



Publisher

<http://jssidoi.org/esc/home>



ENVIRONMENTAL MANAGEMENT FOR SUSTAINABLE BUSINESS DEVELOPMENT

Natalia Mamedova ¹, Zoya Bezveselnaya ², Marina I. Ivleva ³, Vera Komarova ⁴

^{1,2,3} Academic Department of History and Philosophy, Plekhanov Russian University of Economics, Stremyaniy pereulok, house 36, building 2, Moscow 117997, Russian Federation

⁴ Institute of Humanities and Social Sciences, Daugavpils University, Vienības iela 13, Daugavpils, LV-5401, Latvia

E-mail: ² enzoya@yandex.ru (corresponding author)

Received 18 October 2021; accepted 10 January 2022; published 30 March 2022

Abstract. The article examines theoretical and methodological approaches and practical aspects of greening business, which are relevant to the imperatives of sustainable development. Based on expert assessments of domestic and foreign researchers, the ISO 1400 series (International Standard Organization) standards are considered a necessary prerequisite for solving environmental problems of an enterprise, a condition for their integration into the world economy. Four companies' environmental strategies have been identified (Indifferent Strategy, Opportunity Strategy, Risk-based Strategy, and Innovation Strategy) depending on the ratio of market opportunities and environmental risks. The need for innovation arises when both factors are high. An innovation-driven strategy combines both vectors of the green economy: maintaining dynamic economic growth and preserving the natural environment on a long-term basis. The structure and significance of eco-innovations (product, process, organizational) in forming a circular economy (CE) is clarified. A shift towards product-based service systems is proposed as one of the critical solutions to accelerate CE transition. Digitalization is a significant factor driving this process and forming open innovation platforms. Digital technologies provide transparent access to data on the consumption of resources, products, optimize product life cycles, create cyclical business models through automated monitoring, control, and optimization of processes and resources. Depending on technological processes, Cyclical business models are divided into three groups: slowing down, closing, and narrowing the cycle loop. Innovative business models are focused not only on the production of economic value for companies but also on creating environmental and social value for stakeholders.

Keywords: environmental management; sustainable development; environmental strategy; product eco-innovation; process eco-innovation; organizational eco-innovation; circular business model

Reference to this paper should be made as follows: Mamedova, N., Bezveselnaya, Z., Ivleva, M.I., Komarova, V. 2022. Environmental management for sustainable business development. *Entrepreneurship and Sustainability Issues*, 9(3), 134-151. [http://doi.org/10.9770/jesi.2022.9.3\(9\)](http://doi.org/10.9770/jesi.2022.9.3(9))

JEL Classifications: JEL Classifications: O13, Q01, Q56

Additional disciplines ecology and environment

1. Introduction

Currently, the sustainable development paradigm is complemented by the idea of a "green economy". The third stage of transformation of the concept of sustainable development has come, when it has become complex - socio-ecological-economic - both in theory and in its practical interpretations (Bobylev, 2016). The contours of the new economy were defined in the conceptual documents of the UN and OECD (Organization for Economic Co-operation and Development) (OECD, 2009; UN, 2021). The terms green economy and green growth denote the ecological orientation of sustainable development. These terms emphasize the importance of environmental sustainability to the modern economy. The "green economy" in UN documents is defined as an economy that improves human well-being, ensures social justice, and significantly reduces the risks to the environment and its degradation (UN, 2021). The transition to such an economic model is a complex strategic task that requires a combination of two previously not combined development vectors: maintaining dynamic economic growth and preserving the natural environment on a long-term basis.

The global nature of economic and social development and the provision of sufficient opportunities increase the requirements for the competitiveness of products and the ability to adapt to external and internal challenges of the socio-economic and natural environment. It is also necessary to consider the strategic priorities and imperatives of development associated with the need for sustainable business development. Today, due to the lack of adequate systems and management methods, many enterprises, even with unique technologies, may lose their competitiveness, intellectual and innovative potential.

The activities of both public and private organizations have an environmental dimension, which is increasingly coming to the fore in company strategies and is seen as a strategic goal, the practical application of which can be realized at the national, industry, regional, and business levels (Plant et al., 2015; White et al., 2014; White & James, 2014; Chan et al., 2013; Govindan et al., 2014; Pane Haden et al., 2009; Mirzekhanova, 2020; Bobylev, 2016). P. Drucker's idea of the role of "creative destruction" applies to understanding the dynamics of digital society, which is based on continuous innovation. A new type of society based on digital technologies gives rise to appropriate attitudes, rules of conduct, and values that transform traditional business management forms. In this area, radical changes are expected, signs of which are already visible in the activities of companies most sensitive to innovation. Adapting management practice to changing business conditions is one of the main directions of modern management. A comprehensive study of the problem of managing business development becomes relevant from the point of view of increasing competitiveness and developing the strategic goals of the "green economy." Sustainable business development is difficult to implement without greening the activities of economic entities. Modernity requires less resource-saving than resource-efficient business models that imply the environmentally responsible building of business within the green economy paradigm. The level of environmental responsibility characterizes the quality of the enterprises' activities. On the other hand, there is a growing public interest in the environmental impact of corporations (DEFRA, 2011).

The study aims to analyze the main directions of greening management, reflected in modern business management models. Determine the range of environmental strategies of enterprises based on the opposition of two factors: market opportunities and environmental risks. Reveal the importance of the main types of eco-innovations (product, process, and organizational) in implementing a circular economy as the basis for sustainable business development.

2. Theoretical background

The problems of environmental management as a necessary component of an integrated business management model for its sustainable development are considered in various aspects of foreign and domestic researchers. Russian and foreign authors justify the need to develop new management strategies (Stojanovic, 2019; Ivlev et al., 2019; Milovidov, 2020; Schwab, 2019; Roscoe et al., 2019; Boons & Ludeke-Freund, 2013; Pane et al., 2009; Johnson et al., 2008). Particular attention is paid to the experience of various companies in the implementation of ISO 14000 standards as an effective environmental management system (Environmental Management Systems, EMS). It is noted that the importance of effective EMS systems is not limited to improving only environmental performance. Implementing them can lead to efficient operations, lower costs, and foster a sustainable corporate culture (Abd Razak et al., 2016; White & Lomax 2010; Pane et al. 2009).

Researchers from the UK, Slovenia, Russia, based on the analysis of the activities of national companies, have identified the relationship between the availability of environmental certificates (EMAS or ISO14001) for firms with high innovative potential (Hojnik et al, 2017; Abd Razak et al, 2016; Ratner & Ratner, 2016). The idea of maximum openness of the innovation process was formulated based on the systematization of the experience of the most advanced companies.

