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Sustainable Economy: Eco-Branding of an Industrial Region of Kazakhstan

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Abstract: In the sustainable economy, consumer preferences are gradually coming to prioritise environmentally friendly products and services. A sustainable economy is directly linked to the growth of consumer welfare and environmental culture. The success of environmental projects is largely determined by approaches to the management of complex interconnected objects. Technological integration and the value chain from raw material extraction to the marketing of environmentally friendly products add to the growth factors. In this regard, we formulate the purpose of this study: to generalise the approaches and improve the mechanism of the ecological branding of the industrial complex of a region through conscious ESG transformation. For this purpose, we studied statistics and principles of management systems of Kazakh companies and their stakeholders. We analysed the situation of industrial complexes and their partners in the external environment to identify barriers to the development and implementation of eco-branding tools. The theoretical significance of the study helps to reveal the influence of ecological principles of modern production organisation on the speed of transition to green technologies. Its practical significance is seen in the formation of a system for measuring the level of readiness of companies to promote the ecological branding of a region's industry outside its country.

Keywords: sustainable economy; sustainable corporate governance; ESG transformation; eco-branding; consumer satisfaction; industrial economics; stakeholder responsibility

1. Introduction

The outstripping growth of the capitalisation of the information and communication sector, the emergence of digital twins, the diversification of existing industries, the global goals of sustainable development: these are the prerequisites for new technologies for the management of complex socio-economic systems. Adherence to ESG principles in the majority of Kazakh companies contributes to the expansion of international trade zones. In fact, enterprises need to improve environmental branding mechanisms. Terminology in the field of sustainable development such as environmental branding and environmental management is fixed in international and national standards and databases. In particular, the Sustainable Development Goals describe in detail the priority areas for the development of society and the establishment of full-fledged economic relations based on the restoration of the ecological balance in the factors of industrial production.

In the context of global industrial development with the use of digital systems for managing production processes and supply chains, individual states are adopting national strategies to achieve carbon neutrality. Kazakhstan's economy has a raw material orientation. In the context of economic destabilisation, there is an increased desire to increase the depth of the processing of extracted resources to master new principles of production organisation and product sales. Quality tools are regulated by the Environmental Code of the Republic of Kazakhstan, a new document that was adopted in 2021. By studying the activities of industrial companies in recent years, especially during

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the COVID-19 pandemic and post-pandemic period, when there was a disruption in traditional supply chains, we explore the hypothesis of whether the environmental branding system can contribute to the strengthening of ESG principles. Is the systematisation of approaches needed to promote green branding, green production and green finance?

In this regard, it is expedient to achieve the research objective in the form of generalisation of and improvement in the current techniques and mechanisms of the ecological branding of the industrial complex of the region under study. To realise this goal, it is important to solve the following tasks: firstly, to systematise the main scientific and methodological techniques of ESG transformation and eco-branding based on the collection and processing of specialised literature; secondly, to characterise the current state of the regional industrial ecosystem in relation to the leading industrial region of the Republic of Kazakhstan—Pavlodar Oblast—a region with high potential for cross-border linkages; thirdly, to lay the foundation for prospective studies on the digitalisation of green integration programmes based on the eco-branding of industrial products.

The choice of mechanisms for promoting the environmental branding of the region as a research topic is conditioned by the growing competition in the markets of finished products and intermediate consumption in the manufacturing industries. Despite the financial problems and instability of the external environment, the competitive advantages of any region increase manifold in the case of using "green" technologies, from the extraction and processing of raw materials to the sale of finished products that meet high environmental standards [1]. Working with companies' sustainability reporting allows for the systematising of companies' activities, the assessing of their achievements and the forming of a scientific and methodological basis for promoting ESG mechanisms. Researchers are trying to find a balance between the theory and practice of the management of complex socio-economic systems. Such objects include large industrial complexes and small firms that form cluster links with them. Under modern conditions, it becomes important to consider the level of sustainability of enterprises when they formulate their own growth strategy, taking into account environmental, social and governance indicators [2].

