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Improving the Environmentally-Oriented Activities of Entrepreneurship

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Abstract:

In this paper, the authors focused on the ways in which the current entrepreneurship activities should be environmentally oriented due to the fact that nowadays the environmental factor has become the main access factor to foreign markets, while the domestic market became limited by environmental requirements. Also, were identified which are the main barriers to development the market for environmentally friendly products: low income of the majority of the population, lack of innovation, market saturation with consumer products, low state support for business in solving environmental issues, weak investment incentives.

Keywords: sustainable development; environmentally oriented; entrepreneurship; environmental protection.

JEL Classification: Q56; Q57; Q59.

Introduction

In solving world's environmental issues, priority should be given to achieving a sustainable balance between economic and social well-being and the preservation of the natural environment, through the greening of the economy, in particular, the development of a market for environmentally friendly products, which becomes a tool for achieving sustainable development goals, solving environmental and social problems, as well as problems of depletion of natural resources. Successfully development of this market for environmentally friendly products

could become possible only with state support in terms of actions and legislation for monitoring compliance with environmental standards, supporting environmentally oriented enterprises, etc.

The inclusion of the environmental component in the activities of entrepreneurship is a required policy for increasing the competitiveness of products, quality of life and environment, and attracting the investments in environmentally friendly technologies. Economic entities that green their activities pay off their investments in greening will take a strong competitive position in the market.

It is necessary to focus on the fact that the world market for environmentally friendly products shows high annual growth rates and environmental factors for increasing the competitiveness of products will open up new market niches in the economy.

In this regard, we notice that the fast growing of the world market for environmentally friendly products forces the updated study of patterns for formation and the state mechanisms support needed to manufacture and sale of Kazakhstan's environmentally friendly products. Thus, the main criteria for classifying a business entity as an environmental one, should be:

- the entrepreneurial activities aim prevention, limitation and/or elimination environmental harms (development, manufacturing, sales, services in relation to the environmentally friendly technologies, production and the services for environmental purposes), waste processing (recycling), eco-tourism, eco-restaurants, etc.;
- profit maximization by solving environmental problems and accomplishing the environmental needs of society;
- usage of entrepreneurial opportunities associated with the growing and changing environmental needs of society, the environmental policy of the state.

1. Literature Review

An environmentally oriented state policy and issues associated with the environmentally friendly products markets, as well as the development of a mechanism for state support and regulation for the development of this new type market, have not yet been fully covered and require an integrated strategy the development of environmental management. The high costs generated by the production and sale of environmentally friendly products from the initial stages, incurs additional costs, which determine that the mechanisms of state support to be given for that entities that comply with these environmental requirements and successfully applied.

The innovative growth of the economy of Kazakhstan through the creation of fundamentally new materials, breakthrough technologies aimed at creating unique products is putting an increasing burden on the environment, reducing the quality of air, water and land, since new technologies and products in the process of their operation and disposal sometimes have unknown or dangerous features. All this generates environmental risks of innovations and innovative processes for the environment and human health, which requires attention to the analysis of the impact of innovative products and technologies on the environment at all stages of the innovation process, as well as during their operation and disposal.

To ensure the sustainable development of entrepreneurship that does not destroy the environment, it is necessary to stimulate the environmentally-oriented activities of enterprises. It is important to set environmental goals at the enterprise, taking into account the external environment.

World experience shows that the main instruments of state support for eco-innovations are: government programs and the introduction of an environmental management system, which is aimed at continuous improvement of corporate environmental policy, which affects the corporate image of the company.

In this regard, the issue of substantiating and developing a definition of what is an environmentally oriented enterprise in terms of the greening of its internal environment is relevant, to analyze the problems of environmentally oriented activities of business entities and determine areas for improving this activity.

The development of environmentally oriented innovations directly depends on state environmental requirements, measures of state regulation of nature management, the level of technological development and market influence. Entrepreneurship and environmental responsibility are now an opportunity that business entities can take to improve their competitive position in the market and achieve the best level of performance and thereby create value.

Theoretical, methodological and practical aspects of innovative enterprises processes and the economic justification of environmental management have been approached in the studies of various foreign and domestic researchers, such as: Omarova *et al.* (2021), Caldara *et al.* (2020), Pîrvu *et al.* (2021), Ghosh *et al.* (2018), Maran (2022), Harashima (2022), Audi *et al.* (2022). At the same time, economic effects of trade policy and implications support for the innovative processes of strategic planning in conjunction with environmental sustainability haven't

been resolved totally. Solutions found will allow to more effectively develop an innovative development strategy and adjust it in a timely manner (Arutyunov 2018, Balabanis *et al.* 2018).

The environmental concept with its long series of policies and regulations induces a new entrepreneurship paradigm as (Edoho 2018) debated. As well, Kazakhstan's economy is forced to adopt public policies which involves a socio-economic growth based on the increasing of the entrepreneurship's environmentally activities, rational use of natural resources and a balanced combination of environmental, social and economic interests in relation with the awareness that environment depends of our behavior as persons and especially as entities (governmental, juridical, business, in fact all types). Even if this new entrepreneurship paradigm environmentally oriented are present in some native studies of researchers in the field of environmental protection as Teleuyev (2020) or Sadykova (2020), it should be noted the variety of interpretations for this concept, but these doesn't refer to those activities that guide the behavior of the enterprise for the environmental protection and its exploitation in a sustainable way.

So, the development of an environmental concept for the development of entrepreneurship is one of the main tasks and involves the socio-economic development of the economy based on increasing the environmental sustainability of entrepreneurship, rational use of natural resources and a balanced combination of environmental, social and economic interests, awareness of the importance of environment protection.

At the same time, the issues of theoretical and methodological support for the processes of strategic planning of innovative development at enterprises in conjunction with environmental sustainability have not yet been resolved. Their solution will allow innovative and active business entities to more effectively develop an innovative development strategy and adjust it in a timely manner. That is, by environmental sustainability we mean increasing the volume of production and sales of products (goods and services), increasing the efficiency of using natural resources and ensuring the environmental safety of our activities under the influence of external and internal factors, making the most of our production potential and resources (Baboshkina *et al.* 2018, Zhetpisbayeva 2018).

All this leads to the fact that the most important conditions for the sustainable development of entrepreneurship in Kazakhstan should be to ensure the harmonious interaction of society, business, innovation in the context of environmental protection, the rational use of natural resources and the environmental safety of business entities (Avlasenko 2018).

The need for research aimed at solving the problems of the development of society from the standpoint of observing social priorities, balancing the interests of the state, the business community, and maintaining the environmental balance is felt very acutely in the post-pandemic period. All these require mechanisms and regulators that will organize the process of sustainable development of business structures, taking into account the interaction of many internal and external factors that affect their development (Kashakova *et al.* 2022).

Identifying the theoretical and practical issues related to the choice of an entrepreneurship development strategy and means for environmental and economic sustainable development is the most important task for the existences of a modern state. The growing need to update and improve the environmental and economic development of entrepreneurship in accordance with the main directions of innovative reforms in the economy determined us to debate and analyze the need to improve methodological support for assessing the effectiveness of strategic management of entrepreneurship development and the sustainable degree in its development.

The creation of a partnership between universities and technology parks will lead to high-quality training of specialists focused on innovation in the priority areas of science, technology and technology development, which will have a significant impact on the socio-economic development of the region and the entire state. Innovative development of Kazakhstan, based on the introduction of technical progress, the use of computer and resource-saving technologies, industrial and innovative achievements will attract additional resources, reduce environmental risks.

The establishment of a partnership between universities, environment organization and technological parks will lead to high-quality training of specialists focused on innovation in the priority areas of science and technology, which will have a significant impact on the socio-economic development of the region and the entire state. Kazakhstan's innovative development, based on the newest and resource-saving technologies, will lead industrial and innovative achievements which will attract additional resources, reducing environmental risks.