In the works of domestic and foreign researchers, the problem of an increase in the complexity and complexity of strategic planning in a "green economy" is sharpened, associated with both the uncertainty of the market and the uncertainty of the environment (Milovidov, 2020; Mirzekhanova, 2020; Plant et al., 2015; White et al. al., 2014; White & James, 2014)

The introduction of environmental innovation (eco-innovation) in various EMS components is seen as the primary trend that allows companies to achieve sustainable business development (Ahmad & Wu, 2022; Yan et al., 2021; Huddart et al., 2019; Hojnik et al., 2017; Geissdoerfer et al., 2018; Sarkar, 2013; Triguero et al.; Boons & Ludeke-Freund et al., 2013; Belin et al., 2011).

Innovative models and types of closed-cycle production to preserve the environment are spreading. One of the critical areas in this process is the circular economy model, which implies the introduction of used goods into recycling instead of recycling through new technologies and creative environmental design. Fundamental trends in this area are highlighted in publications: (Ahmad & Wu, 2022; Johl & Abu Toha, 2021; Xu, Y 2019; Pagoropoulos et al., 2017; Kirchherr et al., 2017; Bourguignon, 2016; Ghisellini et al., 2016; Boons & Ludeke-Freund et al., 2013). The role of digital technologies in forming a circular economy, the dependence of the effectiveness of any Internet business model (platform) on the emerging network effect is clarified. The factors that complicate the transition to a waste-free economy, driven by a business based on social and environmental responsibility principles, are disclosed.

3. Conceptual framework and methodology

The conceptual foundations of the study are the documents of the United Nations (UN), Organization for Economic Co-operation and Development (OECD) (OECD, 2009; UN, 2011; UN, 2021), ISO 14001 (ISO 14001: 2015) standards system. The international standard for measuring and interpreting indicators of innovative behavior in the business sector contains methodological principles, a conceptual framework, a complex system of definitions, algorithms for formulating questions, and interpreting answers for analyzing innovative activities (OECD, Eurostat, 2018).

Analysis of domestic and foreign publications shows that the methodological foundations for the inclusion of environmental aspects in the enterprise's strategic plans have not been sufficiently developed. The need for and importance of developing a methodology for constructing a complementary environmental management system are determined by the sustainable development tasks of entrepreneurship. The systematic and process approaches, the method of expert assessments, and the grouping and classification constitute the methodological basis of the study. The systematic approach is the basis for analyzing environmental management as a complex socio-economic phenomenon that integrates business management's organizational, technological, environmental, and social components. Eco-innovation from a systematic approach is presented as the integration of product, process, and organizational innovations, making it possible to identify synergistic effects in the environmental management system.

4. Results

Environmental management system. Environmental management regulates the business relationship with the natural environment, in which the enterprise, acting as an object of management, ensures a coordinated interaction with the natural environment. Further development of environmental management in Russia is due to the following reasons. First, it is the need to meet the requirements of the green economy as a strategic goal. Secondly, it is the strengthening of economic and administrative sanctions for violation of legislation requirements in the field of environmental protection and environmental standards. Thirdly, environmental and economic indicators of Russian enterprises' efficiency of economic activities are becoming an increasingly important factor in the competitive struggle. Fourth, Russia's expanding international cooperation and its commitments to harmonize Russian legislation and the legislation of the Organization for Economic Cooperation and Development (OECD) member countries require the use of generally accepted effective management methods and procedures.

As a basis for solving environmental problems of industrial production, we can accept the international standards of the ISO (International Standard Organization) series. ISO 14000 series standards focus on improving an enterprise's environmental performance and provide recommendations for creating an effective environmental management and audit system. Expediency improving the environmental friendliness of modern industries, compliance with international environmental standards can also be substantiated by the economic effect that will comply with the principles of resource conservation, their secondary use against the background of rising prices for natural raw materials. In addition, the integration of Russian enterprises in the global economy requires compliance with environmental standards and rules.

The ISO 14000 family of standards (includes ISO 14001, ISO 14004) is a universal basis for forming an environmental management system (Environmental Management Systems, EMS). Organizations worldwide that design and implement effective environmental management systems use this basic set of rules. ISO14001 is the most common mechanism for improving the environmental performance of organizations, confirming the compliance of products with the current requirements of the international standard and the effective operation of the environmental quality management system. ISO14001 does not set requirements for environmental performance but outlines a framework that a company or organization can follow to establish an effective environmental management system. ISO 14001 can be used by any organization, regardless of its type of activity or industry.

The benefits of efficient EMS are not limited to a mechanical build-up of environmental performance. Their use can help increase the efficiency of operations, reduce costs, and positively affect employees interested in preserving the environment. External benefits can include, for example, expanding the business by strengthening the reputation and improving the company's image (Alum et al., 2020; Abd Razak et al., 2016; Chen, 2013; DEFRA, 2011; White & Lomax 2010).

Environmental governance is on the agenda of many organizations. Its goal is to reduce and further minimize harmful effects on the environment with the broadest interpretation of environmental requirements and the means necessary to meet them. Table 1 (See the Appendix, Table 1) presents publicly available excerpts from environmental strategies and statements from several organizations. Their analysis demonstrates a significant coincidence of positions concerning environmental management, its optimization, and integration with the strategic management of the enterprise.

In the context of technological and social changes, business is faced with the challenges of a more complex operating environment. It requires new strategies that take into account the unprecedentedly broad scope of emerging factors: (Milovidov, 2020; Schwab, 2019; Johnson et al., 2008). The problem of integrating environmental management with the enterprise management system arises from the conflict between economic and environmental goals. While traditionally strategic management aims to obtain economic benefits in the long term, environmental protection often requires additional costs. Therefore, to solve this problem, it is necessary to develop an environmental strategy of the enterprise, in which economic and environmental goals should be equal and complementary. The resulting synergistic effect is manifested in an increase in the enterprise's competitiveness based on the formation of a new potential for success in the market, including an environmental component. With the introduction of environmental goals into an enterprise's strategic planning, its complexity increases since it considers the uncertainty of the natural environment development as far as the uncertainty of the market.

