How to Cite:
Mironchuk, V. A., Rodionov, S. S., Kalyakina, I. M., Sorgutov, I. V., Grigoriev, A. V., & Gavrilieva, N. K. (2021). Environmental aspects of the circular economy. *Linguistics and Culture Review*, *5*(1), 352-360. https://doi.org/10.21744/lingcure.v5n1.1659

Environmental Aspects of the Circular Economy

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***Abstract*---**The purpose of this article is to study the environmental aspects of the circular economy as a phenomenon that is quite relevant today in the light of the changing economic realities under the influence of coronavirus infection and related restrictions. Indeed, today all countries of the world find themselves in a situation where supply chains that have been established for decades are interrupted or degraded due to problems associated with forced lockdowns imposed by individual states, as well as due to the so-called "container crisis". At the same time, an important factor is also the fact that in 2020, due to the forced shutdown of a number of the world's largest manufacturing enterprises, the ecological background of the planet has become more favorable than in the pre-pandemic period. In this regard, it is very important today, against the background of improving the economic development paths of each country, which will be based on the principles of a circular economy to meet the needs of manufacturing enterprises, to take into account

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Manuscript submitted: 18 June 2021, Manuscript revised: 09 Sept 2021, Accepted for publication: 27 Oct 2021

environmental aspects that will inevitably play a key role in the intensification of production.

Keywords---circular economy, closed cycle, ecological aspects, ecological background, intensification of production.

Introduction

A circular economy, in addition to a closed production cycle, includes methods for limiting the growth of carbon emissions and solving relevant environmental problems. This economy is based on a sustainable and integrated approach, where social aspects have their relevance. However, in these relationships, it is important to identify sustainability indicators that are related to the economic cycle in order to better assess the relevant fundamentals and support the development of adjusted policies, including company strategies (Ajzen, 2015). New economic models and new technologies are becoming the basis for new problems that slow down the process of transition to sustainability, in this regard, a circular economy can contribute to the efficient use of the resource base and the management of industrial waste. A study of the literature has shown that many authors have been addressing this issue for the past five years, relying on the effectiveness of indicators of the closed-cycle economy in the context of the environmental component. Accordingly, the actualization of the problem under consideration is undoubtedly high, which determines the purpose of this study.

Materials and Methods

The study of the problem in the work was carried out on the basis of the analysis of literary sources covering the problems of the development of circular economy and environmental components of this process. In the process of work, the comparative method, as well as analytical research methods were used.

Results

The circular economy today represents an innovative approach to the organization of economic relations at both the micro and macro levels. One of the components of a circular economy that directly affects the effectiveness of its implementation is lean production (Boyer et al., 2021). Most researchers note that in the modern period there is a negative impact of production processes on the environment. It should be noted that ecology and economics are inextricably linked with lean production, in which the triad "reduction-reuse-recycling" finds application. The transition to more environmentally friendly production often entails a decrease in production volumes. The impact on production lines must be taken into account when including the use of inorganic binders in the main production process. For this reason, the transition to more environmentally sustainable production requires a complete restructuring of the existing production system, or at least for the part of production that is associated with technological advances. It is this subsystem that should, first of all, take into account the need for an ecological approach to management (Cooper et al., 2016).

The authors also studied the use of lean industrial environmental methods in the leading countries of the world. It was determined that, through the sharing of resources or approaches to the service economy, waste reduction and improvement of quality management are distributed between an economical and a closed economy. These bottlenecks have a significant impact on economic results, as an example, the use of renewable energy sources in industrial production. Dematerialization and diversification are two additional circular concepts that can significantly increase the reliability of supplies. Many of these methods also have significant secondary benefits; energy consumption, waste reduction, emission reduction and cost reduction (Gaustad et al., 2018). Another group of researchers identified the key factors contributing to the introduction of lean production structures by manufacturing organizations in the context of a circular economy. The representatives of this group identified improved production management, quality control and production strategy as priorities. According to the researchers, these aspects contribute to the wider introduction of lean production methods. Consideration of these factors can be useful in the development of incentives and support policies that encourage the introduction of lean production methods by small and medium-sized enterprises (Jacobi et al., 2018).

