatele studiului au arătat că în Belarus dezvoltarea conceptului de economie circulară nu a fost adoptată pe scară largă, dar există deja exemple eficiente de introducere a modelelor circulare de afaceri. Reprezentanții modelului de afaceri tradițional (liniar) intenționează să implice resurse secundare în procesul de producție la locurile de producție individuale. Întreprinderile circulare se concentrează pe utilizarea deplină și eficientă a resurselor și urmăresc creșterea profiturilor, inclusiv prin introducerea de inovații circulare în orice proces de producție.

Cuvinte cheie: economie circulară, modele de afaceri circulare, bariere, Belarus, sondaje.

Циркулярная экономика рассматривается в Национальной стратегии устойчивого развития Республики Беларусь до 2035 года как один из важнейших приоритетов. Это открывает новые возможности для повышения конкурентоспособности традиционных секторов экономики и сохранения благоприятной окружающей среды и актуализирует вопрос готовности белорусского бизнеса к циркулярной трансформации.

Цель работы - изучить как белорусские предприятия оценивают возможности такого перехода, а также барьеры и драйверы развития экономики замкнутого цикла в Республике Беларусь.

Информационной базой исследования послужили научные труды теоретического и методологического плана отечественных и зарубежных ученых, посвященные циркулярной экономике, нормативные и информационные материалы министерств и ведомств, а также информация с официальных сайтов и другие интернет-источники.

В статье представлены результаты опроса белорусского бизнеса, проведенного в период 2019-2021 гг. касательно вопросов обращения с отходами в промышленности, строительстве и торговле в Беларуси (первый квартал 2019 г.), определения уровня понимания концепции циркулярной экономики со стороны белорусского бизнеса, выполненное с помощью диагностических интервью, обработанных в программном продукте *rep:grid get things straight* by Dr. Rosenberger (2020 г.), исследования возможностей циркулярной трансформации в Беларуси (2020-2021 гг.).

Результаты исследования показали, что в Беларуси развитие концепции циркулярной экономики широкого распространения не получило, но эффективные примеры внедрения циркулярных бизнес-моделей уже есть. Представители традиционной (линейной) бизнес-модели намерены вовлекать в производственный процесс вторичные ресурсы на отдельных производственных участках. Предприятия с элементами замкнутого цикла ориентированы на полное и эффективное использование ресурсов и нацелены на увеличение прибыли, в том числе за счет внедрения циркулярных инноваций в любые производственные процессы.

Ключевые слова: циркулярная экономика, циркулярные бизнес-модели, барьеры, Беларусь, опросы.

INTRODUCTION

Topicality. Despite the success of the traditional (linear) economy in the XX century, in the new millennium this method of organizing production processes which determines the relationship between production and consumption according to the principle “the more, the better” has fully revealed its shortcomings. According to experts (*An Economic and Business Rationale for an Accelerated Transition*, 2013), in a forthcoming perspective, there will be a conscious transition of the society to sustainable production and consumption. One of the practical ways to achieve it is the introduction of circular business models.

The economic effect of the introduction of a circular economy is (1) to reduce the consumption of raw materials and energy resources through the formation of a stable demand for secondary resources; (2) reduce the volume of waste generation, including its prevention and increase the share of its involvement in production processes; (3) the emergence of new markets and the expansion of demand for existing ones against the background of increasing environmental responsibility of the society; (4) formation of an innovation ecosystem and infrastructure development; (5) expansion of opportunities for the development of small and medium-sized businesses, etc. The environmental effect includes (1) the reduction of carbon dioxide emissions; (2) decrease in the area of waste storage and disposal facilities; (3) lowering of the consumption of scarce and limited resources. The social effect encompasses (1) an increase in the level of social responsibility for the careful use of material resources; (2) an environmentally friendly attitude towards used goods; (3) increase in the number of jobs due to the formation of new and transformation of traditional sectors of the circular economy, etc. Enterprises can benefit from strengthening relationships with partners along the entire value chain, increasing the innovativeness of products and processes, increasing customer loyalty, gaining additional competitive advantages and new sources of income received; and consumers gain access to environmentally friendly products and, in some cases, with a decrease in their cost, due to cost reduction through the introduction of resource efficiency principles.

Theoretical importance. The article discusses the conceptual foundations of the formation and development of a circular economy.

Practical importance. Practical use of the proposed results and recommendations for the implementation of the principles of a circular economy will ensure more efficient use of raw materials within production cycles and achievement of sustainable development in Belarus.

LITERATURE REVIEW

Theoretical background. At the present stage, the concept of a circular economy has started gaining popularity, since it meets the interests of business, the state and the population. There are three key advantages for business: practical - depletion of natural resources increases costs of primary materials on the market; technological - new technologies facilitate the principles of introducing a circular economy; consumer - a circular approach to your own products allows you to improve communication with the consumer and offer them a product better than that of its competitors. For the state, accelerating urbanization creates an incentive to promote the development of a circular economy. For consumers, the advantage is the new circular product that the business offers. Products designed initially as circular (for example, car-sharing, furniture for rent, etc.) attract the consumer with their unusualness and significant cost savings (Olajos P., 2018).