Environmental management involves determining the environmental potential for success, for the creation of which and ensuring competitive advantages on this basis, offensive and innovative actions of the enterprise are required. On the one hand, these are actions to ensure environmentally friendly products and processes. On the other hand, these are activities to reduce costs due to new and increasing environmental requirements. The ecological potential for success is also achieved by creating new product consumer properties based on ecological differentiation. The space for choosing a strategy of competitive advantages is determined by three vectors of possible enterprise behavior: leadership in the environmental field, leadership in costs, and differentiation. Three equal components of a competitive strategy determine the integrated nature of optimizing an enterprise's ecological and economic goals. An assumption is made that concerning all three components, at least the minimum state must be achieved to ensure the enterprise's existence in the long term. It is also evident that only limited opportunities can be achieved simultaneously in each strategy component. The space between the maximum and minimum results is the area of possible enterprise strategies. It is possible to identify the strategic behavior of the enterprise for each of the three dimensions, which is determined depending on the value of costs, the possibility of differentiation, and the environmental burden, which, in turn, are directly related to value creation processes.

When defining the company's strategy, the market opportunities offered by environmental protection (the result of an analysis of the external environment) and the risks concerning the environment (the result of an internal analysis) are opposed. Market opportunities cover all environmental areas of development, thanks to which the company can provide and increase its profit. Risks combine internal weaknesses and weaknesses of the enterprise, which, combined with unfavorable changes in the environmental sphere, can lead to loss of profits and even liquidation of the enterprise. In response, four environmental strategies can be created (Fig.1).



Figure 1. Diversification of environmental strategies

Source: the authors

1. Indifferent Strategy. If market opportunities and risks are not large, the enterprise can treat the relevant environmental issues indifferently and continue to work as before. In this situation, it is impossible to talk about an environmental strategy since managers do not realize the need for strategic requirements.
2. Opportunity Strategy Opportunity-oriented strategy. If market opportunities in the conservation area are high and the likelihood of risks is still low, then an opportunity-based strategy may be chosen. By producing environmentally friendly products, an enterprise can ensure an increase in its profits (profit-oriented environmental management)
3. Risk-based strategy. With low market chances and high environmental risks, an enterprise can define a risk-oriented strategy. The content of such a strategy is to decide whether the risks should be reduced, mitigated, and transferred by the enterprise's resources and to what extent a dialogue about risks with interested groups should be conducted. The decisive parameter of this strategy is "costs" (costly environmental management).
4. Innovation strategy. If both market opportunities and the likelihood of risk to the natural environment are high, there is a need for innovative solutions. A strategy focused on innovation allows in this situation to stabilize profits due to environmental innovations in production, reduce or eliminate risks through the introduction of environmental technology, and reduce apparent and possible costs. A deliberate choice of this strategy ultimately leads to developing an enterprise focused on environmental safety and environmental protection.

The Role of Eco-Innovation in Building a Sustainable Economy. The innovation strategy reflects the main trends in the greening of enterprises in the paradigm of sustainable development. From this point of view, in the structure of environmental management, a unique role belongs to innovation management strategies. Implementing environmental innovation (eco-innovation) in the various components of EMS allows companies to follow the principles of sustainable development. In the documents of the European Commission, eco-innovation is defined as “any innovation resulting in significant progress towards the goal of sustainable development, by reducing the impacts of our production modes on the environment, enhancing nature’s resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources” (Eco-innovation, 2013). Eco-innovation may be any new or significantly improved products (goods or services), processes, organizational changes or marketing solutions that reduce the consumption of natural resources (including materials, energy, water, and land) and reduce emissions of harmful substances in throughout the life cycle.

Sustainable business development involves harmonizing relations between the economy, the natural environment, and society. The circular economy model has a high potential for creating innovations that contribute to the development of new markets and solve the problems associated with conserving the planet's resources. It is aimed at a comprehensive solution to economic, social, and environmental problems. The circular economy is defined as a system based on business models (Bressanelli et al., 2018). The emphasis is shifted towards reducing or reusing material and energy consumption, recycling and recovering them in production, distribution, and consumption (Kirchherr et al., 2017). Many approaches to its formation are associated with specific business models, which are outlined in the EU's Circular Economy Action Plan (EU, 2020), in the UN Green Economy Program (UN, 2021). Eco-innovation contributes to the transition of a linear economy to an environmentally sustainable or circular closed one, which is based on the principle of the three Rs - Reduce, Reuse, Recycle (Bourguignon, 2016). Successful implementation of eco-innovation depends on an ecological culture and the responsibility of producers and consumers. According to numerous studies, the prerequisites for the transition to a circular economy are companies' establishment of environmentally responsible production and consumers' consideration of environmental aspects when choosing goods and services.

The Circular Economy (CE) is based on the ecosystem principle. The main goal is to remove the dependence of economic growth on the depletion of natural resources through the creation of innovative technologies, models, and services. This goal is closely related to solving the problem of gradation of ways of using waste - preventing waste generation, recycling, and reusing products. EZC opens up new opportunities for diversifying the economy, creating value, forming relevant competencies, and developing entrepreneurship. It involves the introduction of eco-innovations, which, depending on the areas of activity of companies, can be divided into three groups: product, process, and organizational.

Product eco-innovations. Product eco-innovations are the ecological modernization of products and services, as well as the creation and provision of new goods and services with better environmental performance, or the improvement of existing ones (Figure 2). They involve the production of goods and services sustainably and include a variety of activities.