For an objective reflection of the state of the R&D base, let us focus on the approaches to ESG transformation. The first approach can be classified as large-scale digitalisation, which strengthens production and business links with direct and indirect market players. This puts an overlay on business processes in a green economy. They must be aligned with carbon neutrality objectives. In this case, environment, social responsibility and governance (ESG), and green technology innovation are at the centre [3–5]. When it comes to large industrial complexes that may be linked by technological integration, it is important to respect the basics of the circular economy, i.e., cleaning, reducing and recycling waste, which has a direct impact on brand reputation and financial performance [6]. Meanwhile, the digitalisation of logistics systems helps to establish supply chain management and helps to support the brand with digital warehouses.

The second approach to ESG transformation is categorised as green integration relationships, which positively influence company branding, complement the environmental management system and improve green processes [7]. Scholars argue that the development of green marketing strategies plays a major role in the degree of satisfaction and loyalty of professional buyers in a B2B environment [8]. In particular, the modern flourishing of the fashion industry is associated with the opening of lines for the production of "green" cosmetics, such as sewing clothes from environmentally friendly materials. In this case, the essence of the circular economy is manifested through product design and resource efficiency along the entire value chain. However, one should not overlook the possibility of the risks of misleading consumers with knowingly misleading marketing tools. In the face of unfair competition, these are used to achieve business performance and sales growth using green design elements [9]. With the development of ecological consumption, the marketing of environmentally friendly products is favourably reflected in the image of socially responsible organisations. This is indeed an obvious fact, as the practice of developing an environmental image using green marketing tools aims at encouraging consumers to make environmentally friendly purchases, which helps to reduce the risks of an unfavourable environmental situation in the regions [10].

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The third approach related to ESG transformation and ecological branding is the formation of an ecosystem of Industry 4.0 format. Despite the challenges of the modern economy, there are objective prerequisites for the integration and technological transformation of enterprises in industrial sectors. For them, opportunities are opening up for the continuous planning and control of projects that develop according to scenarios of the production and realisation of a product with "green" characteristics and the extraction of "green" income [11]. Researchers conclude that new types of ecosystems are increasingly taking on the characteristics of technological innovation, particularly in the knowledge-intensive and high-risk energy industry, which has environmental and social responsibilities to society [12,13]. Indeed, the gradual decline in commodity dependence is encouraging the economy to open new industrial facilities for accommodating high-level technological upgrading [14].

One can agree with this view, for example, for the Kazakh economy, where the sectoral specialisation of industrial regions is shifting to manufacturing. This helps to get closer to the final consumer but, at the same time, requires strengthening the branding of finished products [15]. According to experts, ecological branding should be the tool to be used to connect all stages of the production and marketing of high-tech products that meet environmental standards. Under conditions where the sustainable growth of companies and regions where industrial facilities of integrated structures are located becomes a necessity for solving environmental, social and governance (ESG) problems, corporate strategies for the digital transformation of companies are beginning to be successfully implemented [16].

In order to achieve sustainable growth by entering global markets, companies are obliged to build their production management process according to standards. It is important to have documentation that authorises and confirms the quality of products, so the management system of companies must move to the level of international certification [17]. This applies to emerging markets, so for industrial companies in Kazakhstan that supply raw materials and finished products abroad, one of the main conditions is presenting "green" certifications. The task of scientists and specialists is to join efforts and improve such mechanisms. The accumulated world experience shows that this can be achieved in different ways, e.g., by improving technological management, using digital tools, managing human resources and capital [18–22].

A review of the research base on eco-branding and ESG transformation in existing industrial facilities helps to conclude that for each country, these processes take place under special conditions. The reasons may be the general state of the world economy, the available resource base, the level of development of economic relations, the practice of change management, the accumulated human capital, environmental and moral norms and principles, and available financing. At the same time, it is important to explore the possibilities related to the accelerated achievement of the Sustainable Development Goals, taking into account environmental norms and "green" innovations [23–28].

2. Materials and Methods

To improve the mechanisms for promoting the ecological branding of the industrial complex of the region under study, classical methods were used: synthesis and analysis methods, the comparative method, the method of strategic planning and forecasting. To actualise the technology of the eco-branding of the industrial complex of the region, official information from international organisations and research centres dealing with the issues of "green" economy was used. Analytical work was carried out with open sources of information provided by the Bureau of National Statistics Agency for strategic planning and reforms of the Republic of Kazakhstan [29]. Reports on a survey of managers of Kazakh companies were also studied and analysed [30]. Thanks to open reporting in the field of sustainable development and established external relations between the studied companies and their stakeholders, it was possible to conduct a survey on the implementation of ESG principles in business entities in the region of Pavlodar and related cross-border regions.

