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## **Innovative Approach to Business Development in the Field of Waste in the Republic of Kazakhstan**

### **Abstract**

*Object:* To research business development opportunities based on the principles and models of the closed-cycle economy in the field of solid household waste (SHW).

*Methods:* General scientific methods (analysis and synthesis, comparison and analogy, hypothetical method) and special methods (formal-logical method, statistical analysis).

*Results:* An analysis of the formation and processing of solid waste in the country revealed problems in this area. A comparative analysis of solid waste processing in Kazakhstan and non-CIS countries, as well as the profitability of waste recycling business in developed countries, showed that the waste sector is a prospective niche for the development of “green” business. The foreign studies contribute to the relevance of the use of business models of the circular economy, which implies the processing of waste into secondary raw materials and its use at different stages of the production process. The research identified the obstacles hindering the development of innovative businesses in the field of waste; suggested ways to solve the problems of the MSW sphere.

*Conclusions:* The results depict that there is a significant potential for the development of an innovative business for the processing and recycling of waste in the field of solid waste management in Kazakhstan. To further develop this area, it is recommended to use the principles and business models of the circular economy, to create favorable conditions for entrepreneurial activity.

*Keywords:* green economy, circular economy, closed-cycle economy, business models, solid household waste (SHW), recycling, extended producer responsibility, recycling, innovative business, “green” business.

### **Introduction**

The relevance of the research is justified by the fact that Kazakhstan has accumulated a large amount of waste, including solid household waste (SHW), which had a negative impact on the state of the environment and the health of the country’s population. In this regard, the improvement of waste management was chosen as one of the priority areas of the Concept for the transition of the Republic of Kazakhstan to a “Green Economy” (Adilet, 2013). Despite the adoption of a number of measures (a ban on the disposal of certain types of waste, the introduction of separate garbage collection, the creation of the Operator ROP LLP, amendments to the Environmental Code designed to increase the volume of waste collection and processing and to support domestic producers), an effective SHW management system with a sufficient level has not yet been created in the country recycling and reuse of waste: according to the plan 40% by 2030, 50% by 2050.

The global trend for solving the garbage problem is a circular economy based on the transition from landfill placement and disposal of waste to industrial processing, as a result of which waste from one production becomes resources for another. The concept of “waste as resources (waste-as food concept)” is based on the principles of “4R”: Reduce (reduce the use of resources), Reuse (reuse or sharing of the product), Recovery, Recycle (waste recycling). In relation to the object of research, it is proposed to add the fifth principle – Reclamation. In contrast to the linear economy, in which natural resources are converted into products, and then into waste, in the circular economy at the beginning of the product life cycle, the principle of minimizing waste that may remain from it at the end of the life cycle is laid down.

The greatest progress in relation to the circular economy is observed in the EU countries due to the coherence of national waste management policies and plans, waste framework legislation (the first waste law was adopted in 1975), the creation of sustainable waste management and inventory systems, clear waste clas-

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sification and a European hierarchy of waste management methods. The development of the circular economy in the EU has provided the creation of 4 million jobs, € 147 billion of added value, and the inflow of € 17 billion of private investment (Eurostat, 2022). In the USA, according to the Law “On Combating Solid Waste” (1976), it is prohibited to create new landfills; mandatory standards prescribe the minimum content of secondary material resources of products in manufactured products. Thus, the cheapest and at the same time profitable way to get rid of waste is recycling. Along with this, there is a program of transition from a linear model to an economy with a multi-turn use of Circular Economy 100 products (CE100). In Japan, the laws are strictly observed: “On the examination of new chemicals” (1973), “On General Environmental expertise” (1988), and “On a society with a sustainable material cycle” (2000). The Government of Japan, along with the tightening of the regulatory framework of state regulation, shifted all costs to firms-pollutants by creating a system of sanctions and fines for them. Due to high costs and difficult financial situations, these companies were forced to introduce environmentally friendly methods into production. As a result, Japan has become a recognized leader in the field of environmental business. In 2002, China developed a circular economy under the industrial ecology program, using waste from one production as raw materials for another. In 2008, the Law on the Promotion of the Circular Economy was adopted, in 2013, an Action Plan for the Development Strategy of the Circular Economy of China was developed and the China Association of Circular Economy was established (Lieder & Rashid, 2016). This organization conducts state policy on environmental protection and conservation of natural resources, monitors the implementation of the law on the circular economy, and promotes the development of plans for the development of the concept of the circular economy at the level of industries and enterprises. Turkey, together with the European Bank for Reconstruction and Development (EBRD), has been implementing the Near-Zero Waste program since 2015 to minimize waste and increase the efficiency of resource use in industry, agribusiness, and the municipal sector.