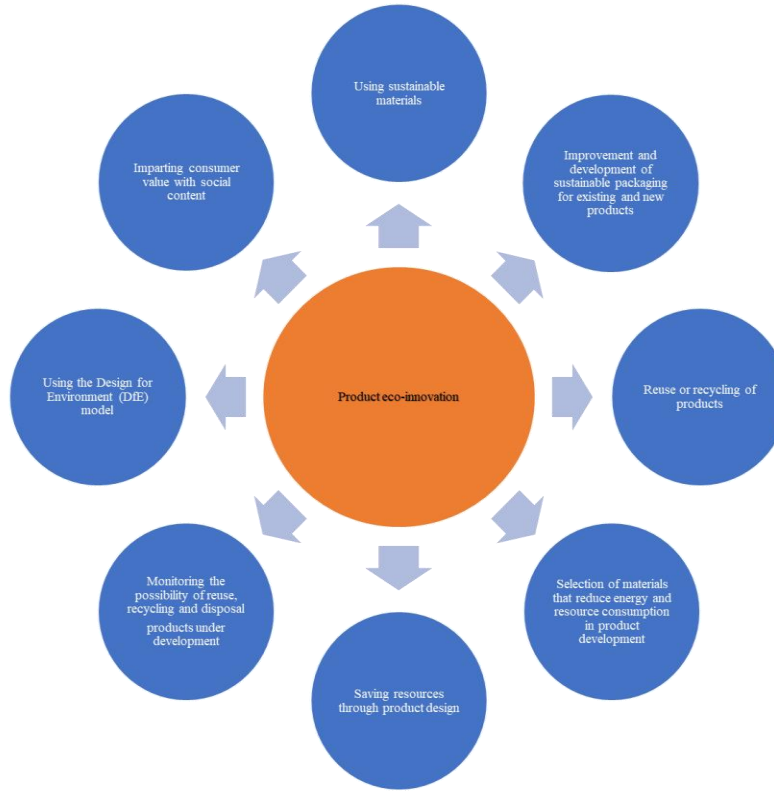


Figure 2. Product eco-innovation

Source: the authors

A shift towards product-based service systems has been proposed as one of the critical solutions to accelerate the transition to CE, and digitalization is a significant driver of this process (Pagoropoulos et al., 2017). The environmental load characterizes the interaction with the environment throughout the entire life product cycle. The innovative approach of DfE (Design for Environment) is aimed at creating products considering the reduction of the burden on the environment throughout the entire life cycle. DfE ensures the environmental neutrality of products, accounting for the gradation of waste, simplifying their recycling, saving resources through appropriate product design, and proper resource use. At the same time, costs mean the costs of producing a product, and differentiation means the degree of a product's uniqueness. An integrated accounting of all components makes it possible to assess their connections. Not all companies voluntarily introduce such innovations. The market context that should favor DfE is critical.

In all its phases, the product's environmental friendliness is becoming an ever-increasing argument for its sale. The preservation of nature, acceptable for the life of future generations, becomes an integral part of the "set of goods" offered by the goods. Therefore, environmental management presupposes taking on social responsibility and participating in reconciling the interests of entrepreneurship and the environment. Product innovations are

designed to complement the objective consumer properties of products with a value dimension, which increases their relevance. The result of such innovations is the optimization of the aggregate social benefit, and the product turns into a mechanism of social self-identification, joining the group. Profit growth has given way to a new target function - total social benefits maximization (Milovidov, 2020). Endowing consumer value with social content requires a set of broad measures from businesses that go beyond marketing goals and take into account the nonlinear patterns of complex systems.

With the mutual interest of consumers and manufacturers in the application of eco-innovations, certain contradictions arise in each party's positions in obtaining and using environmental, social, and economic benefits. The use of organic products brings a variety of benefits to consumers. It means reducing costs and energy consumption, improving the quality and reliability of products, expanding opportunities for its repair, modernization, and disposal, and reducing harmful effects on health. The demand for organic products is growing, and buyers are willing to pay more for such products (Chen, 2013). New needs encourage companies to behave in an environmentally responsible manner (Asdal et al, 2021). Manufacturers need to ensure that products are designed, manufactured, sold, and recycled appropriately to green demand (Sarkar, 2013). However, the consumer value of eco-innovation does not necessarily guarantee an economic bonus to producers. The introduction of eco-innovation can reduce costs by reducing material and energy consumption and increasing manufacturers' efficiency and competitiveness, which is not always evident to them. However, the prospect of optimizing costs (in particular, for energy and materials) most often stimulates investment in eco-innovation (Belin et al., 2011; Huddart et al., 2019).

Process eco-innovations. Process eco-innovation is the greening of production processes, improving technologies at all stages, and introducing innovative business models (Fig. 3). Despite the ambiguity of empirical results, most researchers indicate that thanks to process eco-innovation, significant savings are achieved (Triguero et al., 2013). The use of environmentally efficient green technologies leads to a reduction in operating costs.

The introduction of innovative business models will transform the entire manufacturing process. As part of the circular economy direction, innovations in business models are being developed. The transition to a circular economy involves the sharing model, based on extending a product's life and (or) reusing it and sharing it multiple times to minimize resource consumption and waste generation. Sharing appears to be one of the possible tools for the transition to a closed cycle and recycling of waste.

Digital technology can be seen as an essential contributor to the development of a circular economy through its ability to provide up-to-date information about products and assets. Digitization enables fewer resources to be used more efficiently. Intelligent solutions help to reduce energy consumption, more efficient use of logistics routes and capacities. Digitalization provides transparent access to data on the consumption of product resources and also allows to optimize product life cycles. In addition, digital technologies allow the creation of cyclical business models through automated monitoring, control, and optimization of resources (Pagoropoulos et al., 2017; Kirchherr et al., 2017; Bourguignon, 2016).

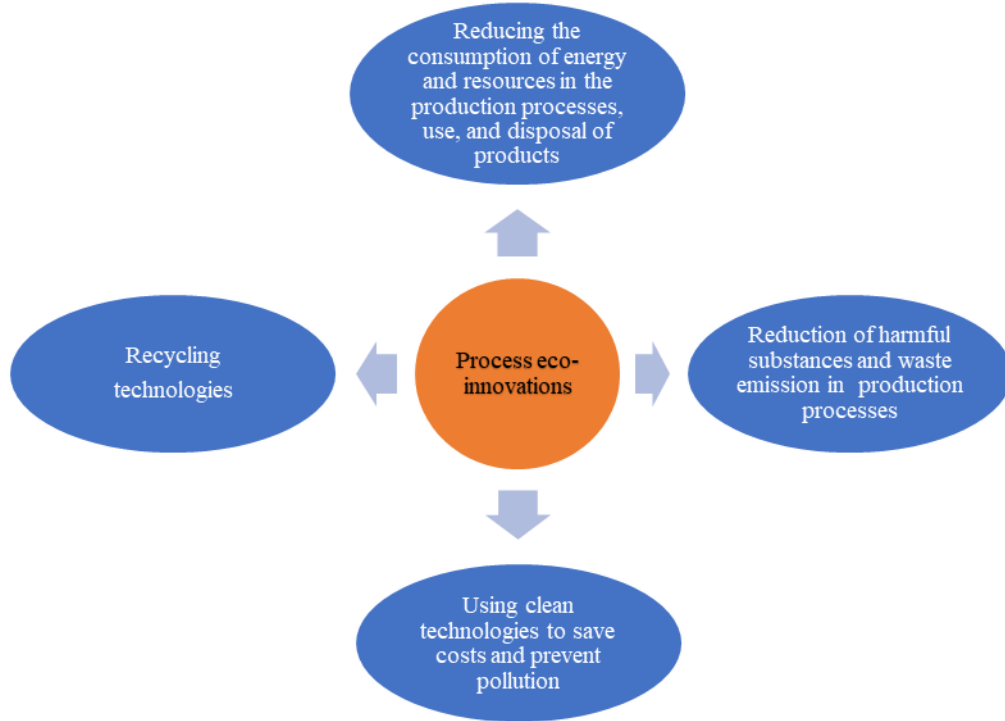


Figure 3. Process eco-innovation

Source: the authors

Cyclical business models can be divided into three groups depending on the direction of technological processes: slowing down, closing, and narrowing the cycle loop. Cycle deceleration is based on the idea of extending the product life cycle through design and maintenance. The closed-loop concentrates on efficiently recycling materials and can be realized, for example, by industrial symbiosis. Narrowing the cycle aims at using fewer resources per product and can be significantly enhanced by intelligent technology. Because they are closely related, cyclical business models are often combined.