In parallel with the analysis of the questionnaire report, the collection method was used, which made it possible to study materials on the transformation of ESG management at the level of companies, public services, banking institutions, educational organisations, public associations. The

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comparative method helped to analyse the potential for innovation activities of the participants of "green" technological integration. When using the method of strategic planning and forecasting, the issues relative to modelling relationships for promoting environmental branding between Kazakh companies and their foreign partners were considered. This method favourably differs from other traditional methods of analytical work. It helped to reveal to what extent Kazakh companies are ready for transformation, the use of new tools of production and the marketing of high-ecological-class products.

The scheme of the presented research is connected by logical links:

- Review of theoretical and methodological approaches in the field of ESG transformation and ecological branding.
- Selection of a region with a developed industrial profile; transport and logistics interchange; presence of large, medium and small firms in the manufacturing industry and an agro-industrial complex.
- Conducting a thematic survey of business entities and their stakeholders to determine the prospects for sustainable development on the basis of a sound environmental policy in the field of production and sale of finished products.

The industrial complex in the region of Pavlodar in the Republic of Kazakhstan became the object of research of sustainable development problems. It is a cross-border region with a diversified economic structure. The products of industrial companies in the region are exported to Eurasia and Europe. This region concentrates more than 7% of all Kazakh industrial production: 61.1% of coal mining; 76.1% of ferroalloys production; 44.3% of electricity generation; 41.7% of gasoline production; 100% of alumina and primary aluminium production [29]. There are functioning enterprises for coal mining; electricity generation; production of gasoline and diesel fuel; production of ferroalloys, alumina and primary aluminium; machine building; the processing and canning of meat; production of meat products; production of dairy products. In total, there are 185 different industrial enterprises in the region, including 15 backbone enterprises. Industrial facilities employ more than a quarter of the region's working population and generate about 43% of Gross Regional Product.

Of interest are the data from the open report on the survey of managers and chief specialists of companies, which was conducted in the period September–October 2023 [30]. Taken together, the classification of approaches to sustainable economic development for meeting consumer demand for environmentally friendly products contributes to the improvement in the eco-branding of economic entities and the region.

3. Description of the Economic Situation in the Region: Challenges to Change

According to official statistics, industrial production in January–September 2023 totalled USD 4.5 billion, 0.4% higher than in the corresponding period in 2022. Mining and quarrying increased by 4.6%; production in the industries supplying electricity, gas, steam, hot water and conditioned air increased by 2.1%; water supply, waste collection, waste treatment and disposal, and pollution elimination activities increased by 0.6%; and manufacturing decreased by 1.4% [29].

Environmental innovations require improvement in both products and business processes. The current situation, with the development and implementation of environmental innovations in Kazakhstan's enterprises in the non-resource sector of the economy, can be classified as requiring a reassessment of the value system in view of modern environmental challenges. Diagnostics of key problems in sustainable development for improvement in the ecological branding of the studied industrial complex give a general picture [30]. According to the criterion of "group of entities to which the organization belongs", i.e., according to their the main activity, the survey respondents can be categorized as follows: commercial legal entities (37.8%), non-profit legal entities (17.8%); branches, representative offices of Kazakh legal entities (6.6%); small- and medium-sized businesses (28.9%); individual business entities (8.9%) (Table 1).

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Table 1. Systematisation of general data of economic entities in the region of Pavlodar, Republic of Kazakhstan.

Criterion	Evaluation Category	Share of Responses in Total, %
Group of subjects to which the organization belongs	Commercial legal entities	37.8%
	Non-profit legal entities	17.8%
	Branches, representative offices of Kazakh legal entities	6.6%
	Small- and medium-sized businesses	28.9%
	Individual business entities	8.9%
Class of entities by average annual number of employees	Small businesses (up to 100 people)	40%
	Medium-sized businesses (from 101 to 250 people)	13.3%
	Large businesses (over 250 people)	46.7%

The industrial diversification in the region determined the connection between one-third of the interviewed subjects and negative impact on the environment. At the same time, the majority of the subjects did not report to have received negative feedback in terms of social responsibility about the environmental impact of their organisation. Among the managers, there was the opinion that industrial waste was the most significant among the environmental problems of the region. They believed that it is necessary to form a reserve of industrial (non-hazardous, inert) waste for use in various sectors of the economy.