Standards of organizations also play an important role in the process under consideration. It is on the basis of these documents that companies are fully responsible for the selection of success indicators within the framework of the circular economy policy both within the company and in cooperation with stakeholders (Korhonen et al., 2018; Tseng et al., 2020). The concept of "construction quality" was also discussed in the literature, researchers, citing Singapore enterprises as an example, noted that the entire production line of a plant can be stopped if a problem or even a single defective product is detected. The same principles are applied to the construction sector, since errors or poor-quality execution of a particular operation can lead to fatal consequences. One of the directions of the problem under study was the consideration in the literature of the issues of reducing the impact of production on the environment. The reliance is made on two lean methods that will improve both the intermediate and final results of the companies' work: this is flexibility in terms of cost and quality. It is assumed that the implementation of lean strategies will lead to an increase in the efficiency of lean production. However, the introduction of all lean methods, according to the authors, does not lead to a complete increase in productivity (Li et al., 2019).

There is also an opinion in the literature that the emphasis in the management of production companies should be placed on coordinating changes, improving production efficiency based on waste management. It was determined that the link between lean recycling and recycling will continue as recycling becomes an increasingly widespread method of reducing waste. Thus, in separate works, the possibilities of a circular economy in the production of small and medium-sized enterprises were investigated on the basis of the theory of a planned behavior model. It has also been demonstrated that social and environmental economic incentives have a significant impact on other predictive components. Partners of large companies in the supply chain should be informed about sustainable waste management methods, such as waste management, lean production, zero-default and zero-effect management (Muranko et al., 2018). In addition, a company with

strong cultural values can demonstrate a higher level of trust in its attitude to the environment, as a result of which it will be positioned as an economic entity that promotes sustainable development. In addition, their results indicate a positive influence of the environment on internal factors, such as the attitude of the owner and manager, as well as behavioral control (Prieto-Sandoval et al., 2018; Fořt & Černý, 2020).

The model of the closed-cycle economy of plastics presented in the literature is of interest, it allows interpreting both individual and organizational behavior. This experience shows that, although most organizations have the best intentions, advanced plastic recycling practices have not yet been implemented due to several serious obstacles. It is assumed that such methods can be used to close the gap in compliance with regulatory requirements and achieve a circular economy in the plastic recycling market (Ghisellini et al., 2016; Viebahn et al., 2007). Also, individual authors studied the willingness of individual stakeholders to participate in environmental behavior using a model of behavioral activation and social pressure. The proposed model demonstrates that external variables do not help classify people who have experience in processing electronic waste, but have extensive work experience and have passed the age of 65. The findings demonstrate that although the promotion of moral values, public education about the benefits of e-waste recycling can contribute to this process, additional measures may be required to solve the problem of e-waste (Saeed et al., 2019). In addition, it is expected that the relationship between household size and recycling behavior will be related to consumption, resulting in a significant amount of waste.

Vietnamese experts who conducted research in the field of household waste recycling determined that the intention to recycle household items is largely influenced by a person's attitude to recycling, determines subjective standards of interaction with the public, forms an understanding of the profit from recycling and the degree of responsibility. Responsibilities are governed by economic incentives and the perceived processing capabilities of companies. The increased level of responsibility seems to mitigate the impact of financial incentives and expected conditions on the willingness of the enterprise to recycle the household. In addition, the study showed that recycling is an act of altruism with the intention to recycle under the influence of a sense of need and commitment. Thus, it seems that the purpose of recycling depends on recycling standards in the public understanding. As a result, it is critically important for the majority of society's citizens to dispose of secondary waste and act ahead of the curve. In addition, it is necessary to conduct targeted information campaigns and educate about the responsibilities of each citizen within the recycling process (Chávez et al., 2019).

The attitudes of Hong Kong citizens towards recycling and their preferences regarding the disposal of electronic waste were also studied. The ability of companies to recycle electronic waste was evaluated. To assess and describe the willingness of residents to participate in the processing of electronic waste, a model was developed that shows that the four determining factors of people's readiness and behavior for the processing of electronic waste are the availability of recycling and operation enterprises, housing conditions, recycling methods and

financial advantages. As a result, people welcome e-waste recycling initiatives if they are implemented (Singh et al., 2021).