Cyclical business models are network-based in nature and thus require different network participants to work together to achieve common goals. The idea behind a circular business model is that the cycle is not completed by one company but by an entire ecosystem. Therefore, networking and collaboration with stakeholders and new partners are needed to create circular business models. Digital collaboration platforms with virtual technologies play a significant role in networking and co-creation (Gawer, 2021; Pagoropoulos et al., 2017; Kirchherr et al., 2017; Bourguignon, 2016; Ghisellini et al., 2016). Consumers play an essential role in the transition to CE as adopters of new products and services. Accordingly, achieving a certain level of digitalization will allow strengthening the feedback from consumers, which will also contribute to strengthening the company's competitive position in the CE environment.

Changes in value creation for a wide range of actors must also be considered (Pagoropoulos et al., 2017). The effectiveness of the Internet business model in creating new value is primarily determined by its attractiveness to new users or developers and the possibility of obtaining a network effect. Platforms integrate knowledge from various sources, including user experience, to create an environment for the co-production of new value, creating a network effect. Business model innovation implies creating economic value for companies and stakeholders, including environmental and social value. In this way, innovative business models can contribute to the sustainable development of a company.

Organizational eco-innovations. Organizational eco-innovation involves the formation of institutions that promote the environmentally responsible behavior of manufacturers (development of environmental auditing, environmental management) (Fig.4).

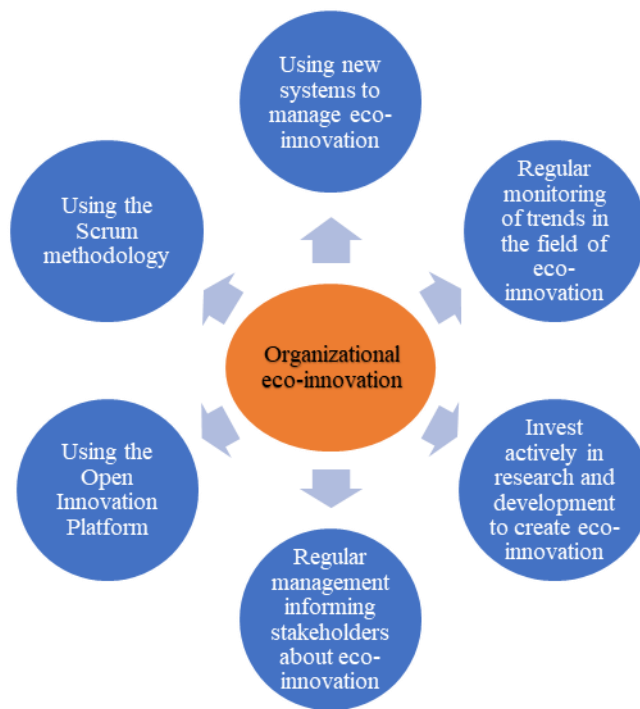


Figure 4. Organizational eco-innovation

Source: the authors

They are aimed at:

- setting priorities and rationalizing environmental costs,
- establishment of critical "ecological" points of production processes and their management in the current mode,
- regular monitoring of the primary sources of environmental hazards.

It is believed that if innovatively active enterprises derive additional benefits from process eco-innovation, then organizational eco-innovation benefits any company, regardless of their innovative potential. Organizational innovation is the least complex form of eco-innovation since it requires fewer financial and human resources to create and implement (Hojnik et al., 2017).

The primary trend in organizational innovation is open innovation platforms based on modern digital management tools. They form a qualitatively new space for co-production. The platform approach expands the knowledge base to provide user-oriented services based on open innovation. It goes beyond the living lab and experiment environment concepts to prioritize service and management aspects in the context of the digital platform economy. Therefore, the platform can be defined as a mechanism for coordinating open innovation. Management of joint activities as the basic model of the virtual economy period assumes that the consumer no longer owns the goods - they remain the producers or intermediaries who organize their everyday use. Any platform presupposes openness of the process, the involvement of a wide range of participants, the use of new forms and methods of value creation.

The novelty of this business model is in the virtual space, which opens up a wide range of opportunities. Unlike traditional organizational models, it allows the exchange of labor, information, cultural products, data storage and evaluation systems without space and time limitations. It is not limited to consumer goods and services but allows the exchange of labor, information, cultural products, data storage, evaluation systems, etc. The virtual context guarantees individuals greater freedom in choosing the time and place of work, but at the same time, responsibility for organizing the production process increases communication with other members of the project team and adherence to information policy. The virtual production context increases the requirements for the qualifications and flexibility of workers, project management skills, the ability to adapt to constantly changing conditions, and the composition of work teams throughout their professional life.

Organizational innovations aim to improve monitoring, analysis, and control of resource use, reduce the production cycle, organize resource recycling, and develop measures to save resources and minimize waste.

A particular project approach is used to form an integrated model of greening. This project considers all aspects of the enterprises' activities that synthesize all innovative processes.

6. Conclusion

Greening as a direction of sustainable development imposes new requirements on the business management process. In the modern period, the concept of sustainable development has acquired a complex - socio-ecological-economic - character. The environmental dimension is increasingly coming to the fore in companies' activities as a strategic goal. The fundamental elements of the ISO 14000 series of environmental management systems can become the basis for developing an enterprise's environmental strategy. The range of environmental strategies from the perspective of environmental potential can be presented on the basis of the opposition of two factors: market opportunities and environmental risks. Depending on the ratio of these factors, the following enterprise strategies are identified: Indifferent Strategy, Opportunity Strategy, Risk-based strategy, and Innovation strategy.

The need for innovative solutions arises when both market opportunities and the likelihood of risk to the environment are high. The choice of such a strategy is relevant to the imperatives of sustainable business development. The innovation strategy is most consistent with the "green economy" principles. It allows solving both the problem of maintaining dynamic economic growth and the problem of preserving the natural environment. The circular economy model has a high potential for creating innovations (product, process, organizational) that contribute to the development of new markets and the solution of problems related to conserving the planet's resources. The circular economy is based on business models, in which the emphasis is

shifted to the processes of reducing the consumption of materials and energy or their reuse, their recycling in the process of production, distribution, and consumption (Design for Environment, Sharing, digital technologies, open innovation platforms). Business model innovation contributes to sustainable economic development, as it involves creating economic value for companies, considering the value created for stakeholders, including environmental and social value.