The circular economy concept combines the most widely demanded practical approaches from various scientific schools. The systematization of the existing concepts of the development of the ecological and economic system presented in various scientific schools made it possible to establish that the theoretical and methodological approaches that form the basis of the circular economy are not fundamentally new, but accumulate the results of research by scientists in the field of industrial ecology, eco-efficiency, regenerative design, etc.:

Performance Economy - Walter R. Stahel (1986); The Functional Economy: Cultural and Organizational Change;

Industrial Ecology - Frosch and Gallopoulos, "Strategies for Manufacturing", 1989;
 Eco-efficiency - World Business Council for Sustainable Development (WBCSD), 1991;
 Regenerative design - John T. Lyle "Regenerative design for sustainable development", 1994;
 Biomimicry - Janine M Benyus Biomimicry: Innovation Inspired by Nature, 1997;

Cradle-to-cradle - M. Brungart and W. McDonough / McDonough & Braungart Cradle to Cradle: Rethinking the Way We Make Things, 2002; "Upcycle: Beyond Sustainability - Designing for Abundance" / "The Upcycle: Beyond Sustainability - Designing for Abundance", 2013;

Blue economy - G. Pauli, Report of the Club of Rome "10 years, 100 innovations, 100 million new jobs", "10 years, 100 innovations, 100 million new jobs", 2011.

The literature review made it possible to reveal that in foreign studies the term "circular" economy has many interpretations, the systematization of which enables to identify two fundamental approaches:

Resource oriented (Geissdoerfer et al., 2017; Geng et al., 2008; Zink & Geyer, 2017), implying a closed flow of materials, energy and waste, which can be achieved through reuse at the product level (repair or refurbishment), at the component level (reuse in production) and at the material level (recycling);

Economy oriented (Bastein et al., 2013; Hislop & Hill, 2011; Ingebrigtsen & Jakobsen, 2007), according to which the circular economy is an economic system that takes the reuse of materials and the conservation of natural resources as its starting point, seeking to create value for the people and the economy in every part of the system.

The definition given by the specialists of the Ellen MacArthur Foundation unites these two approaches. According to it, the term "circular" refers to an economy that functions as an alternative, more holistic approach that imitates natural systems with a transition aimed at distancing economic growth from environmental problems.

In recent years, one of the most common research tools is the method of qualitative data analysis, the results of which take the form of objective scientific conclusions. The specificity of the processes under study and the lack of official statistical information determines the relevance of using the survey method to study the degree of understanding and assess the possibilities of implementing a circular economy.

It was this approach that was used to determine the benefits and risks of transition from the traditional (linear) production model to closed economic systems, as well as to substantiate promising directions and measures to stimulate such transformation, etc. In particular, the GreenBiz Group company in cooperation with UPS conducted a survey of top management representatives to identify trends, factors of effective implementation of the principles of a circular economy. Industry specifics, problems, opportunities, and prospects for the implementation of the principles of the circular economy in specific industries were identified using surveys by ING Group. Based on the survey results, the World Health Organization, identified the prospects assessed the direct and indirect benefits of reducing the negative impact on the environment because of the introduction of circular economy principles (WHO, 2018).

DATA SOURCES AND METHODS USED

The data sources are the surveys by representatives of Belarusian enterprises with various forms of ownership (state, private and mixed) located in all regions of the republic (Brest, Vitebsk, Gomel, Grodno, Minsk, Mogilev, and Minsk). Top management was also interviewed using the technique of repertoire grids and the software product *rep: grid get things straight* by Dr. Rosenberger for processing results.

RESEARCH AND DISCUSSION RESULTS

Surveys of enterprises in 2019 on the use of waste and secondary raw materials confirm the growing interest in the problems of waste processing and the involvement of secondary material resources in the production process (Figure 1).