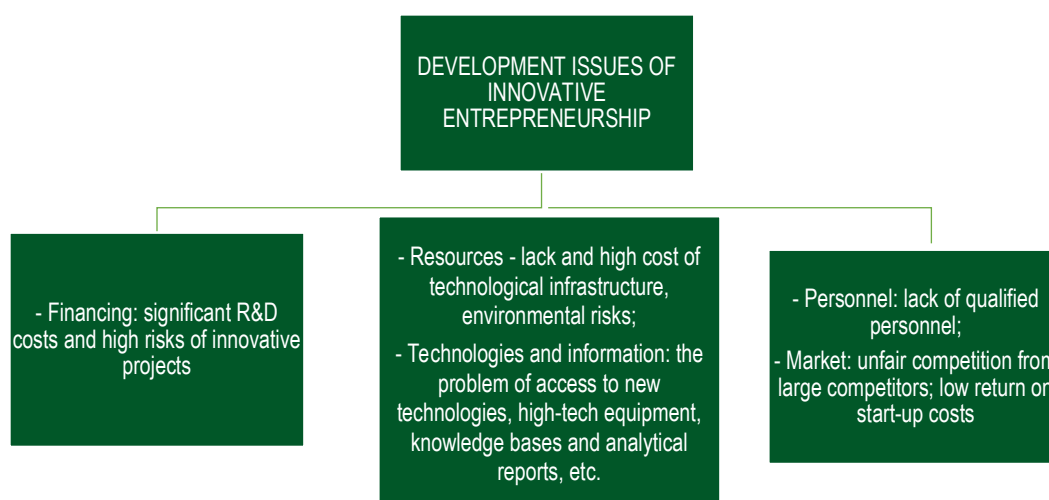
2. Research methodology in assessing environmental sustainability

The algorithm for assessing the environmental sustainability of entrepreneurship, in our opinion, should include the following steps:

- Theoretical substantiation of the meaning, essence and criteria of environmentally oriented entrepreneurship at the present stage of development;
- Analysis of the situation in the field of environmental activities, identification of existing environmentally significant problems and indicators of environmental sustainability: investments in fixed assets for environmental protection, total environmental protection costs, costs of environmental protection measures, payments for environmental pollution and environmental damage, expenses to ensure environmental safety, etc.
- Substantiation of recommendations on strengthening the environmental sustainability of economic entities and mechanisms of state support for the production and sale of Kazakhstan environmentally friendly products by business entities.

Despite the implementation of new governmental programs as "Business Roadmap 2025" or old others as State Program for the Development of Productive Employment and Mass Entrepreneurship "Enbek" 2017-2021, State Program for Industrial and Innovative Development of the Republic of Kazakhstan 2015-2019 and the new version for 2020-2025, State Development Program of the agro-industrial complex of the Republic of Kazakhstan for 2017-2021, Nurlı-Zhol State Infrastructure Development Program, etc., however many problems remain unresolved: underdevelopment of the system for attracting investments, weak attraction of large capital, banks and foreign investors to support small innovative enterprises, insufficient incentives for small enterprises to the implement environmental risks, or new activities and types of small businesses connected with Internet affairs (Figure 1).

Figure 1. Shortcomings in the development of innovative entrepreneurship



Source: compiled by authors

The state used financial and non-financial support instruments as support. Due to the spread of the coronavirus, a moratorium was introduced in 2020 on inspections and preventive control of small and micro businesses and exempted from income taxes for three years. Also, in order to lend to priority SME projects from manufacturing to tourism, the program "Economy of Simple Things" was increased to 1 trillion. tenge within. At the same time, the planned volume of state support for business in 2020 has increased sharply from 0.4 trillion. tenge to almost 2 trillion. tenge due to the negative impact of the pandemic. First of all, this is an increase in the "Economy of Simple Things" program, covering industries from manufacturing to tourism and concessional lending to SMEs.

For example, similar measures to support entrepreneurship were used by developed countries during the pandemic: tax holidays, the possibility of obtaining loans at low interest rates, compensation to employers to pay employees, deferral of payment of administrative fines. The level of support by shares in GDP of funds allocated for such purposes is shown in Figure 2.

Entrepreneurship remains a high-risk activity. Therefore, the level of support for entrepreneurship in developed countries during a pandemic is high. In Germany, with a share of SMEs of 57% in GDP, the level of

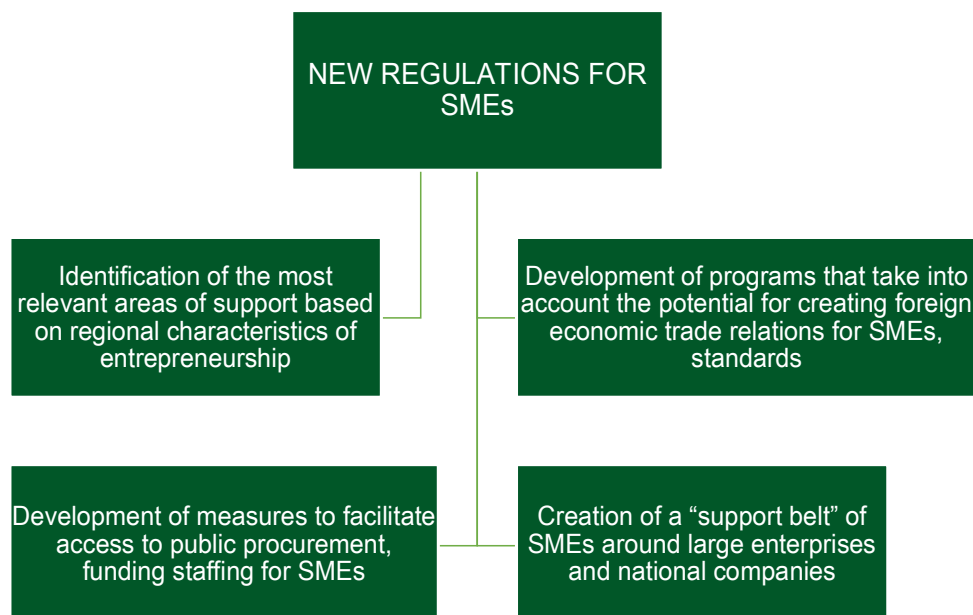
support was 18.7% of GDP, in the UK, with SMEs of 52%, support was 15.6%, in the USA, with a share of SMEs of 53%, the level of support was 13%. New measures to support domestic entrepreneurship in the post-crisis period, taking into account the experience of developed countries, are shown in Figure 3.

Figure 2. The share of SMEs in GDP and the level of business support in developed countries during a pandemic, % of GDP



Source: compiled by authors according to www.stat.kz.

Figure 3. New measures to support domestic entrepreneurship in the post-crisis period



Source: compiled by authors

In Kazakhstan, since 2010, there has been an increase in the number of small businesses from 661.6 thousand units up to 1.5 million units or almost 2.1 times, including individual entrepreneurs 2.2 times up to 908 thousand units in 2021, as evidenced by data on the dynamics and structure of active small businesses (Figure 4).

Favorable business environment (enabling index) assesses the absolute level of efficiency for each of the indicators among all countries where Kazakhstan is in 25th place out of 190 countries (World Bank Doing Business rating for 2019-2020).

Figure 4. Performance indicators of active small and medium-sized businesses, %



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Source: compiled by authors according to www.stat.kz.

The main indicators characterizing the development of small business are shown in Table 1. Over the past years, there has been an annual positive dynamic in the output of products by active small businesses (Table 1). The output of products by small businesses in 2021 of 41,952.0 billion tenge was formed by 86.1% due to legal entities of small businesses (36,128.0 billion tenge), 8.1% of individual entrepreneurs (3,404.4 billion tenge), and 5.8% of peasant (farm) households (2,420.2 billion tenge). The contribution of SMEs to the GDP of the republic amounted to 32.8, having increased by 7.9% compared to 2015.