Appendix

Table 1. Examples of declarations from economic strategies of the Russian Federation organizations

Organization	Declaration fragment
X5 Retail Group is one of the leading Russian food retail companies	Our global goals until 2030 are to reduce greenhouse gas emissions by 30%, reduce waste generation by 30%, and use 30% renewable energy in our own operating processes. A comfortable and safe environment for life is our contribution to the implementation of the national development goal of Russia until 2030. (X5 Retail Group).
ROS AGRO PLC - Russian agricultural and food company	In its activities, the company guarantees full and unconditional compliance with all the requirements of the current legislation in the field of nature protection and human health and tries in every possible way to minimize the impact of negative factors on people, natural resources, etc., and the environment. The principles of ensuring an ecological and economic balance between production and environmental safety form the basis of the company's activities and minimize financial and reputational risks, identify problematic issues at early stages and make the most effective decisions. Realizing its responsibility to society, the company expects its employees to understand the complexity and scale of the tasks it faces. The company's contribution to the preservation of a favorable environment is aimed at: reduction of negative impact on the environment in all segments; production of more environmentally friendly products, rational use of natural resources, both involved in the production and located in the regions of the company's operations. (Code of Business Conduct and Ethics ROS AGRO PLC).
ECOS Group is a group of specialized enterprises united by the management company "ECOS INVEST" LLC and working under a common brand in the field of treatment and reuse of municipal and industrial wastewater.	Professionals in our field undoubtedly bear social responsibility, which is why we see our development in the development of solutions filled with eco-innovations, especially relevant in the era of transition to an eco-economy. (ECOS Group).
Responsible Business Alliance - electronics industry	The company is aware of the total degree of responsibility before present and future generations for the company's activities' impact on the environment. The company consistently introduces production process technologies that reduce as much as possible the level of negative impact on the environment and ensure the minimum consumption of material and raw materials. Code of Business Conduct and Ethics (Responsible Business Alliance).
PJSC Gazprom	The company's large-scale production and gas transmission projects are implemented in regions with a high ecosystem vulnerability, which requires a cautious attitude. The company is aware of its responsibility to current and future generations for the impact on the environment t activities of the company and the legal entities under its control have. In its activities, the company adheres to the principle of dynamic economic growth with the most rational use of natural resources and preservation of a favorable environment for future generations. The company complies with national and international laws, standards, and environmental protection requirements related to its activities and products. The company's policy is also aimed at the most careful use of energy, water, land, and other natural resources in the production process, proper handling of industrial waste, careful and restrained use of hazardous materials and technologies. (Gazprom).

CJSC CUMMINS KAMA is a joint venture of such world leaders in the automotive industry as Public Joint Stock Company KAMAZ and Cummins Inc.	One of the priority tasks of the company is environmental protection and compliance with the company's current legislation and internal rules in this area. The company welcomes and supports the Employees' actions aimed at being environmentally conscious. The company consistently introduces new non-waste and low-waste technologies for the manufacture of products and production, as much as possible, reducing the level of negative impact on the environment and ensuring the minimum consumption of material and raw materials. (CUMMINS KAMA).
OJSC Enel OGK-5. Production, transmission and distribution of electricity, gas, steam and hot water	Solving environmental problems is one of the most important priorities of OJSC Enel OGK-5. In its work, the company adheres to the Environmental Policy approved in 2011, based on the principles of environmental safety and rational use of natural resources, expressing the intentions of OJSC Enel OGK-5 to improve the environmental performance of production branches constantly, to comply with federal and international standards. The company's main efforts in 2011 in the field of environmental protection were aimed at changing the structure of environmental protection processes management at the company's branches by bringing the environmental management system to the requirements of the international standard ISO 14001: 2004. (Enel OGK-5).

Source: authors

References

- Abd Razak, A., Rowling, M., White, G., & Mason-Jones R. (2016). Public Sector Supply Chain Management: A Triple Helix Approach to Aligning Innovative Environmental Initiatives. *Foresight and STI Governance*, 10(1), 43-52. <http://dx.doi.org/10.17323/1995-459x.2016.1.43.52>
- Ahmad, M. & Wu, YY. (2022). Combined Role of Green Productivity Growth, Economic Globalization, and Eco-innovation in Achieving Ecological Sustainability for OECD Economies. *Journal of Environmental Management*, 302, PartA: 113980. <http://dx.doi.org/10.1016/j.jenvman.2021.113980>
- Alum, E., Agyabeng-Mensah, Y., Sun, Z., Frimpong, B., Kusi, L. Y., & Acquah, I.S.K. (2020). Exploring the Link between Green Manufacturing, Operational Competitiveness, Firm Reputation and Sustainable Performance Dimensions: a Mediated Approach. *Journal of Manufacturing Technology Management*, 31(7), 1417-1438. <https://doi.org/10.1108/JMTM-02-2020-0036>
- An, S. & He, YH. (2021). Research on Quality Management of Economic System Based on Ecological Perspective. *Fresenius environmental bulletin*, 30(4), 3245-3251
- Asdal, K., Cointe, B., Hobaek, B., Reinertsen, H., Huse, T., Morsman, S., & Maloy, T. (2021). 'The Good Economy': a Conceptual and Empirical Move for Investigating how Economies and Versions of the Good are Entangled. *BioSocieties* 20 September 2021. <https://doi.org/10.1057/s41292-021-00245-5>
- Belin, J., Horbach, J., & Oltra, V. (2011). Determinants and Specificities of Eco-innovations - An Econometric Analysis for the French and German Industry Based on the Community Innovation Survey. *Cahiers du GREThA*. Discussion Paper 2011-17
- Bobylev, S. (2017). Sustainable Development: Paradigm for the Future. *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, 61(3), 107-113. <https://doi.org/10.20542/0131-2227-2017-61-3-107-113>
- Bourguignon, D. (2016). Closing the loop: New circular economy package. Brussels: European Parliament.
- Bressanelli, F., Adrodegari, M., Perona, M., & Saccani N. (2018). Exploring How Usage-Focused Business Models Enable Circular Economy through Digital Technologies. *Sustainability*, 10(3), 639. <http://dx.doi.org/10.3390/su10030639>

Chan, H.K., Wang, X., White, G.R.T., & Yip, N. (2013). An Extended Fuzzy-AHP Approach for the Evaluation of Green Product Designs. *IEE Transactions on Engineering Management*, 60(2), 327–339.