Currently, there is no waste management law in Kazakhstan; the circular economy has not received public recognition, proper economic justification, and practical application. In recent years, several individual projects and scientific publications have appeared, ways of transition to a closed-loop economy are being discussed, and a Strategy for the introduction of a circular economy in Almaty was developed in 2017, but there are still no tangible, concrete results. In this regard, this article is about the possibility of using the principles and business models of the circular economy in the practical activities of Kazakhstani entrepreneurs in the field of solid waste, making a certain contribution to the field of waste management.

The authors hypothesized that the first step to achieving the targets of the Concept of the Republic of Kazakhstan for the transition to a “Green Economy” is the creation of a circular economy – a closed-cycle economy, which implies waste-free production and the most efficient use of resources. The second hypothesis of the research is that the development of circular business processes in Kazakhstan related to the sorting, processing, and reuse of solid waste will provide “growth points”, and will enable entrepreneurs to refocus on innovative business models.

### ***Literature Review***

It should be noted that for the first time the idea of switching to a circular economy instead of the existing linear model of industrial growth highly dependent on resources, was proposed by the Swiss Architect Walter Stahel in 1970. The first scientific publications of scientists devoted to the issues of the circular economy appeared in 2005; since 2014, the number of works devoted to the concept of circular economy has been growing every year. In the scientific literature, terms such as “cyclical economy”, “circular economy”, and “closed-loop economy” are sometimes used. Theoretical studies of the problems and prospects of the circular economy are conducted by scientists all around the world. To date, there have been various approaches to the content of the “circular” economy: 1) A business model implemented by individual business entities (Murray et al., 2015); 2) A mechanism regulating the ecological and economic state of urbanized territories and regions (Law of the People’s Republic of China “On Evaluation of Environmental Effects”, 2002; Fischer-Kowalski et al., 2011; Roos, 2014; Moriguchi, 2007); 3) A model for building the world economy (Allen, 2012).

Kalmykova et al. (2017) reviewed the theories, practices, and tools for implementing the closed-loop economy. Geissdoerfer (2017) analyzed many studies on the circular economy and revealed that the largest number of publications were identified in China and the European Union. Korhonen (2018) examined the limitations of the circular economy from the point of view of environmental sustainability.

Concerning our research, it is important to outline practically significant publications. It should be noted that a practice-oriented approach to the formulation of a closed-cycle economy is mainly set out not in

scientific literature, but in government documents and initiatives of public organizations. They include the Standing Committee of the National People's Congress, China; the European Commission, European Union (EU); the International Reference Center for the Life Cycle of Products, Processes, and Services (CIRAIG), Canada; Ellen MacArthur Foundation (EMF). The modern approach to the circular economy is to create such production systems in which the product life cycle increases over a number of cycles (see Figure 1). According to this approach, waste disposal, which is popular in Kazakhstan, is the worst form of waste management.

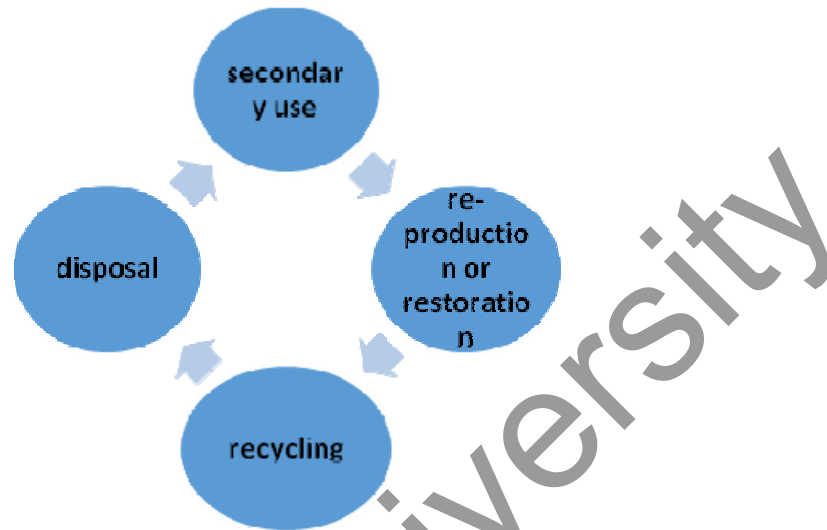


Figure 1. A practice-oriented approach to the circular economy

Note – Compiled by the authors

The Ellen MacArthur Foundation has developed the most meaningful and therefore widespread model of circular economy, which ensures consistent reproduction of the efficiency of resources inherent in nature itself and the principle of non-waste. The EU has developed a strong regulatory framework that has allowed achieving important results in building a closed-loop economy: the Waste Framework Directive (Directive 2008/98/EU); An EU action plan for the Circular Economy (European Commission, 2015); the European strategy for smart, sustainable and inclusive growth (EUROPE, 2020); A new Circular Economy Action Plan (European Commission, 2020).