Table 1. Output of SME products for 2015-2021

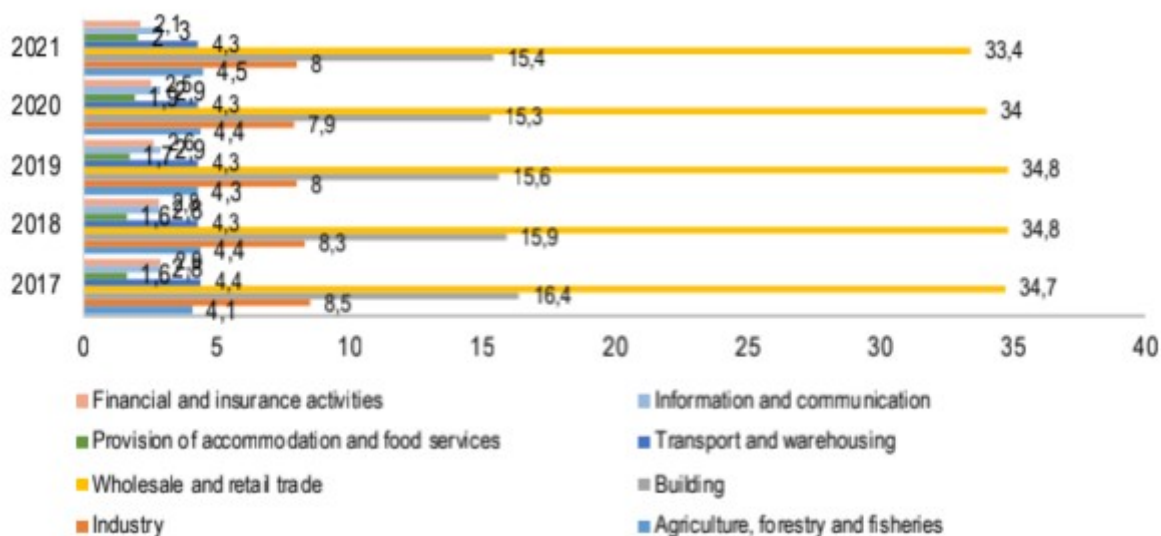
Years	Output of SME products for 2015-2021						
	Total mln. tenge	Small and medium enterprises mln. tenge	%	IE mln. tenge	%	Peasant farms mln. tenge	%
2015	15 699 405	13 276 625	84,6	1 518 237	9,7	904 543	5,7
2016	19 609 010	17 053 522	87,0	1 511 733	7,7	1 043 755	5,3
2017	23 241 125	20 533 922	88,4	1 554 704	6,7	1 152 499	4,9
2018	26 473 049	23 390 712	88,4	1 764 985	6,7	1 317 352	4,9
2019	32 386 960	28 876 416	89,2	1 902 754	5,9	1 607 790	4,9
2020	33 626 992	29 863 565	88,8	1 729 842	5,1	2 033 585	6,1
2021	41 952 637	36 128 018	86,1	3 404 453	8,1	2 420 166	5,8

Source: compiled by authors according to www.stat.kz.

The sectoral structure of the economy of individual regions and the population were the main factors in the uneven distribution of SMEs across the regions of Kazakhstan. In terms of the number of active small businesses, regions with a high population density prevail: cities of republican significance (Nur-Sultan and Almaty), as well as Karaganda and Almaty regions. All this leads to an increase in the number of small enterprises, accompanied by an increase in the number of people employed in SMEs, which contributes to the creation of new jobs and an increase in the adaptability of the entire economy to market requirements. The data in Figure 5 show that more than 30% of entrepreneurship is engaged in wholesale and retail trade, construction is in second place - more than 15%.

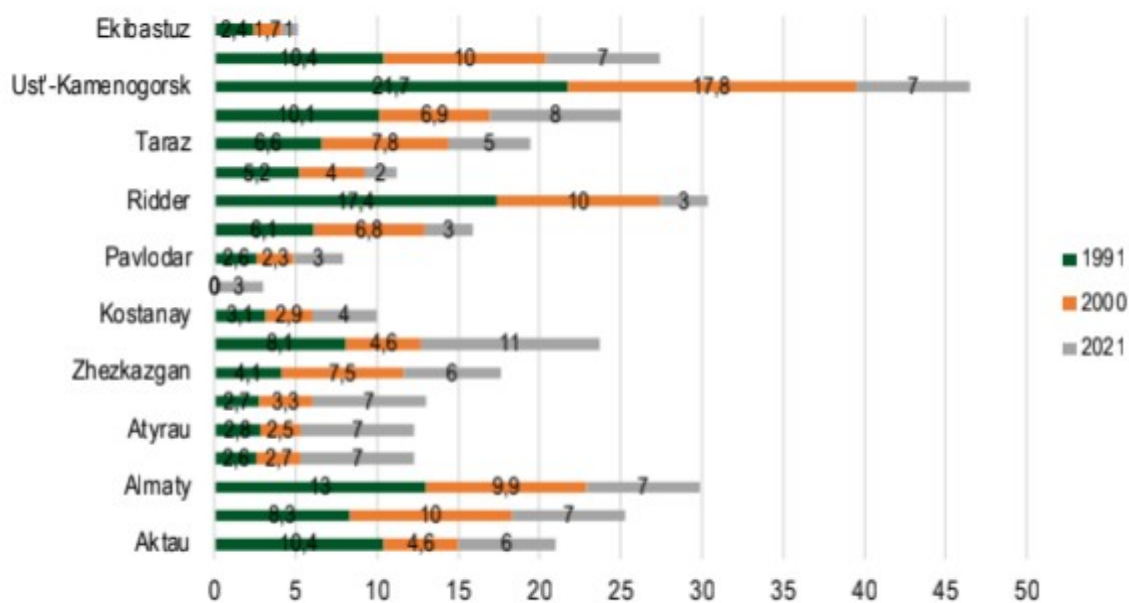
The level of environmental issues in Kazakhstan is exacerbated by the raw material nature of the economy, in which the problems of rational environmental management are of particular importance. Environmental safety and the state of the environment continue to deteriorate in recent years. The level of threats to environmental safety is aggravated in almost all types of economic activity. One of the problems is air pollution. So, despite some dynamics, the following cities have the highest pollution indices: Karaganda - 11, Ust-Kamenogorsk, Almaty, Shymkent, Astana -7, etc. (Figure 6).

Figure 5. Share of SMEs, in %



Source: compiled by authors according to www.stat.kz.

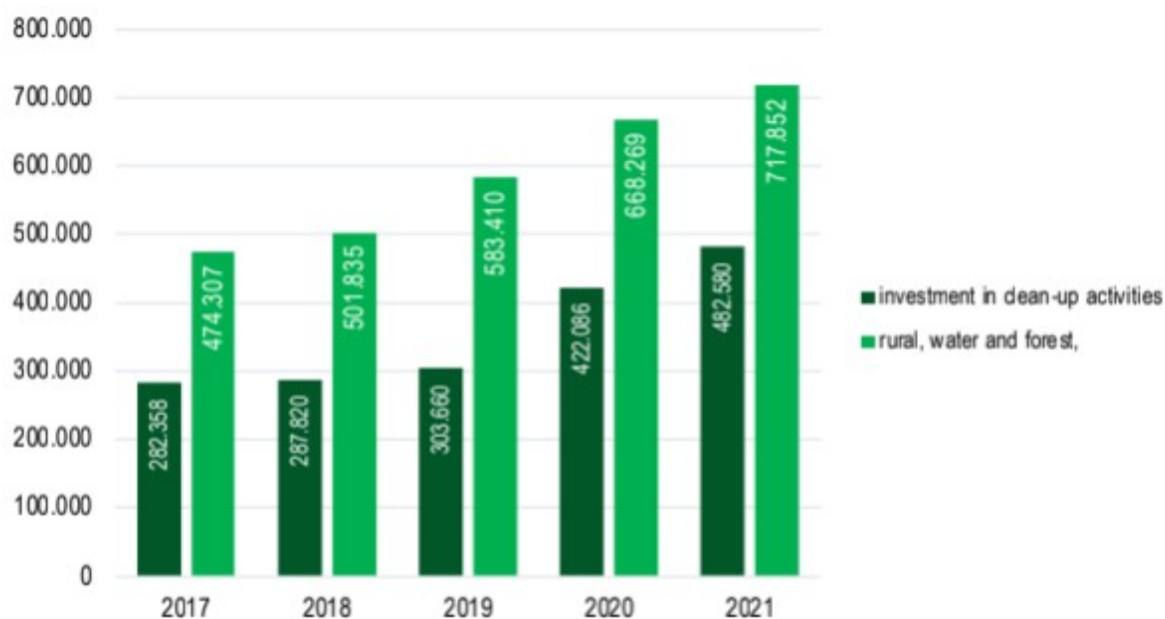
Figure 6. Air pollution index of cities in Kazakhstan



Source: compiled by authors according to www.stat.kz.