Chen, Y.-S. (2013). Towards Green Trust: The Influences of Green Perceived Quality, Green Perceived Risk, and Green Satisfaction. *Management Decision*, 51(1), 63–82. <http://dx.doi.org/10.1108/00251741311291319>

Code of Business Conduct and Ethics ROS AGRO PLC and group companies (2020). <http://os.x-pdf.ru/20raznoe/592031-1-kodeks-delovogo-povedeniya-etiki-ros-agro-pls-kompaniy-gruppi.php>

Code of Business Conduct and Ethics CJSC "CUMMINS KAMA" (2019). <https://www.cummins-kama.ru/rus/aboutt/komplaens/kodeksetiki/>

Code of Ethics of PJSC Enel OGK-5 (2019). <https://www.enelrussia.ru/content/dam/enel-com/documenti>

DEFRA (2011). Attitudes and Knowledge Relating to Biodiversity and the Natural Environment 2007–2011. London: Department for Environment, Food & Rural Affairs

Eco-innovation: the Key to Europe's Future Competitiveness (2013). *EU Publications. Directorate-General for Environment (European Commission)*. <http://dx.doi.org/10.2779/4155> <https://ec.europa.eu/environment/pubs/pdf/factsheets/ecoinnovation/en.pdf>

ECOS Group (2020). <https://www.ecosgroup.com/press/articles/>

Environmental management systems - Requirements with guidance for use (2015). ISO Central Secretariat, Geneva, Switzerland

European Commission (2020). Circular Economy Action Plan: For a cleaner and more competitive Europe. Brussels: European Commission. Access mode: https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

Gawer, A. (2021). Digital platforms and ecosystems: remarks on the dominant organizational forms of the digital age. *Innovation-Organization and management*, 17 Sep 2021. <https://doi.org/10.1080/14479338.2021.1965888>

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable Business Model Innovation: A Review. *Journal of Cleaner Production*, 198, 401–416. <http://dx.doi.org/10.1016/j.jclepro.2018.06.240>

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A Review on Circular Economy: The Expected Transition to a Balanced Interplay of Environmental and Economic Systems. *Journal of Cleaner Production*, 114, 11–32. <http://dx.doi.org/10.1016/j.jclepro.2015.09.007>

Govindan, K., Diabat, A. Madan, & Shankar K. (2014). Analyzing the Drivers of Green Manufacturing with Fuzzy Approach. *Journal of Cleaner Production*, 96(1), 182–193. <http://dx.doi.org/10.1016/j.jclepro.2014.02.054>

Green Growth: Overcoming the Crisis and Beyond (2009). OECD. <https://doi.org/10.1787/9789264083639-en> <https://www.oecd.org/env/43176103.pdf> (accessed 27.11.21)

Hillary, R. (2004). Environmental management systems and the smaller enterprise. *Journal of Cleaner Production*, 12, 561–569.

Hojnik, J., Ruzzier, M., & Manolova, T. (2017). Eco-Innovation and Firm Efficiency: Empirical Evidence from Slovenia. *Foresight and STI Governance*, 11(3), 103–111. <http://dx.doi.org/10.17323/2500-2597.2017.3.103.111>

Horbach, J. (2008). Determinants of Environmental Innovation - New Evidence from German Panel Data Sources. *Research Policy*, 37(1), 163–173. <http://dx.doi.org/10.1016/j.respol.2007.08.006>

Huddart, Kennedy E., & Givens, J.E. (2019). Eco-habitus or Eco-powerlessness? Examining Environmental Concern across Social Class. *Sociological Perspectives*, 62 (5), 646–667. <http://dx.doi.org/10.1177/07311214198369664>

Ivlev, V.Y., Ivleva, M.I., & Ivleva, M.L. (2019). Ecological Regulation of Economy as a Concept of Social Philosophy. *Voprosy filosofii*, 7, 111–121 <http://dx.doi.org/10.31857/S004287440005737-5>

Johl, S.K. & Abu Toha, M. (2021). The Nexus between Proactive Eco-Innovation and Firm Financial Performance: A Circular Economy Perspective. *Sustainability*, 13(11), 6253 <http://dx.doi.org/10.3390/su13116253>

- Johnson, M.W., Christensen, C.M., & Kagermann, H. (2008). Reinventing Your Business Model. *Harvard Business Review*. 87 (December), 52–60.
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the Circular Economy: An Analysis of 114 Definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting Consumers who are Willing to Pay More for Environmentally Friendly Products. *Journal of Consumer Marketing*, 18(6), 503–520. <http://dx.doi.org/10.1108/EUM0000000006155>
- Milovidov, V. (2020). The “Linked Prosperity” Model as an Integrated Response to Corporate Management Challenges in a Network Society. *Foresight and STI Governance*, 14(4), 112–120. <http://dx.doi.org/10.17323/2500-2597.2020.4.112.120>
- Mirzekhanova, Z. G. (2020). Implementation of the Conceptual Provisions of the Green Economy Model in the Russian Far East. Environmental Prerequisites. *Economy of the Region*, 16(2), 449–463. <http://dx.doi.org/10.17059/2020-2-9>
- Pagoropoulos, Aris, Pigosso, Daniela C.A., McAlone & Tim C. (2017). The Emergent Role of Digital Technologies in the Circular Economy: A Review. *Procedia CIRP*, 64, 19–24. <http://dx.doi.org/10.1016/j.procir.2017.02.047>
- Plant, E., Yusen, X., & White, G.R.T. (2015). Green Supply Chain Management in Chinese Electronic Manufacturing Organisations: An Analysis of Senior Managements’ Perceptions. *International Journal of Social Ecology and Sustainable Development*, 6(3), 21–30 <http://dx.doi.org/10.4018/IJESD.2015070102>
- Ratner, Svetlana & Ratner, Pavel. (2016). Regional Energy Efficiency Programs in Russia: The Factors of Success. *Region*, 3, 69–85. <http://dx.doi.org/10.18335/region.v3i1.71>
- Responsible Business Alliance. Access mode: http://www.responsiblebusiness.org/media/docs/RBACodeofConduct6.0_Russian.pdf
- Roscoe, S., Subramanian, N., Jabbour, C.J.C., & Chong, T. (2019). Green Human Resource Management and the Enablers of Green Organizational Culture: Enhancing a Firm’s Environmental Performance for Sustainable development. *Business Strategy and the Environment*, 28, 737–749. <https://doi.org/10.1002/bse.2277>
- Sarkar A.N. (2013). Promotion of Eco-innovation to Leverage Sustainable Development of Eco-industry and Green Growth. *International Journal of Ecology and Development*, 25(2), 71–104. Access mode: <http://www.ecsdev.org/ojs/index.php/ejsd/article/view/48>
- Schwab, K. (2019). *Davos Manifesto 2020: The Universal Purpose of a Company in the Fourth Industrial Revolution*. Geneva: World Economic Forum. Access mode: <https://www.weforum.org/agenda/2019/12/davos-manifesto-2020-the-universal-purpose-of-a-company-in-the-fourth-industrial-revolution/>
- Stojanovic, M. (2019). Conceptualization of Ecological Management: Practice, Frameworks and Philosophy. *Journal of agricultural & environmental ethics*, 32(3), 431–446. <http://dx.doi.org/10.1007/s10806-019-09783-2>
- Sustainable development strategy x5 group. (2020). <https://esg.x5.ru/ru/goals/planet/>
- The Future We Want*. The Outcome Document of the UN Conferention Sustainable Development. United Nations, Rio de Janeiro, Brazil on 20-22 June 2012. <https://sustainabledevelopment.un.org/rio20> (accessed 27.11.21).
- The Road to Rio+20: For a Development-led Green Economy*. Third issue / S. Cullis-Suzuki [et al.]. (2012). New York, Geneva: United Nation
- Triguero, A., Moreno-Mondéjar, L., & Davia, M.A. (2013). Drivers of different types of eco-innovation in European SMEs. *Ecological Economics*, 92, 25–33. <http://dx.doi.org/10.1016/j.ecolecon.2013.04.009>
- UN Green Economy (2021). Geneva: United Nations. Access mode: <https://www.unenvironment.org/regions/asia-and-pacific/regionalinitiatives/supporting-resource-efficiency/green-economy>, accessed 12/16/2021
- White, G.R.T., & Lomax, M. (2010). Environmental Management Systems: Costs, benefits and an activity theory approach to understanding their knowledge-generating capabilities. *The Environmentalist*, 100, 12–16.