The research of the Accenture consulting company is of practical interest: 1) “The Circular Economy Handbook” (Peter Lacy et al., 2013), which outlines practical recommendations to enterprises for the transition to a cyclical closed model to increase the competitiveness and sustainability of business; 2) the book “Waste to Wealth” (Peter Lacy and Jakob Rutqvist, 2015) proves that in case of abandoning the traditional linear system of production and consumption by 2030, 4.5 trillion US dollars (potential economic benefit) can be obtained. Also, the British standard “Guidelines for the implementation of the principles of circular economy” is considerable in our opinion, because it contains mechanisms and business models that facilitate the transition to a circular economy (BS 8001– a Guide, 2018).

In the Russian economic literature, the theoretical aspects of the circular economy have been studied well (Kokoulina, 2015; Konyaev et al., Serbulova et al., 2016; Bakhtina, Zlobina; Pakhomova et al., 2017; Guryeva M., Butko V.; Didenko N. et al., 2018; Kokina Yu.; Kudryavtseva O. et al., Rumyantseva A. Kalyamova A., 2019; Mochalova L., 2020). The analysis of opportunities for Russia's transition to a circular economy was carried out by (Osipenko N. et al.; Tupitsyna A., Esipova O., 2017; Bakhmurin S. et al., Bobkov I., 2019). Foreign experience in the implementation of innovative business models in the practice of waste management was studied by (Vorotnikov A. et al., Plastinina Yu. et al., 2018; Shakirova A., Nikulina S.; Filchenkova O., 2019; Larchenko L., Kuramshina L., 2020). Along with this, Vetrova M. (2018) using the example of the Russian automotive industry, justified the design solutions of enterprises in the conditions of the formation of a circular economy. Ignatov (2018) developed a methodology and technological solutions for recycling machines and aggregates in the agro-industrial complex to create an effective sectoral system for the disposal of decommissioned agricultural machinery. Ilyina A. (2018) based on the research of foreign experience of remanufacturing, identified difficulties and prospects for the development of the circular econ-

omy in Russia. (Rezanko P., 2018) justified the scaling of the Carsharing business model for short-term car rental and developed recommendations to stimulate the development of such a model in the Russian Federation. (Syroezhkina E., 2018) identified the reasons that encourage Russian companies to use closed-cycle economic models and barriers preventing this; developed recommendations for the introduction of circular economy models taking into account the specifics of the Russian context. (Burdenko E. et al., 2020) released the Handbook "Circular Economy Experience: A Russian Perspective"; Ryazanova O. et al., 2021) - the textbook "Circular Economy" for bachelor's and master's degrees.

In Kazakhstan, studies of the circular economy are at the initial stage, some publications are populist in nature, and do not adequately meet the demands of time and economic science (Syzdykbaev A., 2016; Industry portal of the mining and metallurgical industry, 2016; Musin A., 2019; Tumashova E., 2019; Kazakhstan Association for Waste Management ("KazWaste"), 2019). The really significant studies include: an international project of the Dutch companies "Shifting Paradigms", "Circle Economy", "Fabrications" and the NGO "Center for Sustainable Production and Consumption" to explore opportunities for implementing the principles of circular economy in the Almaty and Almaty region (2018-2019); an educational project of Kostanay Regional University named after A.Baitursynov "Promotion of circular economy in partner countries through the development and implementation of the Master's program "Waste Management" (2021-2024); the scientific project of the KazNU team of authors "Development of the circular economy in Kazakhstan: potential, trends, prospects" (2021-2023).

Along with this, a number of scientific publications appeared in which: (Ausharipova D. et al., 2020) justified the circular economy as a tool for the development of "green" business; (Duisembayev A. et al., 2020) investigated the problems of the circular economy in the formation of environmentally responsible hotels. (Lygina O. et al., 2021) made an attempt to consider waste management in the context of the transition to a circular economy (on the example of Kazakhstan); (Tleppaev A. et al., 2021) evaluated the indicators of the circular economy of the EU countries and the possibility of their application in the conditions of Kazakhstan.

The problem of our research is to identify opportunities for the development of businesses for the processing and recycling of solid waste in the Republic of Kazakhstan from the standpoint of a closed-cycle economy.