Investments in the elimination of pollution and environmental protection costs in Kazakhstan are growing from year to year (investments from 282.4 billion tenge in 2017 to 482.6 billion tenge in 2021, the budget from 474.3 billion tenge up to 717.9 billion tenge or 1.5 times over the analyzed period), the level of emissions of pollutants into the atmosphere also increased in 2021 to 2407.5 thousand tons, or by 2.1% compared to 2017 (2357.8 thousand tons), including gaseous and liquid substances amounted to 79.6% (1915.8 thousand tons), solid substances 491.7 thousand tons or 20.4% (Figure 7).

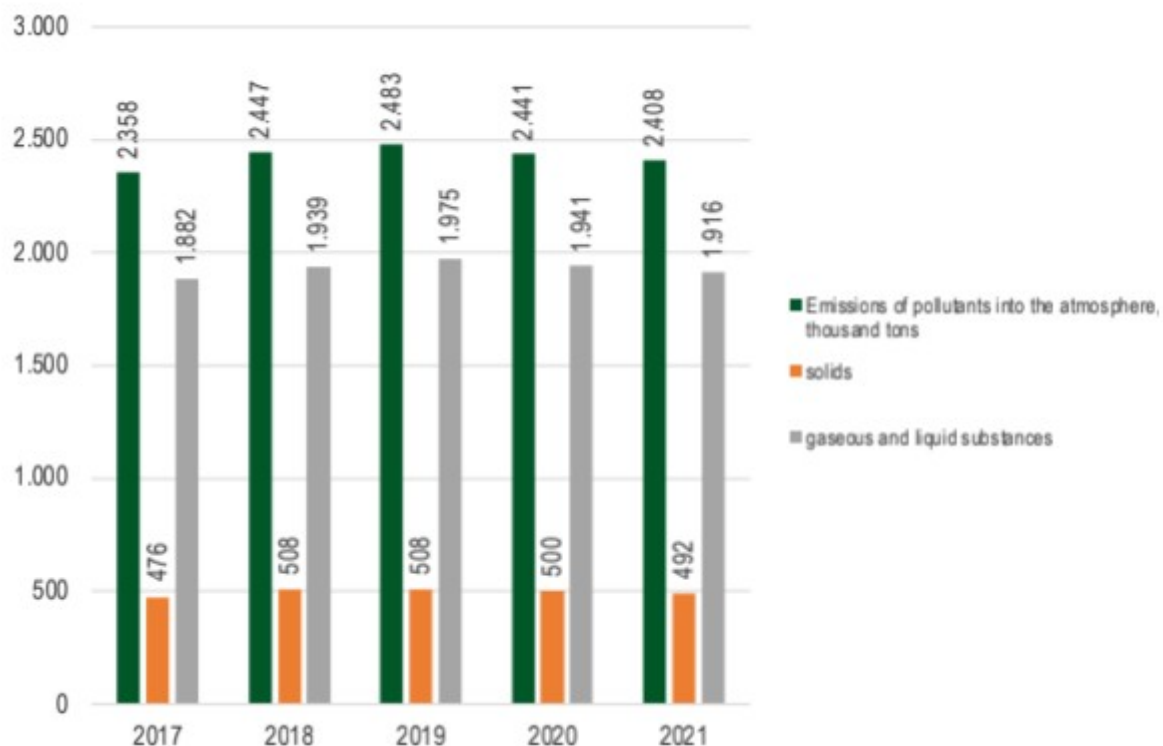
Figure 7. Funding for environmental protection and investments in clean-up activities



Source: compiled by authors according to www.stat.kz.

That is, air pollution in cities and densely populated areas, discharges of pollutants and untreated wastewater into surface water bodies do not decrease (Figure 8).

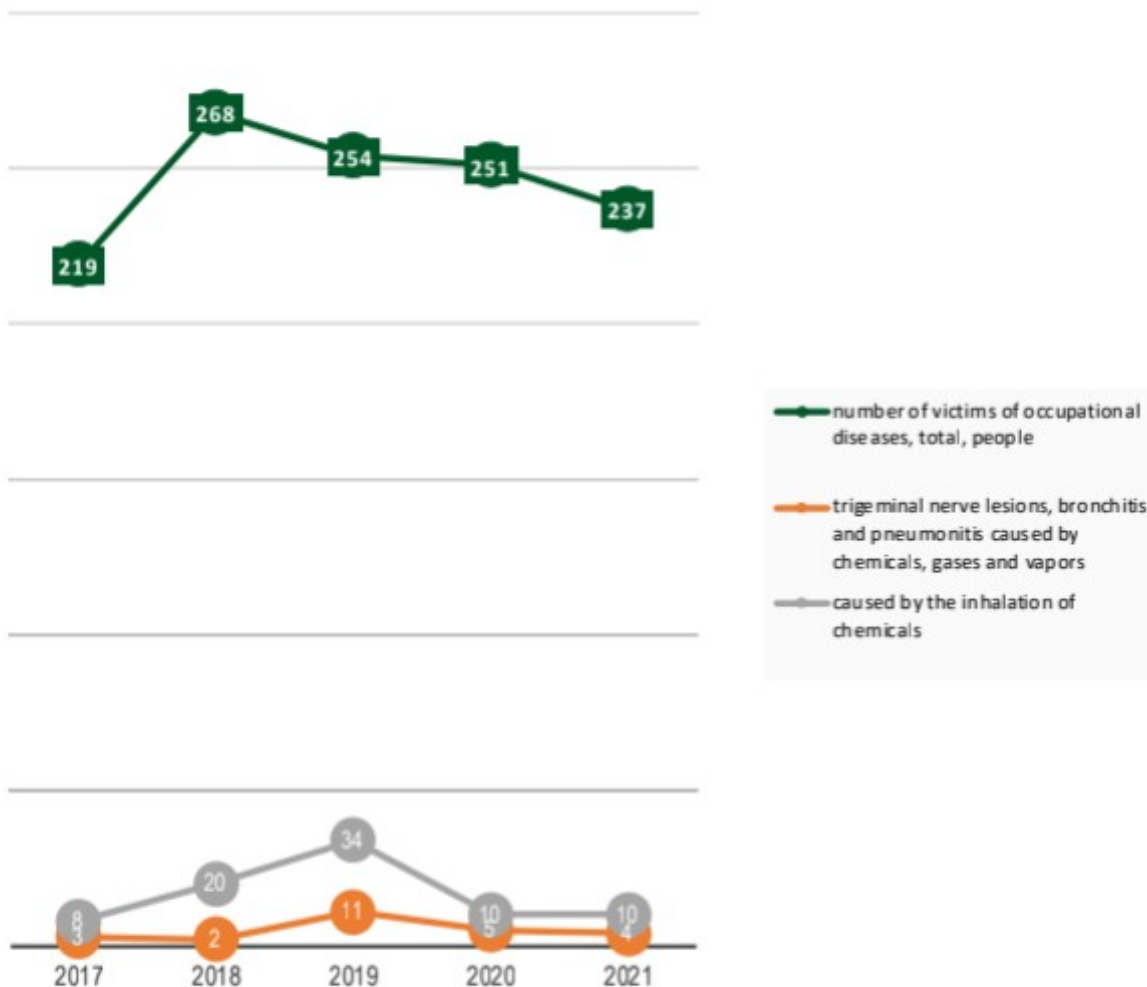
Figure 8. Emissions of pollutants into the atmosphere, thousand tons



Source: compiled by authors according to www.stat.kz.