White, G.R.T., & James, P. (2014). Extension of Process Mapping for the Identification of ‘Green Waste’. *Benchmarking: An International Journal*, 21(5), 835–850. <http://dx.doi.org/10.1108/BIJ-07-2012-0047>

White, G.R.T., Wang, X., & Li, D. (2014b). Inter-Organisational Green Packaging Design: A Case Study of Influencing Factors and Constraints in the Automotive Supply Chain. *International Journal of Production Research*, 53(21), 1-16. <http://dx.doi.org/10.1080/00207543.2014.975854>

White, G.R.T., Sarpong, D., & Ndrecjaj, V. (2015). Sustainable Packaging: Regulations and Operational Challenges in a Manufacturing SME. *International Journal of Social Ecology and Sustainable Development*, 6(3), 31–40.

Wiesmeth, H. (2020). Systemic Change: The Complexity of Business in a Circular Economy. *Foresight and STI Governance*. 14(4), 47-60. <http://dx.doi.org/10.17323 / 2500-2597.2020.4.47.60>

Working towards a Balanced and Inclusive Green Economy: A United Nations Systemwide Perspective /Prepared by the Environment Management Group (UNEMG), 2011 [Electronic resource] URL: <http://www.unemg.org/Portals/27/Documents/IMG/GreenEconomy/report/GreenEconomy-Full.pdf>

Xu, Y. (2019). Impact of management power on enterprise ecological innovation. *Journal of environmental protection and ecology*, 20, 111-118. Special Issue A

Yan, J., Yang, J., Zhu, F. & Teng, Z. (2021). Green City and Government Ecological Environment Management Based on ZigBee Technology. *Environmental Technology & Innovation*, 23, 101711 <http://dx.doi.org/10.1016/j.eti.2021.101711>

Funding: The research is partly financed by Daugavpils University, Latvia

Data Availability Statement: More information and data can be found in the repository on Zenodo: <https://zenodo.org/record/5850017#.YeGGQtHP02w>, <https://zenodo.org/record/5850173#.YeGIY9HP02w>

Data Availability Statement: This publication is supported by multiple datasets, which are openly available at locations cited in the reference section.

Author Contributions: Conceptualization: *Natalia Mamedova*; methodology: *Natalia Mamedova, Zoya Bezveselnaya, Marina I. Ivleva, Vera Komarova*; data analysis: *Natalia Mamedova, Zoya Bezveselnaya, Marina I. Ivleva, Vera Komarova*; writing—original draft preparation: *Natalia Mamedova, Zoya Bezveselnaya, Marina I. Ivleva, Vera Komarova*; writing; review and editing: *Natalia Mamedova, Zoya Bezveselnaya, Marina I. Ivleva, Vera Komarova*; visualization: *Natalia Mamedova, Zoya Bezveselnaya, Marina I. Ivleva, Vera Komarova*. All authors have read and agreed to the published version of the manuscript.

Natalia MAMEDOVA is Doctor of Science (Philosophy), Professor, History and philosophy department, Plekhanov Russian University of Economics, Moscow, Russian Federation. Research interests: the author of more than 90 publications on socio-economic dynamics, psychology of advertising activity. The head of the project "Social Anthropology: Integration of Sciences" received a grant from the Russian Foundation for Basic Research.

ORCID ID: orcid.org/0000-0002-7887-8724

Zoya BEZVESELNAYA is PhD (Philosophy), Associate Professor, History and philosophy department, Plekhanov Russian University of Economics, Moscow, Russian Federation. Research interests: author of articles on the problems of business ethics, business communications, the culture of management of labor processes, axiological foundations of economic activity. The author of textbooks for graduate students "Philosophy of Science" and "History and Philosophy of Science."

ORCID ID: orcid.org/0000-0003-1403-1900

Marina I. IVLEVA is PhD (Philosophy), Associate Professor, History and philosophy department, Plekhanov Russian University of Economics, Moscow, Russian Federation. Research interests: ecology, green economy, sustainable development, communicational aspects of modern informational society.

ORCID ID: orcid.org/0000-0002-5134-7595

Vera KOMAROVA (Dr.oec.) is the leading researcher at the Social Investigations Centre of the Institute of Humanities and Social Sciences of Daugavpils University (Latvia). She has the status of the expert of Latvian Council of Science in the field of economics and entrepreneurship and the external expert of the COST Association. Research interests: regional economics, sustainable development, creative economy, social research methodology, quantitative research methods, social stratification.

ORCID ID: orcid.org/0000-0002-9829-622X

Make your research more visible, join the Twitter account of ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES:
@Entrepr69728810

Copyright © 2022 by author(s) and VsI Entrepreneurship and Sustainability Center

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>



Open Access