### **Methods**

The object of the research is the sphere of solid household waste (SHW), the subject is organizational and economic relations for the development of environmental entrepreneurship in this area. The literature review was conducted by the keyword "circular economy", "waste" in the title, keywords, or annotation of the document in the databases: Google, Google Scholar, Scopus, CyberLeninka, disserCat, eLibrary, etc. The following methods were used during the research: Content analysis, which allowed to systematize scientific research on the circular economy and the state of the waste sphere; analysis and synthesis, which made it possible to assess the potential of the SHW sphere for the development of innovative business; comparison with the best practices of developed countries; analogy when recommending the use of circular principles and business models; graphic and tabular methods for visualizing the results of statistical analysis of the SHW sphere. Two hypotheses were put forward using formal-logical and hypothetical methods. The data of expert assessments, regulatory and policy documents, reporting, and statistical materials were also used.

### **Results**

A review of scientific publications has shown that there are currently many definitions of the circular economy. There is a classic one: "An economy that has a restorative and closed nature, which strives to preserve the usefulness and value of products, materials, and components all the time, while taking into account differences in technical and biological cycles" (Ellen MacArthur Foundation, 2015). In a circular economy, the need for extraction of new resources is reduced and at the same time, the negative impact on the environment due to emissions and waste is reduced.

From the standpoint of our research, the definition of modern authors is the most appropriate: "A circular economy is an economic system that aims at zero waste and pollution throughout the entire life cycle of materials, from environmental extraction to industrial transformation and to end-users, applying to all ecosystems involved. At the end of the service life, the materials are returned either to the industrial process or, in the case of processed organic residue, safely returned to the environment, as in a natural regenerating cycle"(Gustavo Cattelan Nobre et al., 2021).

The main postulate of the closed-cycle economy is to get the maximum effect from all stages of the product life cycle, and therefore effective waste management is one of the main directions of the circular economy. Waste as resources can be used in 2 directions: 1) using garbage streams as sources of secondary resources; 2) collection of waste for recycling and recycling. In this regard, we will analyze the scope of solid waste treatment in Kazakhstan. According to the Bureau of National Statistics of the Agency for Strategic Planning and Reforms (ASPR) of the Republic of Kazakhstan, by the end of 2020, Kazakhstan has accumulated over 120 million tons of solid waste, the volume of which increases annually by about 4.5–5 million tons due to increased consumption of goods by the population and expansion of their assortment, increasing various types of containers and packaging (Table 1).

Table 1. Dynamics of generation and recycling SHW, 2015–2020

Indicators	Unit of measurement	2015	2016	2017	2018	2019	2020
SHW generation	thousand tons	5 467,3	5400,9	4 864,3	4319,2	4 736,6	4 551,7
SHW generation index	% 2015=100%	100,0	98,8	89,0	79,0	86,6	83,3
Intensity of SHW generation	kg	311,7	303,5	269,7	236,3	255,8	242,7
SHW generation per unit of GDP	kg /1000 international dollars in 2017 prices	12,8	12,5	10,8	9,3	9,7	9,4
	kg /1000 US dollars, in 2005 prices	56,2	54,9	47,5	40,5	42,5	41,9
	kg / thousand tenge, in 2005 prices	0,4	0,4	0,4	0,3	0,3	0,3

*Note – Compiled by the authors based on (Bulletin "About municipal waste management in the Republic of Kazakhstan ", 2020)*

Experts considered that if measures are not taken for the disposal and recycling of waste, then by 2025 the volume of SHW will increase to 8 million tons per year. Despite the fact that the volume of SHW in 2020 decreased by 1.2 times compared to 2015, almost 243 kg of waste per citizen of Kazakhstan accounted for. According to our calculations, the main producers of waste are households, i.e., the population of the country produces 71.4% of the total mass (see Figure 2).