Among the population there is an increase in the number of environmentally caused diseases. The level of threats to environmental safety remains high in almost all types of economic activity. The number of cases of occupational diseases for the period from 2017 to 2021 remains almost at the same level of 237 people. Of these, a large proportion is occupied by diseases caused by the inhalation of chemicals (Figure 9).

Figure 9. Number of occupational diseases, people



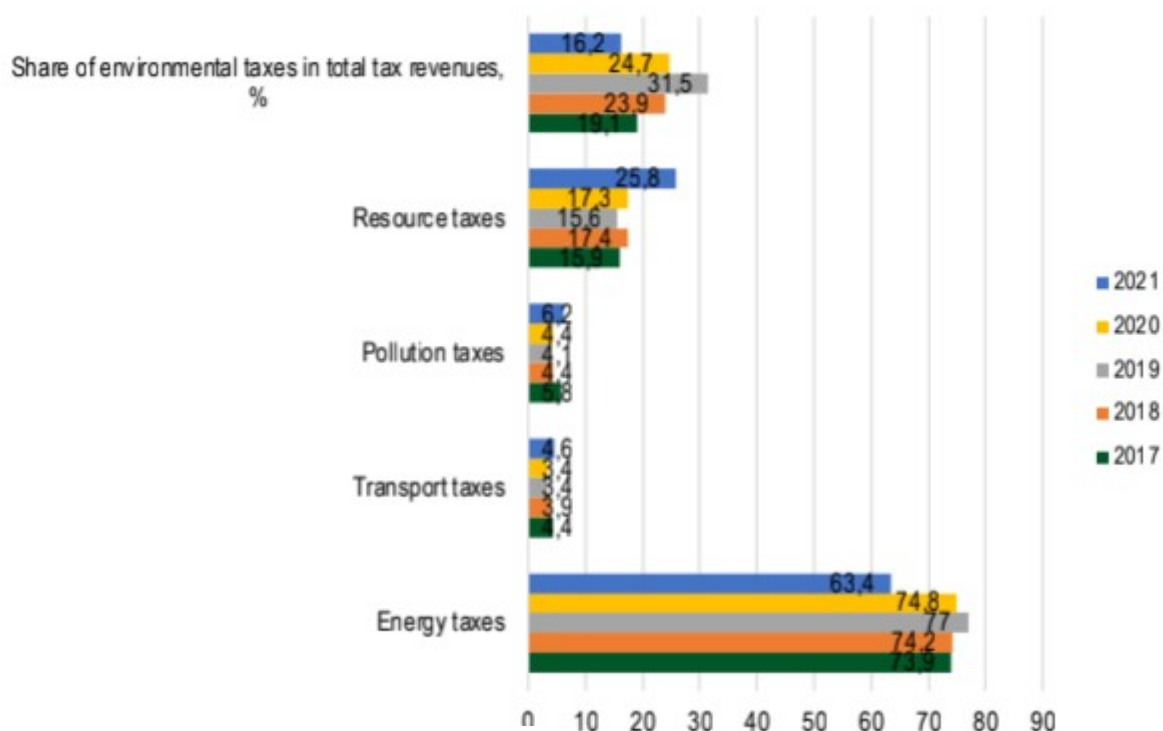
Source: compiled by authors according to www.stat.kz

The transition of Kazakhstan to an innovative path of development necessitated the active development of environmentally-oriented activities of enterprises. Today, enterprises no longer face a choice - to develop or not to develop environmentally-oriented activities. Global changes in environmental protection oblige domestic enterprises to restructure their activities, modernize their production facilities, and reduce the negative impact on the environment. These processes, which bring innovative changes, require certain efforts for its formation and development, both on the part of state bodies and on the part of the enterprises themselves.

In this regard, it requires the development of a program of industrial environmental control in order to comply with environmental legislation, control over the payment of taxes and penalties and administrative sanctions (Figure 10). The share of environmental taxes in total tax revenues in 2021 amounted to 16.2%, having decreased by 8.5% compared to the previous period and almost 1.5 times compared to 2018. In the structure of environmental taxation, a significant share is occupied by taxes on energy carriers, on average 72.7%. Pollution taxes take only 5.0%. In this regard, the technogenic activities of enterprises, which, as a rule, cause negative changes in the environment, are not taken seriously by the regional authorities.

Assessment of the state of the environment is subdivided into an assessment of the state of the constituent parts of natural environments, namely air, water, soil, etc. Data on the generation of hazardous waste by type of economic activity is shown in Figure 11. Thus, the mining and quarrying industry (more than 70% of all waste) and the manufacturing industry (12% on average) are leading in this direction.

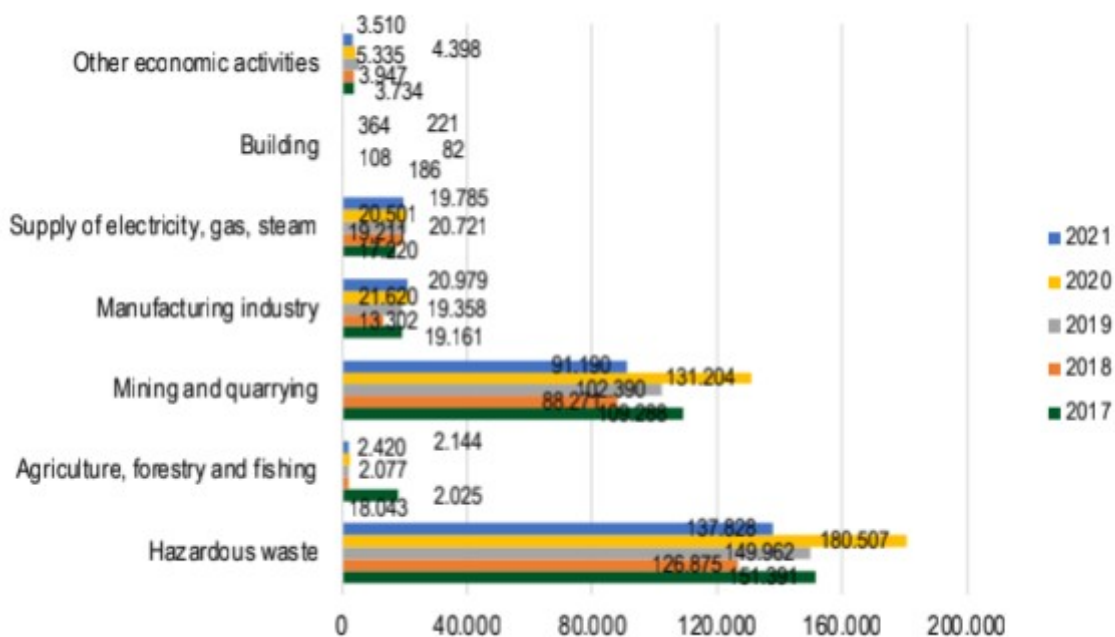
Figure 10. Environmental taxes, in %



Source: compiled by authors according to www.stat.kz

However, it does not show the already changed state of the environment, does not reflect the contribution of each enterprise to this pollution, and does not allow identifying incentives for enhancing their environmentally oriented activities. An approach is needed that would reflect the degree of environmental pressure exerted by enterprises, as well as the level of their environmental orientation, taking into account the implementation of modern environmental legislation.