Discussion

In the modern period, there is no doubt that broad-format explanatory work is needed for the general public to clarify the links between circular economy, environmental sustainability, social risks and ethical responsibility. In particular, the propensity to buy electric vehicles is formed, among other things, under the influence of the desire to participate in the process of reducing the harmful impact on the environment (Ceddia et al., 2013; Garibaldi et al., 2019). As a result, the desire to change established behavior can affect the purpose and application of cyclical business models and the formation of habits that positively affect the greening of behavior in general. This position can be traced in the work of a group of researchers who analyzed the relationship between the willingness of consumers to participate in the process of recycling electronic waste. It was found that the size of the city plays an important role in predicting the willingness of consumers to participate, with respondents from larger cities showing a greater inclination. It was also determined that the willingness of citizens to participate in the disposal of electronic waste, expressed online, is an indicator of their intentions. People who are more concerned about environmental protection are more likely to participate. Discussion of the issue of recycling online and calls for this action have a number of advantages over traditional methods, including lower costs of information propaganda and an increase in the number of people involved (Belhadi et al., 2021).

It should also be noted that numerous psychological variables, including attitudes and beliefs, social pressure, social and personal expectations, identity and control, as well as self-efficacy, have been studied in relation to behavior within the framework of recycling. The influence of perceived social and spatial distance on the readiness of adolescents to behave in the environment was also investigated. It was determined that the adolescents in the sample were more aware of the environmental impact, but at the same time they regulated their activities less and demonstrated numerous violations in solving environmental problems. Although this discovery is not surprising, educational initiatives can influence this process. Some authors have determined that pro-ecological identities, such as values and attitudes, are associated with various forms of behavior (Kunniyoor et al., 2020; Moraga et al., 2019). Those who identify themselves as "processors" adhere to broader social standards.

Buyers of environmentally friendly products have increased cognitive and emotional social responsibility. Consumers and non-customers of environmentally friendly products have different ideas, expectations and opportunities for reuse. Their findings show that consumers who have previously engaged in or engaged in pro-environmental activities are more likely to exhibit additional pro-environmental behavior. In the end, consumers' disposal of waste can be influenced by cognitive habits, social norms and personal expectations of disposal (Nandi et al., 2021). Taking care of the environment can encourage people to make extra efforts when it comes to recycling. Additional results show that environmentally sustainable behavior is influenced by environmental standards

and attitudes. Carbon conservation and recycling reports, as well as more widespread economic measures, point to rapid growth in both developed and developing countries. The researchers argue that studying the factors influencing pro-environmental behavior may be crucial for future growth in strategy development and policy formulation. It is also possible to have a high level of attachment and a higher quality of life, which will demonstrate the beneficial effect of pro-environmental behavior on individual life (Doroshenko et al., 2021; Sabodash et al., 2021).

Buyers are looking for consistency between their personal attitude, other methods of environmental protection and the possibility, for example, of recycling packaging. They conclude that companies should provide transparent information to justify decisions on such processing. ICT solutions can make a significant contribution to the dissemination of technical knowledge about this process. It has also been determined in the literature that enterprises can apply a circular approach to production by introducing various alternative business models. These models require consumer approval. However, a number of behavioral barriers currently hinder the development and implementation of the circular economy. The pro-circular model of change is a new theoretical framework that combines the theory of planned behavior, pro-circular values and persuasive communication to determine and influence behavior that supports the evolution of the circular economy (Barra Novoa, 2021; Suryawati, 2021). For the purposes of the model, the behavior resulting from prioritization of resource efficiency was defined as a pro-circular behavior. Many experts agree that the transition to a closed-loop economy will require a change in the way goods are produced and consumed.

It is important to note that the circular economy can be applied to critical and strategic approaches to the quality of production. Overall quality management has a significant impact on lean production. Due to the use of new technologies, proper process management is crucial in waste recycling. Industry technology 4.0 is often used in combination with lean production concepts to reduce production waste and achieve sustainable results. In this regard, it is necessary to actively implement certain innovations related to the introduction of environmental postulates in the process of circular economy (Kustina et al., 2019; Zu, 2021).

Conclusion

Sustainable methods of environmental behavior contribute to achieving high productivity in developing countries with closed economies. Promoting the principles of circular economy is important for managers in light of the recent trend towards globalization. Manufacturing companies today must function through the use of efficient equipment that provides long-term savings of various resources. Also, manufacturing organizations need to prioritize their internal capabilities to achieve high efficiency by increasing awareness of closed-loop economics methods, social awareness and promotion of ISO standards for the closed-loop economy. In particular, companies should improve employees' environmental knowledge more effectively. Further development and definition of the principles of the circular economy in the framework of greening should focus on providing more detailed recommendations for quantifying the results of the

circular economy strategy in the implementation of environmental principles and lean production.

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