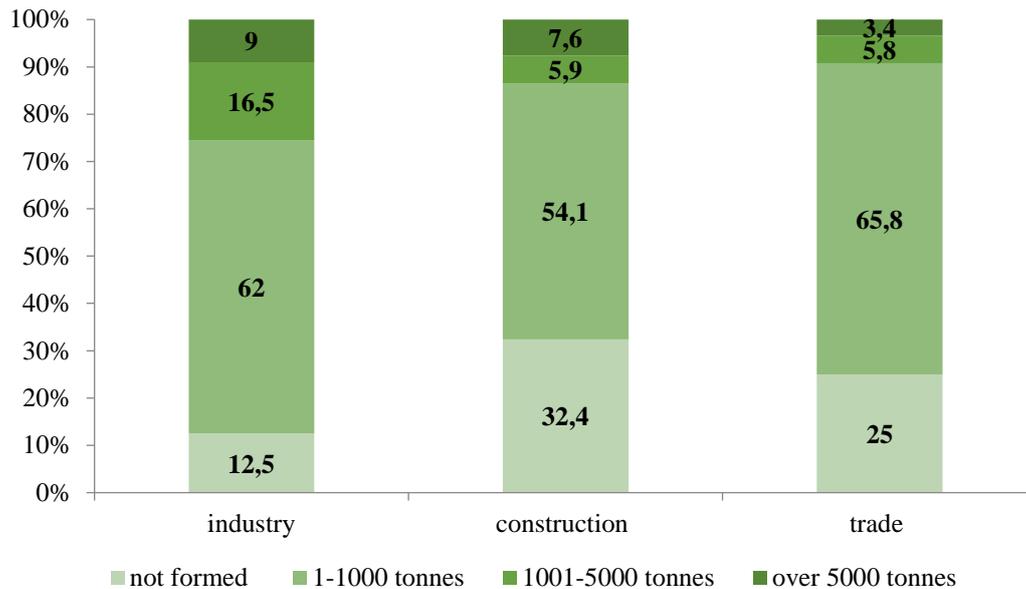


Figure 1. Annual volume of production waste generation at industrial, construction and trade enterprises, % of enterprises

Note.

1. Green arrows show the proportion of enterprises using waste in own activities, in the corresponding group by the volume of waste generation

2. Source: Figure based on the data by (Сачек, Шершуневич, Тоцицкая, 2019).

In the industry, there is a pronounced tendency towards an increase in the use of waste in the own activities of an enterprise with an increase in the volume of its generation. This testifies the existence of a good base for the implementation of the principles of a circular economy in the industry of Belarus. In construction, the share of waste-free organizations exceeds 30%. It is necessary to clarify here that the main activity of construction enterprises is construction and installation work. This type of activity allows them to reuse certain substances and objects when backfilling roads, pits and performing other construction work. In trade, less waste is generated and used than in construction and the industry. Trade organizations most often transfer waste for recycling, since they themselves have neither production facilities for this, nor areas for storage, sorting waste, etc. In general, it should be noted that waste management issues are not a priority for enterprises. In this regard, it is of particular importance to increase the level of knowledge of enterprises on the functioning of the circular economy in their sector.

Studies to determine the level of understanding of the circular economy concept by the Belarusian business carried out in 2020. The study was carried out using Kelly repertory grid method. The results obtained enabled to answer the main research question: “To what extent does Belarusian business understand and is ready for transition to a circular economy?” (H. H. Барова, 2021).

As a result, it was found that the level of understanding of the circular economy concept by the Belarusian business is still in the formation stage, since the respondents have many disparate opinions regarding its essence, features and advantages of its implementation. Many respondents view circular economy through the prism of environmental responsibility and resource efficiency, often equating the two. The majority of the respondents noted in their answers that the circular economy is an inevitable global trend, and it is inextricably linked with innovation, resource efficiency and new market opportunities. The respondents defined the modern model of the Belarusian economy as more consistent with the traditional (linear) model (Figure 2).

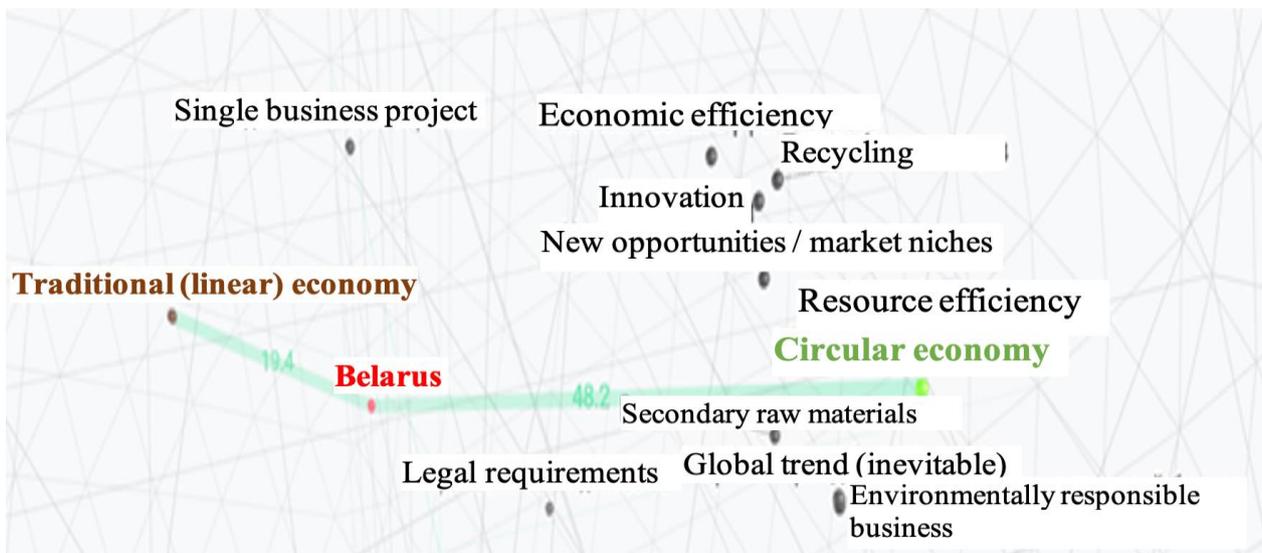


Figure 2 Element-based analysis of the "circular economy" and Belarus elements ratio

Source: Figure based on the data by (H. H. Бамова, 2021).

