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# Improving Approaches to Strategic Enterprise Management in the Context of Sustainable Development

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Received: 11 August 2020; Accepted: 7 October 2020; Published: 12 October 2020



**Abstract:** This article discusses the issues of improving strategic management of sustainable development of enterprises of the Russian Federation. The management of many companies continues to demonstrate an inadequate attitude to the development and implementation of a system of measures to ensure the proper level of sustainability of an industrial company. The main problem considered in the study is the insufficiently perfect mechanism for the strategic management of the investment policy of industrial enterprises in the Ural region of Russia. The management of many enterprises does not conduct a comprehensive assessment of sustainability and does not rely on the triad of sustainable development indicators—economic, environmental, and social. This negatively affects the strategic management decisions made. Under an insufficiently perfect mechanism, in this study, we refer to the following: At Russian regional enterprises, there is no close connection between the processes of making strategic decisions and the investment policy of the enterprise. This leads to certain errors in the formation of the enterprise strategy. The connecting element of these processes is highlighted. It is a comprehensive assessment of sustainability. The main objective of this study is to improve the model and mechanism of strategic management of the investment policy of the enterprise in the context of the environmental and economic status of the business. The proposed model is based on the principles considered from the perspective of three directions—economic, social, and environmental. This model provides for a close interconnection of components: management decision-making, investment policy development, and comprehensive assessment of sustainable development strategy. Based on the analysis of scientific works, the practice of managing industrial enterprises and certain gaps have been identified in theoretical sources related to the topic, problem, and objectives of the article. The methodological base of the study is determined, and methodological aspects of the analysis of the ecological state of business projects and the formation of strategic management of investment activity of an industrial enterprise are substantiated. The model for managing sustainable enterprise development is presented. This model provides for close interaction between the mechanisms for developing strategic decisions and managing the investment policy of the enterprise based on the environmental component of the business as a factor in sustainable development. Tools are proposed that ensure interconnection and synergy between the components of strategic management of the investment policy of the company and improve the quality of management decisions.

**Keywords:** sustainable development; strategy; investment policy; sustainability assessment; indicators of sustainable development; industrial enterprise

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## 1. Introduction

In the last 5–6 years, the socio-economic condition of Russia has been experiencing certain difficulties associated with the impact of both external and internal environmental factors. The crisis and a serious slowdown in economic growth were due to the general state of the world economy, the deterioration of relations with a number of leading countries, and the domestic economic and financial problems of the Russian Federation. This, of course, has stepped up the search for ways and new methods to maintain competitive positions, improve management mechanisms, and achieve a steady state and the development of business entities.

Representatives of the scientific community, states, owners, and heads of backbone enterprises of the country have stepped up their development in the direction of improving strategic management of sustainable development of enterprises based on a balance of the three fundamental areas of this concept—capital, social welfare, and improving the environmental situation. Some successes have been achieved along this path, but a cardinal turning point in overcoming negative trends has not yet occurred.

Unfortunately, many Russian companies continue to experience problems associated with the lack of investments necessary for the implementation of vital business projects. Despite a sharp decline in inflation and restoring order in the banking sector, lending rates for industrial enterprises remain very high, economic indicators are gradually declining, and access to foreign, in particular, European investments is difficult.

On this basis, the problem of improving the strategic management mechanism for the sustainable development of industrial enterprises, namely, such an important component as the optimal investment policy, remains relevant [1]. A competent approach to the formation of investment strategies, as shown by foreign and domestic experience, has a fruitful effect on the competitiveness and stable, progressive development of an industrial enterprise [2].

According to representatives of the systematic approach, and in particular H. Geerlings and T. Vellinga, any enterprise is a systemic phenomenon with the properties of dynamics, openness, and target orientation [3]. As a system, an enterprise is in the process of constant changes: the structure, criteria, indicators of the system, and its properties are changing. In modern conditions, the system acquires new characteristics and its quantitative and qualitative reformatting takes place. Moreover, as T. Pablo notes, the conditions of interaction with the external environment change; as a rule, they acquire more complex forms [4].

The term “sustainable development” just points to a process of change in which the exploitation of natural resources, the direction of investments, and the orientation of scientific and technological transformations, institutional transformations, and human development are coordinated and strengthen the potential needed for updating and developing systems, in relation to society as a whole as well as individual companies [5].