Figure 11. Generation of hazardous waste by type of economic activity, thousand tons

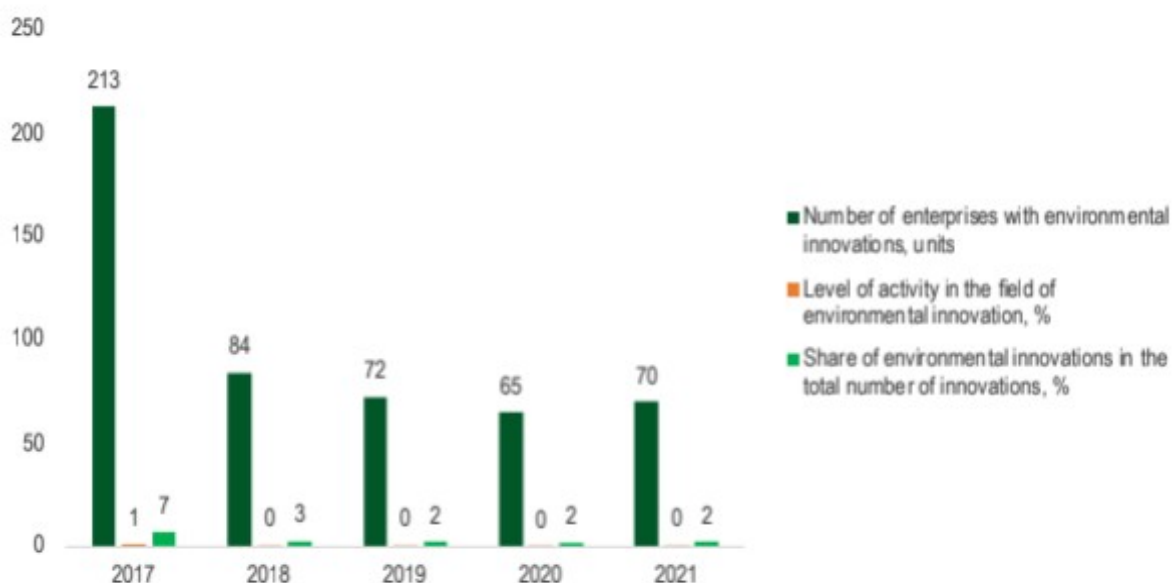


Source: compiled by authors according to www.stat.kz.

The analysis carried out in the work suggests that the innovative economy, as a new type of modern economic development, will contribute to sustainable development, which, in turn, will largely depend on an increase in the share of environmentally oriented enterprises in all sectors of the country's economy. Figure 12 shows that the number of enterprises with environmental innovations in 2021 decreased to 70 or almost 3 times compared to 2017, the level of activity of environmental innovations decreased to 0.2% or 0.5%, the share of environmental innovations in the total innovation is only 0.2%.

The growing need for environmental modernization of the economy requires a transition to a "green economy" as one of the effective tools for ensuring sustainable long-term development. However, the development of small and medium-sized businesses took place in circumvention of environmental protection activities. Under these conditions, it is necessary to define the concept of "environmentally oriented entrepreneurship" on the basis of a theoretical analysis of the content and approaches to its definition.

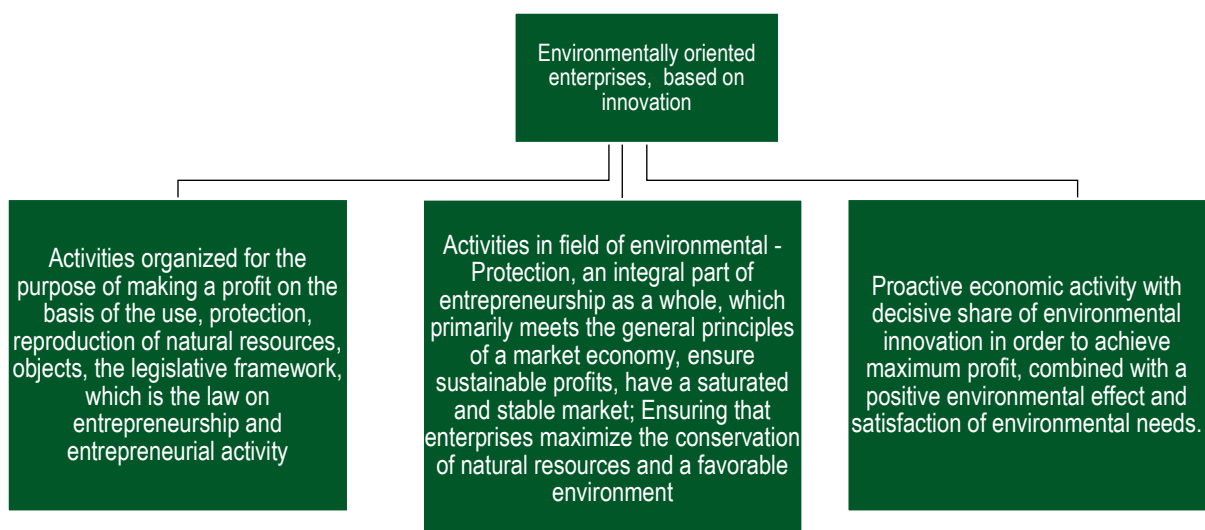
Figure 12. Ecological innovations of enterprises in Kazakhstan



Source: compiled by authors according to www.stat.kz.

Environmentally oriented entrepreneurship is an ecological entrepreneurship based on ecological innovation, that is, on the organization of a modified production and technological process aimed at reducing the negative impact on the environment and environmental protection activities. In other words, there should be a predominant role of the environmental utility of environmental innovations in the overall utility derived from entrepreneurial structures (Figure 13).