The need to comply with global trends and stay competitive both in Belarus and abroad, as well as an increase in the environmental responsibility of business and a focus on resource efficiency are factors stimulating the development of a circular economy. At the same time, the fear of enterprises about a possible decrease in quality when recycled materials are involved in production processes and the lack of information about successful circular business models hinder the development of this direction. Several elements and related factors have a multifaceted effect. Thus, the requirements of the current Belarusian legislation, on the one hand, do not restrict the introduction of a circular economy, moreover, they fully comply with its basic principles, but on the other hand, they do not contain incentive measures for the practical implementation of this concept. The development of scientific and technological progress undoubtedly has a positive effect on the development of the circular economy, but the high cost of innovation and long payback periods slow down these processes. Low economic efficiency of enterprises, their focus on solving current problems hinders the development of a circular economy, at the same time, the economic efficiency of circular business models stimulates their implementation. Elements such as "waste processing" and "secondary raw materials" form the basis of the circular economy and stimulate its development, while the underdevelopment of the internal market for secondary resources, imperfection of current waste collection and disposal system limit the possibilities of transition from the traditional (linear) model to the circular one (Table 1).

Table 1.

Classification of circular economy development factors

Factors		
Stimulating	Versatile action	Restraining
Resource efficiency	Secondary raw materials	Concerns about declining quality
Environmental responsibility of business	Waste recycling	
Global trends	Innovations	Difficulties in scaling
New opportunities / market niches	Economic efficiency	

Representatives of traditional business models argue that this type of production organization prevails in Belarus, and the circular economy is represented only by single business projects that cannot be effective without scaling. Agreeing with this statement, the respondents of enterprises with a closed economic cycle indicate that in recent years the socio-ecological responsibility of business

has been increasing in the country, the issues of preserving natural resources and reducing the impact on the environment are becoming topical. Representatives of the traditional (linear) business model in their activities focus on resource conservation and aim at maintaining the existing, albeit relatively small, but stable income. In the short term, while maintaining the previously selected specialization to increase the economic efficiency of the business, they intend to involve in the production process secondary resources in individual production areas. Enterprises with elements of a closed cycle focus on the full and efficient use of resources and strive to increasing profits, including through the introduction of circular innovations in any production process. The respondents representing the enterprises of this group believe that in the future the adherence to the circular model will remain, and the main emphasis will be placed on the prevention of waste generation, therefore, the need for their recycling fades into the background. The technological superiority of such enterprises will ensure their competitive advantages and will expand their market niche. (H. H. Барова, 2021).

The study about the possibilities of circular transformation in Belarus was conducted in 2020-2021 based on the survey of 403 enterprises. These enterprises were registered and operating in the territory of the Republic of Belarus with locations in Brest, Vitebsk, Gomel, Grodno, Minsk, Mogilev regions and Minsk. The questionnaire contained five blocks of questions.

Among the survey participants: 61.5% are industrial enterprises; 20.3% are engaged in agricultural production; 11.9% work in the construction industry and 6.2% provide housing and communal services. 50.6% of respondents have private ownership, 38.0% - state, 11.4% - mixed. The largest share of the respondents falls on medium-sized (46.1%) and large (39.5%) enterprises, the average number of employees in which is 103 and 1425 people, respectively. The share of small businesses in the total sample is 11.4% with an average employee number of thirteen (Барова et al., 2021).

12.4% of the respondents attributed their business to a model based on the principles of a circular economy, considering that it is more based on the “take, make, reuse” principle and is characterized by a minimization of the consumption of primary raw materials and the volume of processed resources, accompanied by a decrease in waste sent to disposal. A third of the respondents (27.3%) indicated that production processes are built according to the traditional (linear) model, which is based on the principle of “take, make, waste”, which leads to a constant increase in the burden on the environment, both in terms of extracting energy and materials useful for human economic activity from the ecosystem, and in terms of emissions of pollutants during the production, operation and disposal of various types of products. Most of the enterprises participating in the survey (60.4%) have a transitional model, which is largely based on linear approaches to the organization of production processes, with the introduction of closed cycle individual elements.

Given that the effective implementation of the circular economy principles is directly related to understanding its concept, the respondents were asked to choose from several definitions the one that, in their opinion, most accurately describes it. At the same time, the enterprises participating in the survey were able to assess eight definitions using a scale from one to five, where 1 - strongly disagree, 5 - strongly agree. One of the definitions contained the most complete interpretation of it, and the remaining seven, reflected individual elements of a circular economy (Table 2).

As a result of the survey, it was found that representatives of the Belarusian business, both with traditional and transitional models, generally have a narrow view of the circular economy essence. In particular, 31.6% of traditional and 28.5% of transitional enterprises believe that this is a theoretical business model that is difficult to apply in practice. This is a consequence of the lack of information on the best practices, as well as foreign and domestic experience in the application of the closed-cycle business model at enterprises of various industries. 53.4% of traditional enterprises consider the circular economy as a concept with the main goal to increase waste recycling, and 36.3% of the surveyed enterprises of this group consider it to be a linear business model with an emphasis on resource efficiency.