In general, the country is developing technologies for processing organic waste from sewage sludge at sewage treatment plants, as well as waste from agriculture, poultry farms and pig breeding (including biogas production) to produce organic fertilizers and use them to improve soil quality. Attention is being paid to the production of plants and equipment for waste collection, transportation, sorting, processing and utilization (Table 2).

Table 2. Systematization of data in the "Business Processes" block.

Criterion	Evaluation Category	Share of Responses in Total, %
Specific requirements for environmental standards of purchased resources for production and economic activities	Charged	51.2%
	Absent	24.4%
	Difficult to establish	24.4%
The presence and development of an innovative phenomenon in the regional market— "new generation eco-consumer"	Present	40%
	Absent	31.1%
	Difficult to establish	28.9%
Attributes of the behaviour of the "new generation eco-consumer"	Conscious endeavour to reduce the negative environmental impact of production and economic activities	80%
	Purchase of products made from recycled materials	40%
	Assistance in collection of secondary raw materials ("separate" waste) for further processing and production of environmentally friendly products	60%

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	Application of international environmental safety standards by the organisation	55.6%
	Fostering moral values in society through the example of a responsible producer and consumer	53.3%

The relationship between regional eco-branding attributes and opportunities to develop the export potential of Kazakh industrial products is shown in Figure 1.

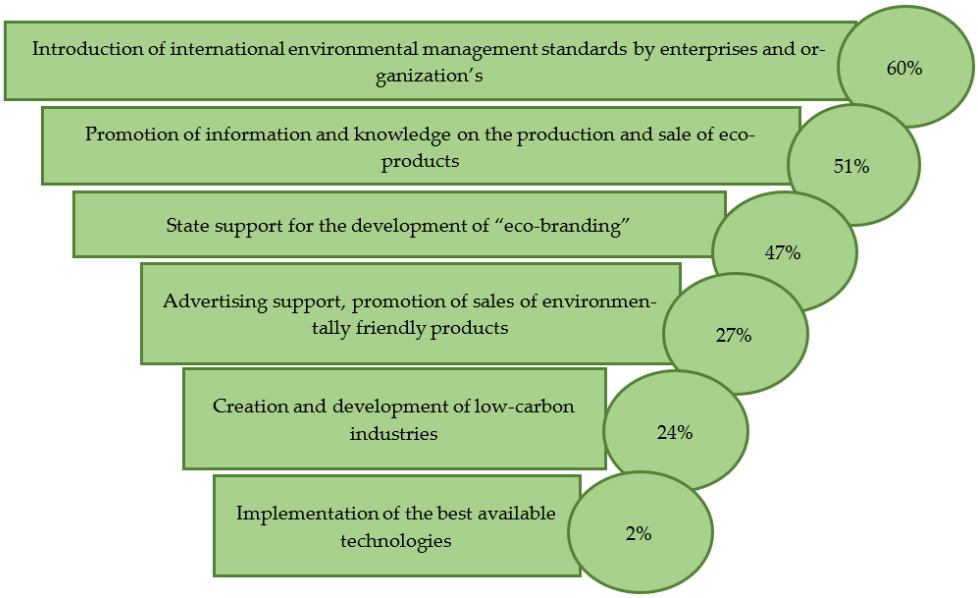

Figure 1. Funnel of attributes for the development of eco-branding in the region. Distribution of responses from business entities in the region of Pavlodar, Republic of Kazakhstan, and partners, in % of respondents' population.

As the research results show, the majority of company managers saw the introduction of international standards of environmental management, dissemination of information and knowledge about the specifics of production, and sale of environmentally friendly products as the main signs of eco-branding development of the industrial complex in the region of Pavlodar.

As a result, the certification of products and the building of a management system in accordance with international environmental standards are expected to help unlock the export potential of products with a national "eco-brand" and facilitate the recognition of eco-products by the international expert community (Figure 2).