Figure 13. Environmentally oriented innovative entrepreneurship

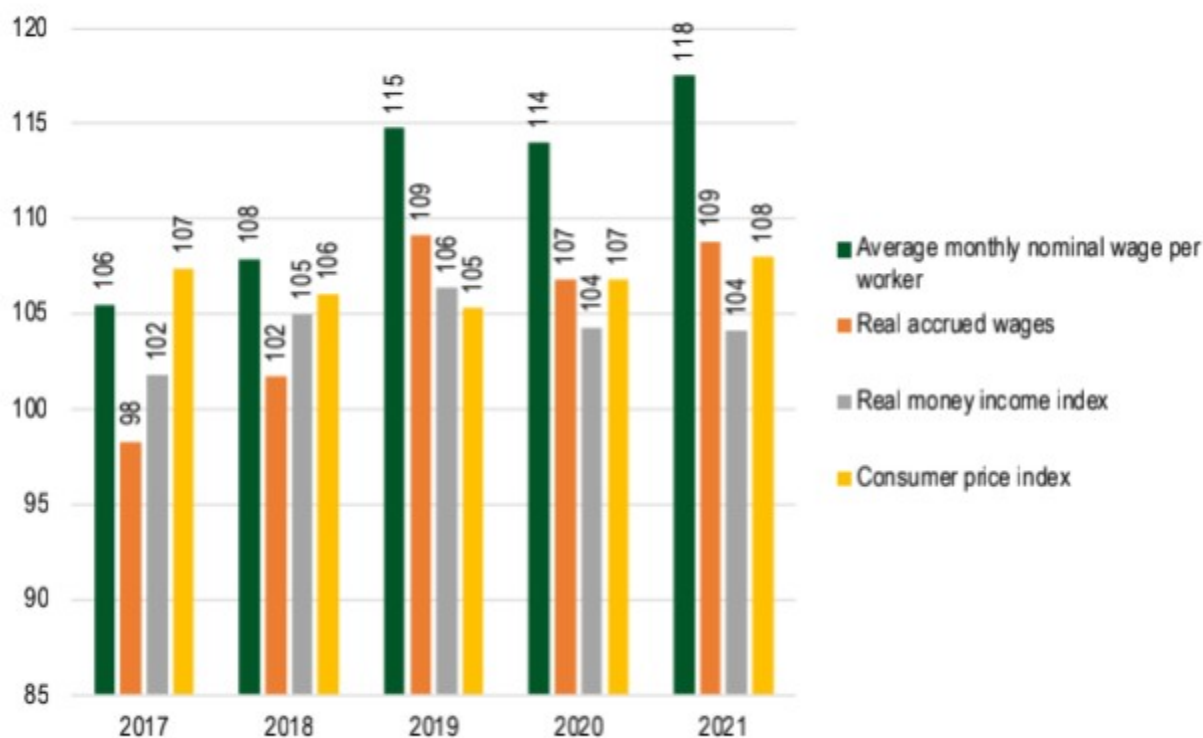


The main result of environmental entrepreneurship depends on the implementation and use of environmental management, which embraces environmental innovation. That is, the concept of environmentally oriented entrepreneurship should be considered in making a profit together with the environmental effect obtained from the use of products for the conservation of the environment and recreational areas. Consequently, the essence of environmentally oriented entrepreneurship is in its dual nature: firstly, it is profit maximization, and secondly, it is the performance of very important social and environmental functions - the formation of a favorable human environment.

For a more objective reflection of the material level of the population's well-being, let us consider the dynamics of the population's monetary income through their expenditures. As a fundamental criterion for assessing the level of well-being of the population, calculating indicators of poverty and inequality under the survey program, the indicator of income used for consumption is conceptually defined and applied.

The data in Figure 14 show that the real money income index amounted to 104.1 in 2021. At the same time, the price index amounted to 108 and is ahead of real incomes by almost 4%. The average per capita nominal cash income of the population in 2021 amounted to 131,797 tenge, in 2020 - 116,126 tenge, in 2019 - 104,282 tenge, in 2018 - 93,135 tenge, in 2017 - 83,710 tenge, that is, an increase of 48,087 tenge or 57.4% compared to 2017. Despite some growth in the nominal cash income of the population, the rise in prices for consumer goods and paid services affected the solvency of the population. And as you know, an increase in the cost of goods causes a depreciation of money due to an increase in the money supply.

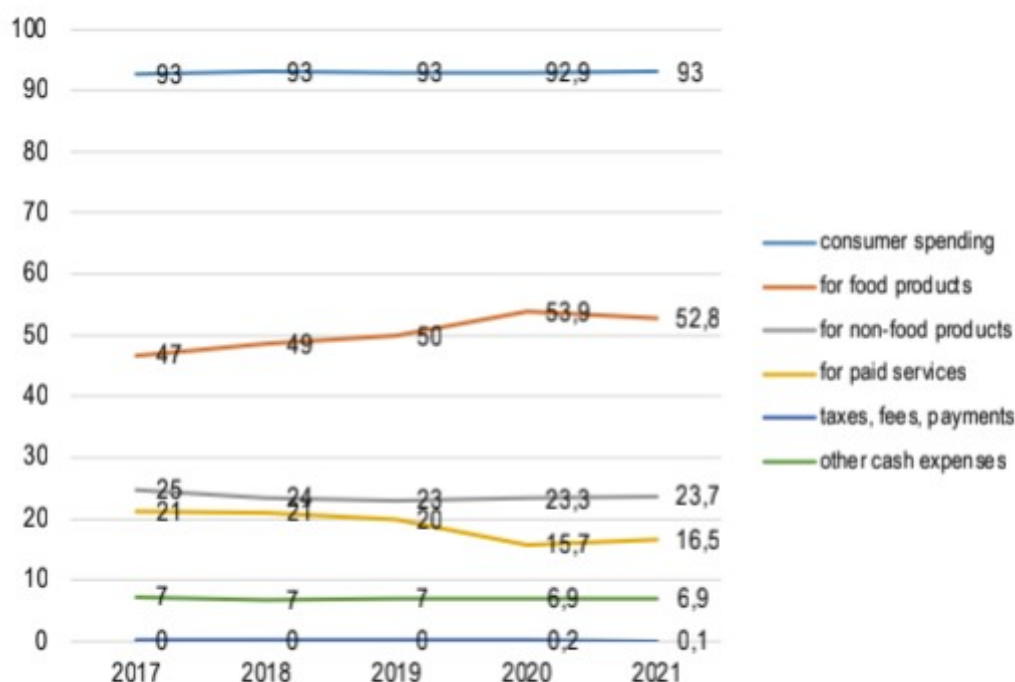
Figure 14. Population income index, in % of the previous period



Source: compiled by authors according to www.stat.kz.

Household consumer spending in the Republic of Kazakhstan in 2021 amounted to 93% or an average of 752.5 thousand tenge per capita and increased by 0.4% or 237.8 thousand tenge compared to 2017. The main share of consumer spending is occupied by food products (including tobacco products and alcoholic beverages) - 56.2%. Non-food products accounted for 23.7% and decreased by 1% compared to 2017. The remaining consumer expenditures of the population, which on average occupy 6.9% over this period, are used to pay off previously received debts or bank loans, etc. (Figure 15).

Figure 15. Share of household expenditures, in %



Source: compiled by authors

3. Environmental and innovative development of entrepreneurship in Kazakhstan

To ensure conditions for a decent standard of living for the population, it is necessary to develop the economy comprehensively by creating innovative industries, stimulating economic growth and employment of the population through the development of entrepreneurship based on resource-saving and environmentally friendly technologies, focusing on improving the environment and living conditions of the population.

On average, more than 92.8% of expenses in the regions are occupied by consumer spending. The leaders in consumer spending are: Almaty city - 96.9%, Pavlodar region - 96.5%, Mangystau region - 96.2%. The lowest expenses are: Karaganda region - 85.3%, Akmola region - 87.4%, Northern Kazakhstan - 87.8%.

In 2021, the share of the population with incomes below the subsistence minimum amounted to 5.2%, having almost doubled compared to 2017, and the share of the population with incomes below the subsistence minimum is the smallest in the total population and amounted to 9.3%, exceeding the level 2017 by almost 1.8 times. The indicator of household spending on food, which is 52.8% in 2021, is an important indicator of the economic development of Kazakhstan and any country. For comparison, in the countries of Central and Eastern Europe, the indicator of household spending on food does not exceed 18% of total spending, which once again confirms the depth of poverty of the population.

The objective need for the development and implementation of innovative materials and technologies contributes to the growth of energy efficiency, environmental friendliness, resource saving and requires the justification of appropriate scientific and methodological tools.

As the main vector of environmental and innovative activities of small and medium-sized businesses, we will take the following indicators (Table 2).