Table 2
Distribution of respondents' answers to the question "How much do you agree with the following statements on the essence of circular economy?", %

	Answer scale					Total
	1	2	3	4	5	
<i>1. Circular economy is a theoretical business model that is difficult to apply in practice</i>						
1.1. Traditional (linear) model	11.2	17.4	39.8	15.3	16.3	100.0
1.2. Circular model	31.8	22.7	29.6	6.8	9.1	100.0
1.3. Transitional model	17.0	19.9	34.6	15.2	13.3	100.0
<i>2. Circular economy is like linear economy, but with more emphasis on resource efficiency</i>						
2.1. Traditional (linear) model	9.1	20.2	34.4	24.2	12.1	100.0
2.2. Circular model	15.6	15.6	20.0	28.9	20.0	100.0
2.3. Transitional model	14.2	15.6	29.4	19.9	20.9	100.0
<i>3. Circular economy allows you to reuse resources and only deals with waste and increasing their recycling level</i>						
3.1. Traditional (linear) model	6.9	12.9	26.7	28.7	24.8	100.0
3.2. Circular model	6.8	9.1	34.1	31.8	18.2	100.0
3.3. Transitional model	11.8	10.9	32.7	22.3	22.3	100.0
<i>4. Circular economy is an economy based on innovation, which, considering global trends, is gradually becoming a necessary condition for access to foreign markets</i>						
4.1. Traditional (linear) model	12.8	16.0	19.1	27.7	24.5	100.0
4.2. Circular model	8.9	11.1	20.0	31.1	28.9	100.0
4.3. Transitional model	6.7	13.8	30.0	23.3	26.2	100.0
<i>5. Circular economy principles need to be embedded in product design and development</i>						
5.1. Traditional (linear) model	6.2	4.1	19.6	34.0	36.1	100.0
5.2. Circular model	7.0	4.7	23.3	25.6	39.5	100.0
5.3. Transitional model	2.9	7.6	25.2	19.0	45.2	100.0
<i>6. Circular economy can develop only if consumers are willing to pay more for products produced in closed production systems, including from secondary resources</i>						
6.1. Traditional (linear) model	18.9	12.6	27.4	23.2	17.9	100.0
6.2. Circular model	17.1	17.1	24.4	19.5	22.0	100.0
6.3. Transitional model	12.5	19.8	25.5	14.6	27.6	100.0

Source: Батова, Точицкая, Шериунович, 2021

Almost half of the respondents (44.6%) with a transitional business model believe that the circular economy allows for the reuse of resources and only deals with waste and increased recycling rates, and 40.8% believe that it is a linear economy with a large emphasis on resource efficiency.

The importance of the circular economy for export orientation, its relevance and innovativeness does not raise doubts among survey participants. 60% of the representatives of enterprises with a circular business model and about 50% with a traditional and transitional business model fully or partially agree with these arguments.

Most respondents (65–70% of those surveyed) indicated the need to implement the principles of a circular economy at the design and product development stage. More than 40% of the survey participants, regardless of the business model, consider a circular economy as an important component of not only sustainable production, but also consumption, supporting the point that this concept can develop subject to consumer support.

To assess the prevalence and implementation of the circular economy principles by Belarusian enterprises, respondents were asked whether they have elements of a closed cycle in production processes.

Most respondents (76.0% of the circular, 67.3% of the linear and 65.6% of those with a transitional model) sell waste/secondary resources to other enterprises. The rather high proportion of such responses is largely due to legislation requirements on waste management, including the prevention of secondary material resources disposal. In the republic as a whole, the traditional types of secondary material resources (wastepaper and cardboard, glass, plastics, rubber-containing waste, including worn-out tires) usage level generated in the industrial sector is over 94%.

The second most common element of a circular economy is the use of secondary raw materials in product manufacturing. However, among the traditional and transitional enterprises, the share of those who apply it in practice is significantly lower than among those using the closed-cycle model (42.7%, 45.7% and 64.0%, respectively) (Figure 3).