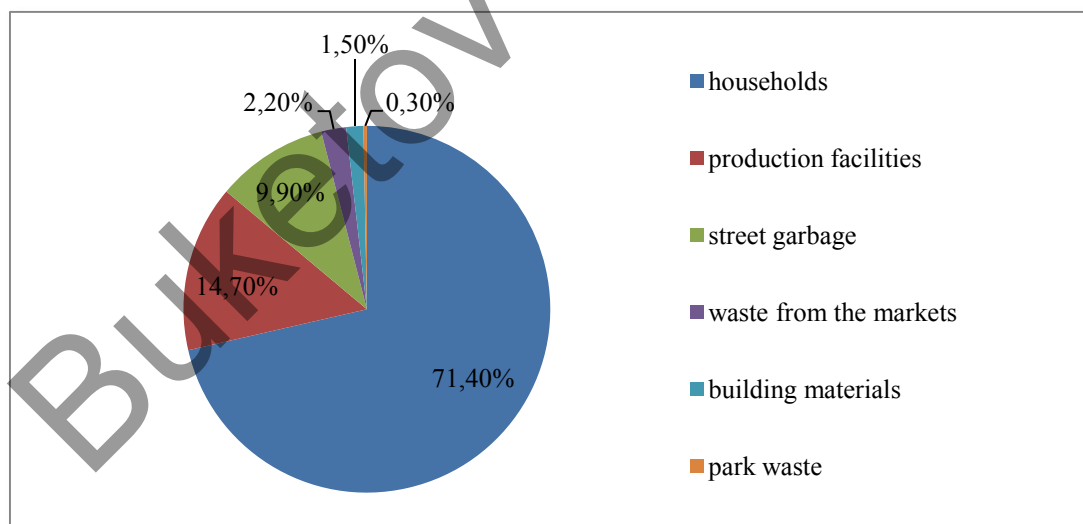


Figure 2. Structure of municipal waste generated in Kazakhstan, 2020

*Note – Compiled by the authors based on (Bulletin "About municipal waste management in the Republic of Kazakhstan", 2020)*

During the analysis, it was revealed that most of the SHW (97% in 2020), without the use of separate collection and pre-sorting into components, is exported to landfills, which for the most part (81.8%) do not meet the requirements of sanitary rules and environmental legislation. Along with this, according to the space monitoring data of JSC "NC "Kazakhstan Garysh Sapary" and the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, 8884 spontaneous garbage dumps were found in the country

(Zhuravleva E., 2021). In Kazakhstan, about 70% of the urban population is provided with services for the collection and removal of the SHW (100% in Almaty to 44.5% in the Akmola region). Despite the fact that separate garbage collection was introduced by law in 2016, less than half of the country's cities are currently covered by it (94 cities out of 204). Garbage sorting is carried out only in 80 out of 6000 settlements of Kazakhstan (less than 1%).

Solid waste is collected and transported by specialized waste collection and disposal enterprises, as well as individual entrepreneurs (sole proprietors). According to the Bureau of National Statistics (ASPR) of the Republic of Kazakhstan, in 2020 the total number of enterprises for the collection and removal of municipal waste increased by 6.5% compared to last year (amounted to 625); the number of individual entrepreneurs increased by 20.5% (206 sole proprietors). These facts indicate that the sphere of waste processing is becoming attractive for businesses. However, it should be noted that there is not a single operating plant in the country for the complete processing of solid waste with the production of secondary products. Spot recycling is carried out in small volumes at waste sorting plants in three cities: Nursultan, Shymkent, and Zhanaozen. Also, the processing is carried out by some small and medium-sized businesses that process individual components of solid waste. There are 34 enterprises in the register of specialized enterprises that dispose of packaging waste; 24 organizations that collect, transport, process, neutralize, use and dispose of waste of automotive components. In 2021, 3 more waste sorting complexes with a total capacity of about 300 thousand tons of waste per year were to be launched: in Semey, Ust-Kamenogorsk, and Aktobe.

In 2020, according to our calculations, more than half of solid waste (57.1%) was taken to landfills for further storage, 39.2% – sorted, 13.7% – sent to waste processing plants for further processing. Of the total volume of waste in 2020, only 13 thousand tons (0.46%) were processed to obtain secondary raw materials.

We have analyzed the data on recycling, and reuse of solid waste (Table 2).

Table 2. Dynamics of indicators of SHW disposal in Kazakhstan

Indicators	Unit of measurement	2015	2016	2017	2018	2019	2020
Volume of processing, secondary use of the SHW	thousand tons	99,7	140,3	440,0	497,1	705,2	868,9
Share of processing, recycling of the SHW	%	1,8	2,6	9,0	11,5	14,9	18,6

*Note – Compiled by the author based on (Bulletin "About municipal waste management in the Republic of Kazakhstan", 2020)*

Table 2 shows that the share of waste recycling in 2020 was less than 20%, although it increased almost 10 times compared to 2015. For comparison, 100% of waste is disposed of in Sweden, of which over 50% is recycled, 49% is incinerated to produce renewable energy and only 1% is sent to landfills (Shalginsky, 2021). In Finland, 99% of SHW is disposed of, of which 41% is recycled into secondary raw materials, 58% is burned to produce energy. In Germany, this figure reaches 66%, about 2/3 of the waste is disposed of domestically, 1/6 of it is exported to other EU countries, and the rest is burned to generate electricity (Tishchenko, 2018). In South Korea, which entered the top five in waste recycling in 2018, the recycling rate was 53.7%. The EU countries plan to increase the share of processing of all packaged goods to 70% by 2030, and household waste to 65% by 2035 (Koshik et al., 2018).