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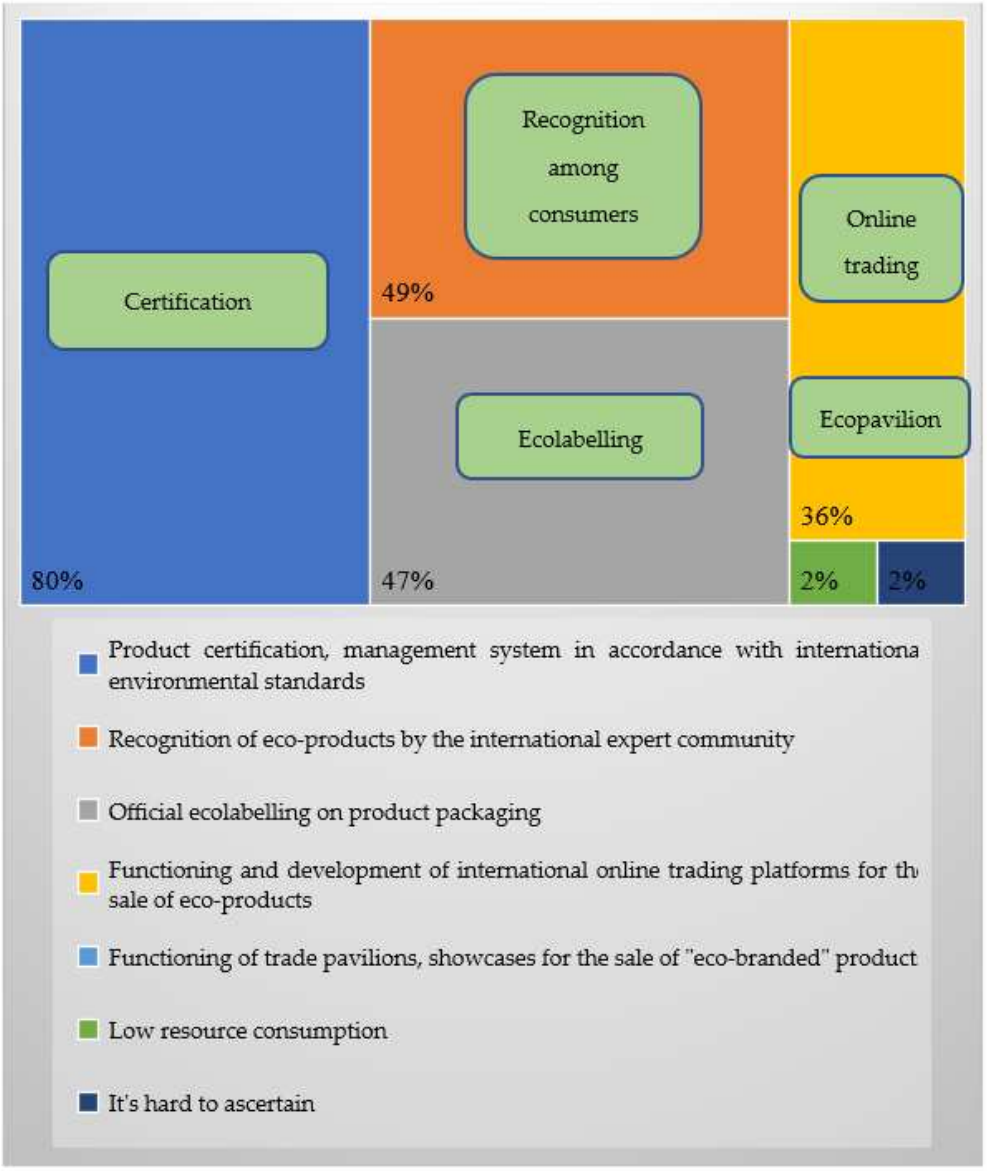

Figure 2. Infomap of tools and mechanisms for development of export potential of products with "eco-brand". Distribution of responses of economic entities in the region of Pavlodar, Republic of Kazakhstan, and partners, in % of respondents' population.

An important step in identifying the main challenges to sustainable development is the linkage with ESG principles.

3.1. Sustainable Economy and ESG Transformation

By processing the information obtained with the survey, we can draw a conclusion about the importance and prospects of the technological integration of environmentally friendly industries for Kazakhstan and its partners. All large companies have developed and are implementing a Sustainable Development Strategy, which includes a section on compliance with ESG policies. A third of managers of business entities believed that ESG transformation under the current conditions is proceeding at a fairly high level. However, in total, about 20% of respondents believed that the change in environmental, social and governance elements is a weak or generally difficult-to-characterize process (Figure 3).