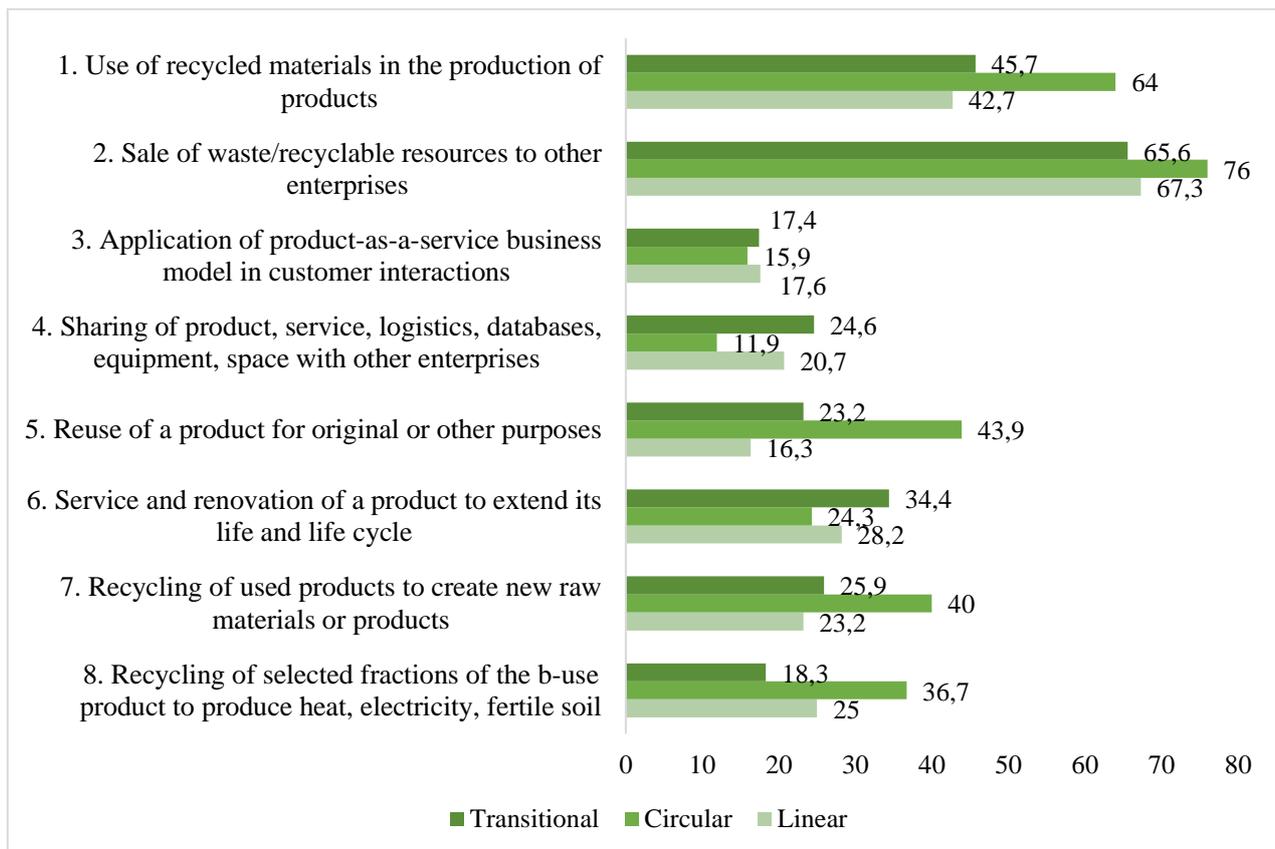


Figure 3. The presence of the elements of a circular economy in the production model

Note. Figure based on the data by (Bamova et al., 2021)

About 40% of the circular enterprises participating in the survey noted that they reuse the product for initial or other purposes (43.9% of the respondents), process used products to create new raw materials or products (40.0%), and recycle certain fractions of used products for heat, electricity, a fertile soil (36.7%). Together with the previous two, these three elements formed the top 5 most common elements of a circular economy in the enterprises with a closed production cycle.

In turn, the linear enterprises implement measures for the maintenance and repair of the product to extend its useful life and life cycle, obtain heat, electricity, a fertile soil by processing individual fractions of used products. This was indicated by 28.2% and 25.0% of the respondents in this group, respectively. However, among the linear enterprises there are those who apply more progressive elements such as product processing to use new raw materials and products (23.2%).

The enterprises of the transitional production model are engaged in the maintenance and repair of the product to extend its useful life and life cycle (34.4%), joint use with other enterprises of the

product, service, logistics, databases, equipment, space (24.6%) and recycling of used products to create new raw materials or products (23.2%).

The least widespread business model is “product as a service”, which is used by only 15.9% of the circular enterprises, 17.6% of the transitional and 17.6% of the linear enterprises. The lack of prevalence of this model is largely because it presupposes a new way of interaction, both from the economic and organizational side, requiring a restructuring of production and sales processes.

It should be emphasized that in terms of the level of implementation of such elements as "product as a service", "sharing", "maintenance and repair of a product" circular enterprises are significantly inferior to traditional and transitional ones. This allows us to conclude that the circularity in the Belarusian economy has a pronounced production orientation and does not cover the service sector.

This indicates that most enterprises are not yet ready or do not have enough knowledge about the new economic and organizational approach of interacting with customers, which presupposes long-term relationships with them based on the sale of services. However, it should be noted that not all industries can use this business model.

To determine the potential and directions of circular transformation, the responses of the participants were systematized, considering the size of the enterprises, implying the possibility of introducing certain elements within the next three years (Figure 4).

The element of selling waste/recyclable resources to other enterprises will be the most common in the short term. The possibility of introducing this element (totally or partly agree) was indicated by 71.4% of the enterprises with a closed production cycle, 64.2% - with a linear one and 61.4% with a transitional one. It should be noted that the creation of a fully functioning waste market is an important prerequisite for the development of a circular economy. At the same time, the sale of waste by an enterprise does not in itself mean that it will take further steps towards a circular business model.