Table 2. Indicators for assessing the environmentally oriented innovative potential of an enterprise

Indicators	Status and dynamics of factors	The nature of the impact on innovation activity
<ul style="list-style-type: none"> The economic situation in the country; 	<ul style="list-style-type: none"> GDP growth, inflation decline pace, growth of investment activity; high degree of depreciation of fixed assets. 	<ul style="list-style-type: none"> Increasing resources for innovation; activities; the need to modernize funds.
<ul style="list-style-type: none"> General strategy; of economic development. 	<ul style="list-style-type: none"> Focus on environmental and innovative development 	<ul style="list-style-type: none"> Government support for innovation
<ul style="list-style-type: none"> The share of investments in the 	<ul style="list-style-type: none"> Investment Growth into fixed assets 	<ul style="list-style-type: none"> The need to update fixed assets;

Indicators	Status and dynamics of factors	The nature of the impact on innovation activity
protection of atmospheric air in the total volume of investments; ▪ The volume of investments for protection of atmospheric air in fixed assets, % of GRP.	simultaneously with an increase in the degree of depreciation of funds, the high cost of building materials.	▪ Availability of resources to perform work, the need to reduce the cost of work, including by introducing new resource-saving technologies.
▪ Dynamics of innovation, the share of environmental innovation costs in total innovation costs; ▪ Share of products of high-tech and knowledge-intensive industries in GRP, %.	▪ Growth of innovative activity, growth of volumes of research works, ▪ Growth of technological innovation and innovative activity compared with foreign countries.	▪ Modernization of innovation based on the development of innovation, the possibility of using new (borrowed) technologies; overall level of innovation activity.
▪ Reducing pollution of atmospheric air, land, water resources, reducing noise levels as a result of the use of innovative products by the consumer; ▪ Incidence of the population with diseases of the respiratory system, cases per 1000 people.	▪ Changes in the volumes of pollutants emitted into the atmosphere as a result of the introduction of environmental innovations.	▪ Changes in the environmental burden of the enterprise associated with pollution of wastewater, emissions of pollutants into the atmosphere, as well as waste disposal as a result of the introduction of environmental innovations & innovative environmental activity.

Source: compiled by authors

To determine the relationship between environmental and innovation indicators and parameters of socio-economic development, a correlation analysis of environmental indicators and indicators of socio-economic development was carried out, and a forecast of environmental indicators and interrelated economic and social indicators was built. Autocorrelation in residuals can be caused by several reasons of different nature:

- it can be associated with the original data and is caused by the presence of measurement errors in the values of the resulting attribute;
- in some cases, autocorrelation may be due to incorrect model specification. The model may not include a factor that has a significant impact on the result and whose influence is reflected in the residuals, as a result, the latter may turn out to be autocorrelated. Very often this factor is the time factor t .

One of the more common methods for determining autocorrelation in residuals is to calculate the Durbin-Watson test:

$$DW = \frac{\sum_{t=2}^n (\varepsilon_t - \varepsilon_{t-1})^2}{\sum_{t=1}^n \varepsilon_t^2} \quad (1)$$

where: the value of DW is the ratio of the sum of squares of the differences of successive values of the residuals to the residual sum of squares according to the regression model.

It can be shown that for large values of n there is the following relation between the Durbin-Watson criterion d and the autocorrelation coefficient of the first-order residuals r_1 :

$$DW = 2 \cdot (1 - r_1) \quad (2)$$

Thus, if there is complete positive autocorrelation in the residuals and $r_1 = 1$, then $DW = 0$. If there is complete negative autocorrelation in the residuals, then $r_1 = -1$ and hence $DW = 4$. If there is no autocorrelation of residuals, then $r_1 = 0$ and $DW = 2$ so $0 \leq DW \leq 4$.

The algorithm for detecting autocorrelation of residuals based on the Durbin-Watson test is as follows. A hypothesis is put forward H_0 about the absence of autocorrelation of residuals. Alternative hypotheses H_1 and H^*_1 consist, respectively, in the presence of positive or negative autocorrelation in the residuals.

Further, according to special tables, the critical values of the Durbin-Watson criterion are determined d_L and d_U for a given number of observations n , number of independent model variables m and significance level α . For these values, the numerical interval $[0;4]$ divided into five segments. Acceptance or rejection of each of the hypotheses with a probability $1-\alpha$ is carried out as follows:

- $0 < DW < d_L$ - there is a positive autocorrelation of the residuals, H_0 rejected with a probability $P = 1-\alpha$ accepted H_1 ;
- $d_L < DW < d_U$ - zone of uncertainty;
- $d_U < DW < 4 - d_U$ – no reason to reject H_0 , there is no autocorrelation of residuals;
- $4 - d_U < DW < 4 - d_L$ - zone of uncertainty;
- $4 - d_L < DW < 4$ – there is a negative autocorrelation of the residuals, H_0 rejected with a probability $P=1-\alpha$ accepted H^*_1 .

We define the value of the Durbin Watson criterion in the package SPSS. During the analysis of models (linear, quadratic, exponential), the most promising model turned out to be linear, then we will continue to work with this model. Using the SPSS package, we determine the Darbin Watson criterion $DW = 1,461$. At the level of significance $\alpha = 0,05$, $n = 13$ quantitative observation, $k = 1$ the number of features, can be determined in a special table by Durbin Watson, that the lower limit $d_L = 0,97$, and the upper limit $d_U = 1,33$. As we see that our indicator $1,34$ belongs $d_U < DW < 4 - d_U$, this means that there is no positive autocorrelation of the residuals, H_0

accepted, i.e. the model is suitable for regression. The main results of the correlation analysis are presented in Table 4. The values of the indicators selected for the study were used as the calculation base. To analyze the relationships, the MS Excel data analysis package was used.

Table 4. Forecast indicators of environmental and innovative development of entrepreneurship in Kazakhstan

Years	Output of SME products, mln. tenge	Investments in environmental protection, thousand tenge	The incidence of respiratory diseases, the number of cases per 100,000 population
2017	23.241.125,0	86.961.995	24.819,6
2018	26.473.049,0	111.161.429	28.390,7
2019	32.386.960,0	198.721.626	23.243,7
2020	33.626.992,0	173.618.612	23.102,6
2021	38.199.909,5	229.498.428	22.314,65
2022	41.907.060,7	264.251.432	21.284,85
2023	45.523.086,1	296.537.348	19.125,075
2024	48.694.497,9	318.404.768	18.797,675
2025	52.827.765,8	363.445.487	17.385,1425
2026	56.243.409	391.041.729	16.077,6215
2027	59.832.376,8	422.882.773	14.887,7559
2028	63.474.474,8	456.060.765	13.896,2465
2029	67.183.874,3	490.791.888	12.518,8152
2030	70.695.365,0	520.758.080	11.378,9075

Source: compiled and calculated by authors

Table 5. Correlation coefficients

Output of SME products, mln. tenge	Investments in environmental protection, thousand tenge	The incidence of respiratory diseases, the number of cases per 100,000 population
$y = -53354x^2 + 2E+08x - 2E+11;$ $R^2 = 0,9853$	$y = -1E+06x^2 + 5E+09x - 5E+12;$ $R^2 = 0,9102$	$y = -99,434x^2 + 400584x - 4E+08;$ $R^2 = 0,6024$

Source: compiled and calculated by authors

The data on the impact of investments in environmental protection on the output of SMEs and the correlation coefficient equal to 0.9853, as well as the impact of innovation processes on the sustainable development of the economy, led to the conclusion that it is necessary to develop environmentally oriented activities of enterprises in various areas of their activity. Based on the empirical results we can conclude that among the above factors influencing the output of SMEs, the most significant factor is investment in environmental protection.

Conclusion

In order to further improve the system of environmentally oriented entrepreneurship, it is necessary to establish and implement environmental control methods for protecting and ensuring the environmental safety, such as: auditing the environmental sustainability of business entities, introducing compulsory environmental insurance and standardizing environmental quality, using environmental technologies non-consuming raw resources. Also, are required environmental structures able to implement and apply standards, norms, to boost applied research for innovative technologies, goods and services.

Strategy for sustainable development of Kazakhstan, should combine the main economic instruments at its disposal for regulation of some environmental and economic policies that lead and develop environmentally oriented entrepreneurship activities. We conclude that following mechanisms could sustain an environmentally oriented entrepreneurship behavior: payments for the use of natural resources; taxes for emissions and pollution; environmental taxes that stimulate the socio-economic distribution of rental income from these resources; fines for the damages caused to environment and human health; creation of the Fund for Environmental Protection in order to preserve financial resources allocated for environmental needs; improvement the market of environmental entrepreneurship good and services; attraction of public-private partnership funds to finance measures for protection, reproduction and conservation of natural resources; tax rebates and lower interest rates for credit for entities using clean technologies.

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- *** Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan for 2010-2021. Available at: <http://www.stat.gov.kz>