S. Cao and D. Tian indicate that sustainable development mechanisms provide for the improvement of all subsystems of the company based on the selection, assessment, and analysis of performance criteria, investment options, and managerial decisions about the strategic development scenarios of the enterprise [6].

According to the work of representatives of strategic management, in particular, P.K. Kopteva, there is a close relationship between the management of a company’s investment policy and its sustainability, which makes it possible to describe various processes using appropriate schemes and economic models [7].

The problem of the presented study is the insufficiently perfect mechanism for strategic management of investment activities of industrial enterprises in Russia, which often leads to the failure to meet deadlines for the implementation of business projects, to unreasonable costs, and ultimately reduces the economic stability of the enterprise.

Based on the research problem, the aim of this work is to offer recommendations for improving the model and mechanism for strategic management of the investment policy of the enterprise, taking into account the environmental and economic status of the business.

In the framework of the goal, research tasks are highlighted:

First, justify the methodological aspects of assessing the steady state and the formation of strategic management of investment activity of an industrial enterprise.

Second, point out gaps in theoretical studies on the problem of the imperfection of the strategic management mechanism and methods for assessing the environmental and economic status of enterprises.

Third, make suggestions on improving the model and mechanism for evaluating and developing strategic management decisions, taking into account the environmental component, allowing to influence the sustainable development of the company.

## 2. Theoretical Framework and Literature Review

The issues of analysis and improvement of the strategic management system are considered in numerous works of foreign and domestic scientists, theorists, and business practitioners. The topic of strategic management of industrial enterprises and the achievement of sustainable development is presented in scientific research, taking into account various aspects, positions, approaches, and points of view. Nevertheless, there are still certain white spots, not-completely resolved problems, that attract the attention of the scientific community in many countries of the world.

This study also focuses on improving the strategic management of industrial enterprises. First of all, we were interested in certain subsystems of company management related to the process of developing strategic decisions on the basis of taking into account indicators for assessing the environmental and economic state of the business and the formation of investment policy.

In the framework of this study, the world experience of strategic planning, business valuation, environmental assessment, investment policy management, and works that could help in finding possible solutions to the problems of sustainable development inherent in Russian industrial enterprises were analyzed.

In the course of substantiating the methodological base of the study, some gaps were identified, which we point out in this article.

When analyzing the works devoted to the optimization of strategic management, attempts were made by a number of scientists, for example M.L. Tseng, P.A. Tan, and S.Y. Jeng, that achieved a real synergy effect between the components of the sustainable development management system [8]. The process of developing investment strategies was reviewed. A sound investment policy and a favorable investment atmosphere have the most direct impact on maintaining the company's stability. At the same time, progressive development is often a guarantee of the successful implementation of investment projects. This relationship is confirmed by management practice but requires the allocation of a basic binder component. This component should contribute to achieving unity of action for the relevant services of the enterprise. The authors have not clearly defined such a component. This required him to be singled out in the proposed improved model for managing the development of a company.

The development of investment policy and sustainable development of the enterprise include a thorough assessment of various environmental factors [9,10]. This assessment, based on the concept of sustainable development, should contain both standard indicators related to the criteria of economic efficiency and indicators of social and environmental safety. In fact, many researchers, in providing

basic indicators for assessing business projects, offer only formal indicators of profitability and payback of projects. An example of this approach is the scientific work of O.I. Averina [11].

A number of scientists, for example D. Gong, C. Kao, and B. Peters, try to focus on environmental and social security when analyzing investment strategies and sustainability indicators, somewhat lowering the value of standard economic indicators, which violates the idea of real business performance [12].

In practice, it causes a serious difficulty, with which Russian scientists are also faced, in combining assessment indicators reflecting the triad of sustainable development aspects into a single complex. Nevertheless, some works present methodological approaches and tools that allow under certain conditions to solve this problem.

Thus, the work of N. Dalevska, V. Khobta, A. Kwilinski, and S. Kravchenko attracts attention, in which the authors, to quantitatively assess stability, propose tools for economic and mathematical modeling based on well-known models of fuzzy logic, the Mamdani algorithm, and the Saati hierarchy method. This work considers the possibility, when evaluating investment policy, to take into account the influence of sources of economic growth [13]. The recommendations of the authors contribute to the optimization of strategic management, regulation of sales, and trade relations. Unfortunately, they do not reflect the specifics of the activities of industrial companies and cannot be fully used in modeling the process of analysis and development of sound strategic decisions in the investment policy of industrial enterprises.