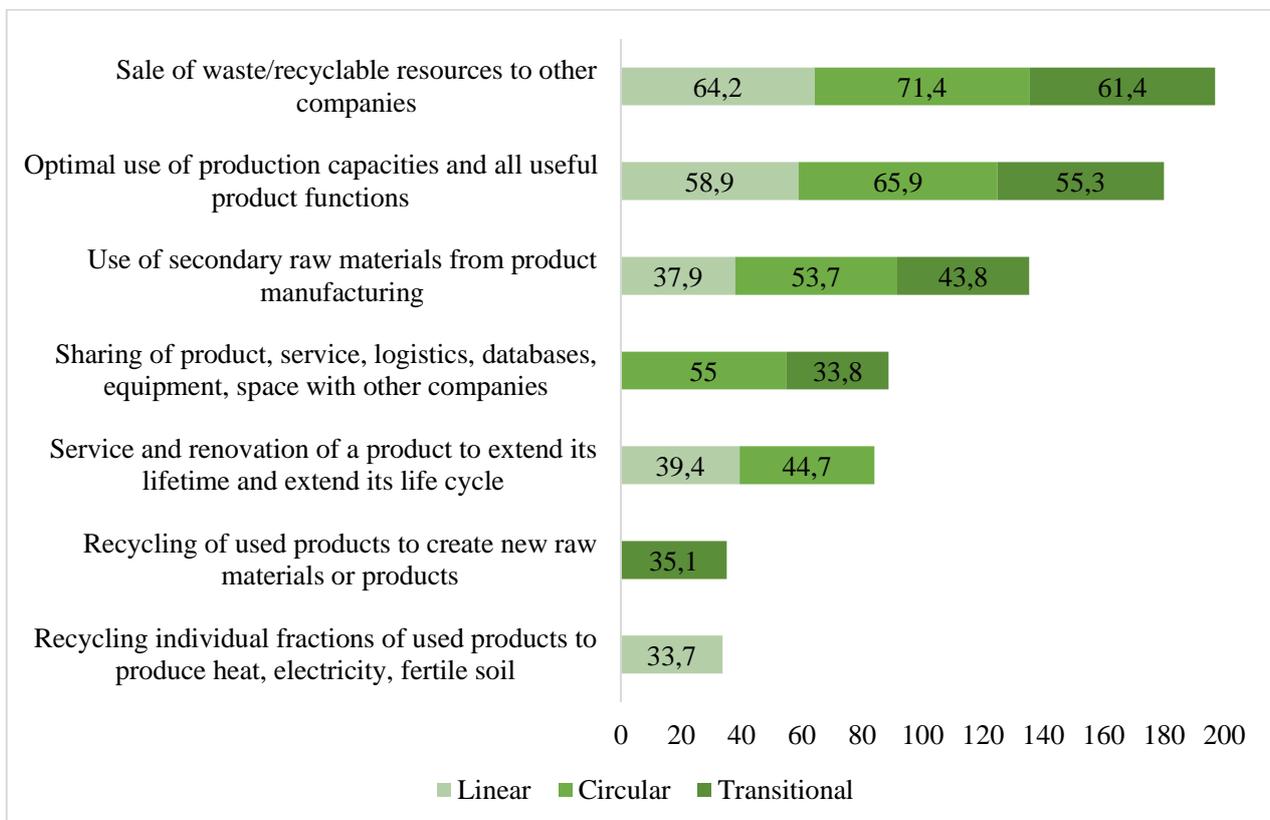


Figure 4. Preferred elements of a circular economy implementation according to respondents, %

Note. Figure based on the data by (Bamova et al., 2021)

The second most popular element is the optimization of the production capacity use and all beneficial properties of the product. The development of this function was fully or partially supported by 65.9% of the circular, 58.9% of the traditional and 55.3% of the transitional enterprises. However, this component also lies more in the plane of resource efficiency, which, without using other elements of the circular business model, does not mean that traditional and transitional enterprises intend to abandon the linear economy. Therefore, to understand the readiness for circular transformation, it is important to identify what other elements of the circular cycle these enterprises plan to implement. According to the survey results, traditional (linear) enterprises in the short term intend to develop the service and repair sector (39.4%), expand the use of secondary raw materials (37.9%), and process certain fractions of used products to generate heat and electricity, a fertile soil (33.7%). This indicates that these enterprises generally do not plan to go beyond the linear business model.

In perspective, enterprises in the transitional stage of organizing production, plan to expand the share of used secondary raw materials in the manufacturing of products (43.8%), develop the sphere of processing used products to create new raw materials or products (35.1%), and share products, services, logistics, databases with other enterprises (33.8%). Consequently, in this group of the enterprises, 34 to 44% of the respondents are ready to increase the degree of circularity of their business processes, and in some cases to abandon the linear business model altogether.

Circular enterprises also plan to build a system of joint use with other enterprises (55.0%), expand the use of secondary raw materials in the production of products (53.7%) and develop the use of secondary raw materials in product manufacturing (44.7%).

Only a third (33.3%) of the circular enterprises, a quarter (25.0%) of the transitional enterprises and a fifth (21.5%) of the linear enterprises positively assess the possibility of using the product-as-a-service business model in the future. As noted earlier, this may be due both to the lack of knowledge about this model, and to the fact that enterprises are currently focused on elements of the circular economy to a greater extent related directly to production processes.

According to the survey, most respondents believe that the development of the circular economy is constrained by several barriers.