The best practices of the leading countries of the world show that waste recycling is a profitable business: for example, in Germany, the average annual turnover of this industry amounted to 200 billion euros (<https://www.dw.com>) and in the USA – 240 billion dollars (Tass.ru, n.d.). Along with this, the development of a waste recycling business allows you to create new jobs. For example, in Germany, which is one of the suppliers of recyclables on the world stage, about 250 thousand people worked in this industry in 2018. In the EU countries, due to the introduction of the circular economy, by 2035 it is planned to create an additional 170 thousand jobs in the field of waste management.

### Discussion

As a result of the analysis, a number of problems inherent in the field of solid waste in Kazakhstan have been identified (see Figure 3).

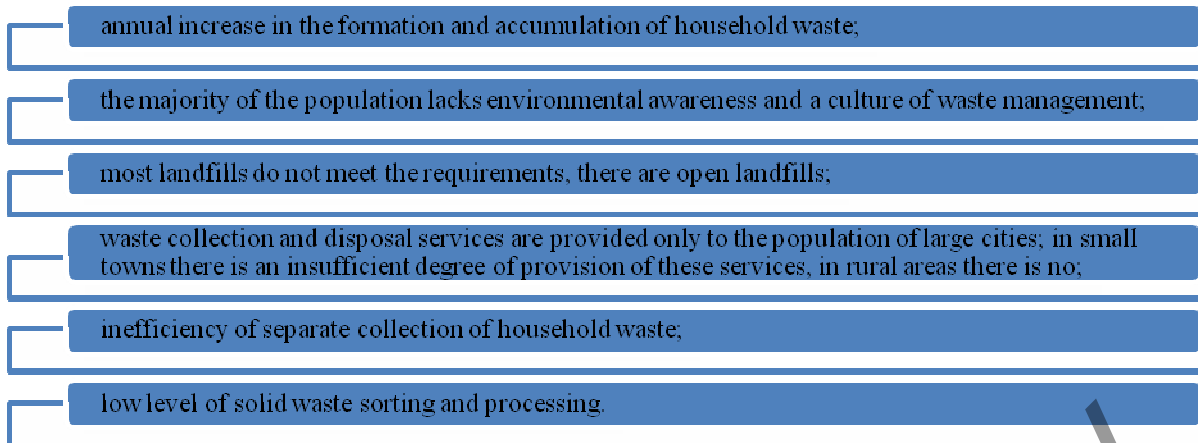


Figure 3. The main problems of the SHW sphere

*Note – Compiled by the authors*

Based on a review of the literature and world experience in waste management, the following ways of solving the problems of the SHW sphere are proposed: the adoption of a special law regulating activities in the field of waste of the Republic of Kazakhstan (“On Waste”); reducing the amount of waste by means of a closed cycle of circular production (prevention of waste generation); reuse of waste as secondary raw materials (recycling of waste until complete extraction of useful substances); introduction of safe waste disposal by tightening operational and technical requirements for waste and landfills; priority use of waste recycling methods instead of incineration and burial; a separate collection of all packaging waste that is recycled and reused (paper, plastic, scrap metal, glass) and food waste; removal of hazardous, toxic, radioactive waste (accumulators, batteries, pesticides, paint and varnish materials, etc.) from the flow of solid waste in order to prevent them from being stored at landfills and disposed of (with the help of permanent collection points or special days of collection of these wastes); waste disposal at the expense of the manufacturer.

For greater objectivity, it should be noted that there are still some elements of a circular economy in Kazakhstan: certain types of waste are processed (paper waste, car batteries, used oils and lubricants, glass, plastic, paper, and cardboard packaging). However, the share of solid waste processing remains at a fairly low level compared to the total volume of education.

The research found barriers hindering the development of the circular economy in the field of solid waste: the majority of the population does not know anything about the circular economy and innovative business models, and is not interested in these issues; there is no State waste management program, no national circular economy strategy; potential investors and businessmen lack the motivation to create enterprises for recycling and reuse of waste; entrepreneurs operating in the field of solid waste have no desire to invest their own funds in improving waste management methods, acquiring modern recycling technologies, and improving the quality of services provided; the approved tariffs barely cover the costs of removal and storage at landfills, they do not take into account the costs of recycling and reuse; there are no qualified personnel for waste recycling and recovery, as well as management of the MSW sphere; the innovation ecosystem and the corresponding infrastructure have not been created.

To effectively implement the principles of circular economy in the business sphere, including the processing of household waste, it is necessary to change the existing practice when enterprises focus on increasing the consumption of raw materials to increase sales of finished products, without due consideration of consumer demand and consumption. In this regard, Kazakhstani entrepreneurs need to research and apply new business models based on the reuse and restoration of decommissioned things, the sharing of goods and services.