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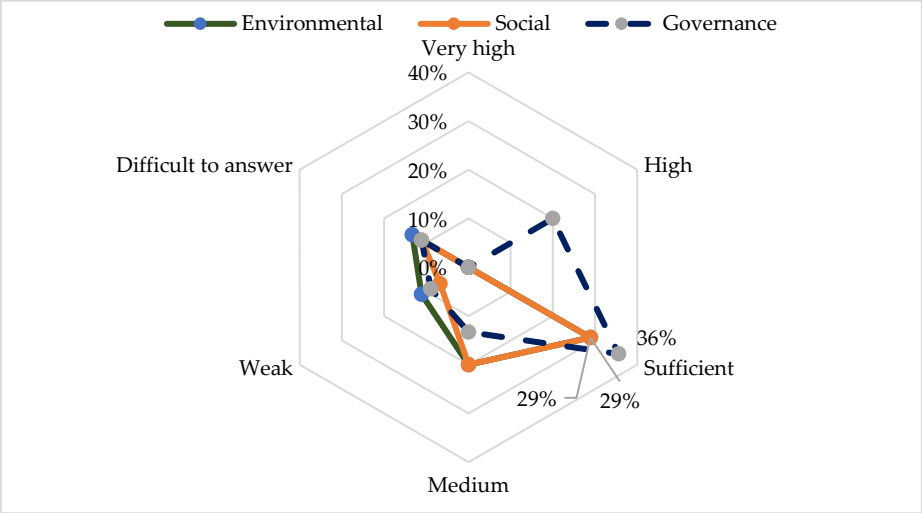

Figure 3. Implementation of ESG principles in organisations. Distribution of answers of business entities in the region of Pavlodar, Republic of Kazakhstan, and partners, in % of the total number of respondents.

When characterising the technological process of backbone companies in the region of Pavlodar, it is important to focus on the "4R" closed-cycle model: refusal of additional packaging material ("Refuse"), reduction in the amount of waste produced ("Reduce"), recycling resources within the organisation ("Reuse"), transformation of waste into new materials or items ("Recycle"). About two-thirds of the managers interviewed expressed that the technological processes in their organisations were fully or partially circular. As a potential threat, we can point out the fact that 7% ("Reduce"), 11% ("Recycle", "Reuse") and 16% ("Refuse") of managers indicated that their organisations did not plan to implement a resource-efficient economy (Figure 4).

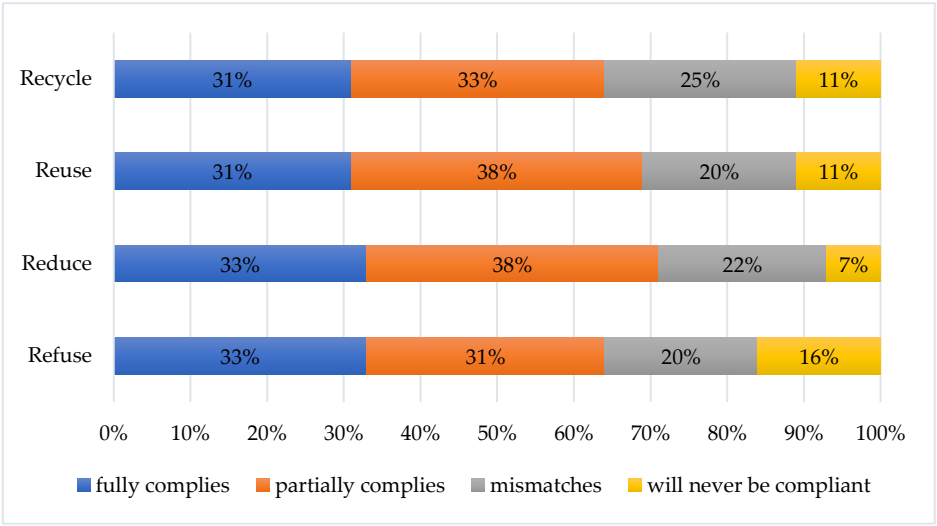

Figure 4. Compliance of organisations with the principles of closed-cycle economy (4R model) Distribution of answers of economic entities in the region of Pavlodar, Republic of Kazakhstan, and partners to the question "To what extent does your organisation comply with the principles of the circular economy (4R model)?", in % of the aggregate.