The lack of financial resources is an important and common barrier for all groups of respondents to the implementation of the principles of a circular economy. This is because most enterprises believe that the introduction of a circular economy should begin at the design and product development stage. The enterprises with a traditional (linear) and transitional production model identified the lack of technologies and information, primarily about successful projects, as the main barriers, while the circular enterprises attributed the lack of a unified electronic database on the availability of waste of secondary material resources to the main barrier.

A significant part of the respondents who have a linear (61.8%) and transitional (66.8%) way of organizing production note that there are no technologies suitable for their enterprise. Also, the representatives of these groups indicated a lack of information and practical examples of the successful implementation of circular projects - 52.8% and 56.6%, respectively. At the same time, only a third of the circular enterprises participating in the survey share this position. Moreover, 44.0% of the respondents in this group completely and partially disagree with the lack of information on the effectiveness of implementing circular economy principles and 33.3% do not agree with the argument about the absence of circular technologies.

The enterprises with a transitional production model are most concerned about the lack of consulting services (44.1%) and express uncertainty about the uninterrupted supply of secondary raw materials (32.2%). At the same time, the circular enterprises (36.1% of respondents) are more worried about the absence of a unified electronic database on the availability of waste of secondary material resources compared to the other groups of respondents.

Despite the general similarity in assessing the significance of measures that can help in overcoming barriers that impede the implementation of the principles of a circular economy, there are some differences in the answers of the respondents.

The Belarusian business sees state support as the main driver of the circular transition both through the development and implementation of specialized state support programs and through tax incentives, as well as the development of infrastructure for processing waste and secondary material resources. Thus, about 80% of the traditional (linear) enterprises and 70% of the transitional enterprises consider the development and implementation of support programs as the most effective incentive tool, while for the circular enterprises this is the second most important factor.

The program of socio-economic development of the Republic of Belarus for 2021-2025, as part of the implementation of the environmental policy, sets the goal of providing environmentally friendly conditions for the life of citizens improving environmental protection, and effectively using natural resources. A prerequisite for achieving long-term targets is the greening of the industry, which ensures a decrease in the negative impact on the environment, the involvement of wastepaper, glass, polymer waste, worn tires, waste oils, waste electrical and electronic equipment and others into economic circulation, an increase in the production and consumption of environmentally friendly, that is, processed products. Measures are outlined to develop mutually beneficial cooperation ties in terms of processing Belarusian cellulose into special types of paper and cardboard for the domestic packaging industry, board products - into furniture, wood waste and low-grade wood raw materials - into fuel pellets and briquettes. It will also continue to implement a set of measures to gradually reduce the use of plastic packaging with its replacement with environmentally friendly ones, including glass and paper (Republic of Belarus Ministry of Economy (2021)).

The draft National Action Plan for the Development of a Green Economy in the Republic of Belarus for 2021-2025 (Ministry of Natural Resources and Environmental Protection (2021)), which is currently undergoing the final stage of approval by the Republic of Belarus Council of Ministers, provides a development strategy regarding the circular economy of the Republic of Belarus for the period up to 2035, as well as a number of measures to introduce the principles of the circular economy in various types of economic activity.

CONCLUSIONS

The transition to innovative circular models is becoming global in nature, and the competitive advantages of the development of this concept are becoming more obvious. In general, the concept of a circular economy has not found widespread application in Belarus, but there exist already effective examples for the implementation of circular business models in Belarus. These are factories for the production of office paper from waste paper in the city of Borisov (Unitary Enterprise "Paper Mill" of Goznak), the use of waste oils in the Krupsky District of the Minsk Region, the use of wood waste for biofuel production in the city of Brest (PKUP "Kommunalnik"), operating services for the provision of rental housing, cars, bicycles and scooters; biogas energy complexes based on the use of agricultural waste in a number of agricultural organizations; implemented innovative projects for the introduction of low-waste technologies at industrial and metallurgical enterprises, etc. (H. Батова et al., 2021).

The implemented projects on a "green" economy and cleaner production at individual enterprises have only opened a window of opportunity for a circular economy. For the formation of sustainable growth, further generalization of the results achieved in building "green" growth points and formulating directions that ensure an increase in the efficiency of the use of material resources is required. Large-scale development and ensuring the effectiveness of the implementation of circular business models require a combination of technological advances, innovations, as well as joint efforts of stakeholders, business, and government representatives.

Studies show that representatives of the traditional (linear) business model intend to involve secondary resources in the production process in certain production areas soon, while maintaining the previously selected specialization to increase the economic efficiency of the business. .

The enterprises with elements of a closed cycle are focused on the full and efficient use of resources and aim at increasing profits, including through the introduction of circular innovations in

any production process. The technological superiority of such enterprises in the long term will ensure their competitive advantages and will expand their market niche.

Considering modern global trends associated with, among other things, the introduction of mechanisms for cross-border carbon regulation, trends in the introduction of a circular economy in the Belarusian economy, as well as subject to the development and implementation of a set of all measures planned for the current five-year period to develop a green, circular economy, the prospects for the implementation of these concepts in the medium and long term can be assessed as optimistic. The development of a circular economy in Belarus will contribute to economic growth through more efficient use of available resources, recycling of waste and production of goods from secondary resources.

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