In foreign practice in the field of waste, the mechanism of extended producer responsibility (ERM), recycling, and the creation of ecotechnoparks have received the greatest application. The terminology ERM in world practice means “an environmental protection strategy aimed at achieving the environmental goal of reducing the overall impact of the product on the environment by making the product manufacturer responsible for the life cycle of the product and especially for its return, recycling and final disposal” (EXPRA, 2016). The final goal of this mechanism is to reduce and gradually reduce to zero the disposal of waste in favor of recycling and involvement in secondary circulation.

In Kazakhstan, the principle of ERM was legislatively introduced in 2016, but the main emphasis was on the recycling fee that manufacturers and importers of products must pay to a private enterprise – “Operator of ERM” LLP. This is a broader concept that includes the obligations of manufacturers and importers of goods that have lost their consumer properties for the collection, transportation, processing, neutralization, use, and disposal of waste, which are subject to the terms of the ERM.

Recycling includes the reuse of production (consumption) waste, as well as the production of recyclables and materials from waste that is later reused in the production of other goods (i.e., waste from one process acts as raw materials for another). Thus, conditions are created for low-waste or even waste-free “green” businesses. The experience of foreign countries (EU, Japan, China, South Korea, etc.) testifies to the relevance and effectiveness of this type of environmental entrepreneurship. In ecotechnoparks, which are industrial clusters, a closed waste management system is being created, and the production of products from secondary raw materials is carried out. The experience of the leaders in this direction (Japan, Denmark, Sweden, and Austria) shows that all processes are interconnected, carried out by energy saving, and therefore do not lead to environmental pollution.

According to the Concept for the transition of the Republic of Kazakhstan to a “green” economy, the share of solid waste processing in 2030 should grow to 40%, that is, twice as compared with current indicators. In this regard, state support and stimulation of business development for processing (recycling) and recovery (recycling) of solid waste are necessary. Ultimately, this will allow: to preserve limited natural resources; reduce capital and energy resources; increase the share of recoverable valuable components and increase the range of products. It will also be possible to create low-waste and waste-free production facilities, and the overall environmental situation in the country will improve.

The only domestic publication on a similar topic at the moment, “Waste management in the context of the transition to a circular economy: the case of Kazakhstan”, mainly analyzes foreign experience in the functioning of a waste management system within a closed cycle. In contrast, in this research, based on a comprehensive analysis of the treatment of solid waste in the Republic of Kazakhstan, the problems of this sphere are identified; the need to change the existing traditional business models to circular ones is justified; barriers hindering the development of a circular economy in the field of solid waste are identified; ways to solve the problems of the SHW field. The originality of the research lies in the fact that the authors considered the circular economy as a step toward the transition to a “green” economy and sustainable growth. Based on the research of foreign experience, they proved the relevance of the application of innovative business models that can be used in practice in the field of SHW.

### **Conclusions**

The results obtained made it possible to assess the possibilities of using the basics of the circular economy for business development in the field of SHW management to successfully implement the Concept of the transition of the Republic of Kazakhstan to a “green” economy. This article makes a theoretical contribution to the theory of “green” and circular economy, social entrepreneurship (“green” business), waste management can be used in the educational process when teaching these disciplines. In practice, the results of the research can be used in the development of regulatory documents on waste management, the circular economy, the development of measures to support businesses in the processing and recycling of waste; the activities of public organizations, and government authorities and businessmen.

The results of the research confirm the first hypothesis that in a linear economy, end-use products are produced and waste is generated with the help of technologies, and natural and labor resources; and in a circular economy, waste is re-returned to the production cycle, minimizing the damage to the environment. Thus, the circular economy is a kind of step for the transition of the Republic of Kazakhstan to a “green” economy by transforming existing business models. In this regard, for the successful “greening” of the economy, it is necessary to apply the principles and innovative business models that operate based on cyclical material flows. The research showed that the sphere of the SHW is one of the most important areas of the formation of a circular economy. It should be noted that Kazakhstan has not yet established a comprehensive waste management system from the moment of their appearance to their final disposal (sources of solid waste generation, collection, transportation, waste processors, waste disposal, and incineration organizations, monitoring, and regulation). The world experience of the circular economy shows that to reduce the number of unauthorized landfills, reduce the volume of waste, and reduce the load on officially operating landfills, it is necessary to switch to separate waste collection, from which secondary raw materials, materials, and goods are obtained during processing.

The research of foreign experience and the analysis of the current state of the sphere of solid waste management showed that there is a significant potential for the development of an innovative waste recycling business in this niche. As a result, the consumption of primary natural resources will decrease, and new jobs will appear, which will contribute to economic growth and environmental improvement. Thus, the second hypothesis will be confirmed. *The scientific novelty* is justified by the fact that the circular economy is considered a fundamental component of the “green economy”, and the MSW sphere is considered the main direction of the development of the closed-cycle economy. The results of the research are of *practical value* for representatives of small, medium, and large businesses, environmental organizations, government authorities, and non-governmental organizations.