Observations show that in the present stage, the ESG transformation of industrial complexes of cross-border regions may face certain barriers:

 doi:10.20944/preprints202312.0467.v1

- Deficiencies in the systemised approach to the technological integration of environmentally friendly production facilities with subsequent certification in accordance with international standards;
- Weakness in mechanisms for promoting knowledge about domestic ecological products, lack of interest of network trade in sales and in setting an adequate price for these products;
- Lack of universal technology for ecologically friendly production;
- Lack of universal technology for ecologically friendly production facilities.

3.2. "Green" Integration and Its Activators

Analysing different perspectives on the development of a sustainable economy shows that there is a link among all processes. If the processes occur within integrated industrial complexes, we refer to technological integration, depth of raw material processing and output of environmentally friendly products. In cases where companies seek to expand beyond the region and the country, it is important to take into account the existing norms and standards of product quality. No process is without financing and capital raising, including green lending. These arguments push researchers to look for points of interaction among economic actors. There is a need to develop mechanisms of interaction among the participants of market relations.

A guide to green integration can be offered as a mechanism to help connect industrial companies with stakeholders to meet consumer demands (Table 3).

Table 3. Interactions among participants in "green" integration.

Stage	Key Partners	Regulatory Framework	Possibility of an International Alliance
Choice of cleaner production type—depth of raw material processing	Regional producers, Department of Project Activities Support of the Eurasian Development Bank	Environmental Code of the Republic of Kazakhstan	"ESG-Market Place"
	Retail chains	Strategy for achieving carbon neutrality by 2060 of the Republic of Kazakhstan	Qaztrade Accelerator—service support for entrepreneurs
	Members of the National ESG Club Green Finance Centre of the Astana International Financial Centre	Global Reporting Initiative (GRI)	ESG Disclosure Rating
Submitting and promoting an application for "green" finance	Regional producers	Financial instruments aimed at implementing environmentally friendly, energy-efficient and low-carbon projects	UNDP programme funding International agreements for the supply of raw materials and products
	Commercial banks members of the National ESG Club		

4. Discussion

The study of the sustainability of economic relations due to the interaction of companies and their stakeholders for the benefit of the quality of manufactured products, as well as the purity of the production process, helps to improve the system of technological integration of industrial companies and cluster formation, as it carries exclusive functions of integration interaction.

Under modern conditions, with the economy undergoing formational shifts, changing global supply chains do not always manage to comply with the rules of ethical business conduct. Ultimately, end consumers suffer the consequences, and energy and natural resources are damaged. This is why scholars agree that in many cases, the effectiveness of cleaner production and the promotion of

environmentally friendly products could be influenced by green credit policies and low-carbon technological innovation in ESG-certified enterprises [31–38].

The eco-branding of quality industrial products is not expected to cease to be at the basis of the choice between super profits and ecosystem protection. How far can our civilisation go, and how can we improve contacts among all participants in the technological cycle and the marketing of products? The answers to these questions do not always lie on the surface, as, for example, in the case of the operation of large-scale facilities where platform integration is based on artificial intelligence [39–46]. Artificial intelligence technologies facilitate early response to possible threats of disruption in the process chain and prevent emergency stops and unintentional releases. But we cannot forget about human factors or the advantages of building human capital [47–54].

Why does Kazakhstan, like other global market players, seek to strengthen its competitive advantages? Studies show that industrial companies have additional opportunities due to the inflow of green investments [55]. It is important not to forget that "cheap" resources cannot fully deliver industrial facilities from problems related to the market [56,57]. The global economy shows that the financial component (i.e., the ability to finance operations quickly and coherently), a diversified product range and efficient production management help to sustain economic growth [58].

Our results indicate that mechanisms for promoting the eco-branding of the studied region's industrial complex should help to take a fresh look at the problems of company management in related industries [59–66]. In this, we share the views of scholars who explore the possibilities of accelerating the transformation of socio-economic systems according to ESG principles [67–72].

Despite the accelerated pace of technological growth, we must remain committed to universal human values, care for the world around us and strive to cultivate an ecological culture of consumption and respect for what our earth has given us. The task of scientists and researchers in the field can be defined as studying the sustainable economy as an opportunity to leave a "green" planet to future generations, because it is thanks to this concept that development programmes are adopted by states, financing instruments appear and individuals with a new view of the world are formed.

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Conflicts of Interest: The authors declare no conflicts of interest.

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