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### **Қазақстан Республикасының қатты тұрмыстық қалдықтар саласындағы бизнесті дамытудың инновациялық тәсілі**

**Мақсаты:** Қатты тұрмыстық қалдықтарды (ҚТҚ) басқару саласындағы тұйық циклді экономиканың принциптері мен үлгілеріне негізделген бизнесті дамыту мүмкіндіктерін зерттеу.

**Әдісі:** Зерттеу мақсатына жету үшін жалпы ғылыми (анализ және синтез, салыстыру және аналогия, гипотетикалық әдіс) және арнайы әдістер (формальды-логикалық әдіс, статистикалық талдау) қолданылды.

**Қорытынды:** Еліміздегі қатты тұрмыстық қалдықтардың түзілуі мен өңделуіне жүргізілген талдау осы саладағы проблемаларды анықтауға мүмкіндік берді; Қазақстанда және алыс шетелдерде ҚТҚ қайта өңдеуді салыстырмалы талдау, сондай-ақ дамыған елдердегі қалдықтарды қайта өңдеу бизнесінің табыстылығы қалдықтар саласының «жасыл» бизнесті дамыту үшін перспективалы тауашалар болып табылатынын көрсетті. Шетелдік озық тәжірибені зерделеу қалдықтарды қайталама шикізатқа қайта өңдеуді және оны өндіріс процесінің әртүрлі кезеңдерінде пайдалануды көздейтін айналмалы экономиканың бизнес үлгілерін

қолданудың өзектілігін негіздеуге мүмкіндік берді. Авторлар қалдықтар саласындағы инновациялық бизнестің дамуын тежейтін кедергілерді анықтады; ҚТҚ саласындағы проблемаларды шешу жолдарын ұсынды.

*Тұжырымдама:* Алынған нәтижелер Қазақстанда қатты тұрмыстық қалдықтарды басқару саласында қалдықтарды қайта өңдеу және кәдеге жарату бойынша инновациялық бизнесті дамыту үшін айтарлықтай әлеует бар деген қорытындыға әкелді. Бұл бағытты одан әрі дамыту мақсатында айналым экономикасының қағидаттары мен бизнес үлгілерін пайдалану, кәсіпкерлік қызметке қолайлы жағдай жасау ұсынылады.

*Кілт сөздер:* «жасыл» экономика, айналмалы экономика, тұйық циклді экономика, бизнес-модельдер, қатты тұрмыстық қалдықтар, қатты тұрмыстық қалдықтарды қайта өңдеу, рециклинг, өндірушінің кеңейтілген жауапкершілігі, қайталама пайдалану, инновациялық бизнес, «жасыл» бизнес.

**Д.Е. Аушарипова, Л.Б. Кулумбетова, Э. Танкова**

### **Инновационный подход к развитию бизнеса в сфере твердых бытовых отходов Республики Казахстан**

#### **Аннотация**

*Цель:* Исследование возможностей для развития бизнеса на принципах и моделях экономики замкнутого цикла в сфере обращения с твердыми бытовыми отходами (ТБО).

*Методы:* Для достижения цели исследования использовались общенаучные (анализ и синтез, сравнение и аналогия, гипотетический метод) и специальные методы (формально-логический метод, статистический анализ).

*Результаты:* Анализ образования и переработки ТБО в стране позволил выявить проблемы в данной сфере; сравнительный анализ переработки ТБО в Казахстане и странах дальнего зарубежья, а также прибыльность мусороперерабатывающего бизнеса в развитых странах показали, что сфера отходов является перспективной нишей для развития «зеленого» бизнеса. Изучение передового зарубежного опыта позволило обосновать актуальность применения бизнес-моделей циркулярной экономики, которая подразумевает переработку отходов во вторичное сырье и использование его на разных этапах производственного процесса. Авторы выявили преграды, сдерживающие развитие инновационного бизнеса в сфере отходов; предложили пути решения проблем сферы ТБО.

*Выводы:* Полученные результаты позволили сделать вывод о том, что в сфере обращения ТБО Казахстана имеется значительный потенциал для развития инновационного бизнеса по переработке и вторичному использованию отходов. С целью дальнейшего развития данной сферы рекомендуется использовать принципы и бизнес-модели циркулярной экономики, создавать благоприятные условия для предпринимательской деятельности.

*Ключевые слова:* «зеленая» экономика, циркулярная экономика, экономика замкнутого цикла, бизнес-модели, переработка ТБО, рециклинг, расширенная ответственность производителя, вторичное использование, инновационный бизнес, «зеленый» бизнес.

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