Of interest are the works of S. Sala, B. Ciuffo, and P. Nijkamp, which raise questions related to the determination of assimilation potential, which is understood as the ability of the ecosystem to neutralize and process part of the polluting substances of the territory [14]. Due to the ability of the biosphere to recover, it is possible to reduce the costs of environmental measures. Saving on the costs of prevented damage affects the economic assessment of the environmental and economic status of investment projects [15]. Unfortunately, the algorithm for analyzing and accounting for cost data in assessing the investment attractiveness of business projects, presented in these works, is rather vague and requires corresponding detailing.

This study examined the work of E. Santoyo-Castelazo and A. Azapagic, in which an attempt was made to integrate into a single complex a system of economic, environmental and social indicators for assessing the sustainability of industrial enterprises [16]. Such integration is based on achieving close interaction between the components of planning, decision making, and evaluation of strategies. However, it is difficult to adapt the system of proposed criteria for assessing sustainable development specific to the energy sector of the economy to the operating conditions of coal mining companies and integrate them into the management mechanisms of these enterprises. However, the approach itself proposed by the authors is of genuine interest and requires further development.

Achieving the goal of this study required the study of works in which recommendations were proposed on the use of tools to form the image of the company, affecting the creation of a favorable investment atmosphere. According to J. Surroca, S. Tribó, and J. Waddock, this is one of the aspects of managing the investment policy of an enterprise [17]. These authors did not consider in detail the conditions for the interaction of strategic decision-making mechanisms in the field of investment projects and the formation of investment policies. Nevertheless, their proposals allow us to determine the tools for creating a positive investment climate for industrial enterprises.

One of the urgent tasks of the presented study is to achieve close, streamlined interaction between the mechanisms for developing strategic decisions and managing the investment policy of a coal mining company.

In the work of R. Eschenbach and H. Schiller, strategic aspects of the development of the company and algorithms for establishing the mechanism for managing the investment activity of an enterprise are analyzed [18]. In the presented algorithm, instruments for monitoring the implementation of strategic decisions related to the development of investment strategies and the formation of a favorable investment atmosphere are not clearly presented.

In their study, T.A. Khudyakova, A.V. Shmidt, and S.A. Shmidt analyzed methodological tools for improving the mechanism for managing the development of strategies for sustainable development of the company and investment design of industrial enterprises in a nonequilibrium environment [19].

One cannot ignore the scientific work of P. Loon, who proposed conceptual approaches to building dynamic models for managing business processes of industrial enterprises [20]. Of course, the Loon model looks somewhat simplified, but it is the simplicity and the ability to adjust this model in accordance with the conditions of activity of Russian industrial enterprises that makes it attractive for the presented study.

These works allow us to present the general contours and directions of improving the model of strategic management of the company.

### 3. Materials and Methods

#### 3.1. Methodology for Assessing and Making Strategic Decisions on Managing Sustainable Development of Industrial Enterprises: Current Status

As a methodological base of the research, the following are proposed: a systematic approach to studying the problems of sustainable development, a cultural and logical approach, and the theory and practice of assessing the sustainability indicators of economic facilities. Also considered are the theory of economic and mathematical modeling and works on investment design, strategic management, and the development of managerial decisions.

The analysis of scientific works shows that the problem of sustainable development is considered in the coordinate system: “nature–society–man”. This means that the ecological, economic, and social systems should be presented as three equal, interconnected components of sustainable development that cannot be separated from each other [21]. The interaction of these guidelines for sustainable development provides a certain synergy and, with the optimal organization of strategic management, can increase the efficiency of the production system.

The enterprise itself, given the specifics of the activity, must be represented in the form of a stochastic dynamic system [13,22,23]. This implies the synthesis and certain integration of complementary approaches to improving the management mechanisms of the mining company. Specifically, this study proposes the integration of three approaches. Firstly, the theory and practice of strategic management of enterprise sustainability; secondly, investment design; thirdly, analysis and assessment of sustainability indicators of industrial enterprises. An honest and correct assessment of the business allows you to choose and implement the optimal investment policy, which affects the equilibrium development of the company and the implementation of selected strategies. At the same time, the success of investment design is determined by the effectiveness of strategic management of the sustainable development of the enterprise and the ability to make adequate management decisions. Thus, this interconnection and complementarity makes it significant to use and clarify modern methods for diagnostics, assessing the safety of investment projects, and developing investment strategies of enterprises in the context of managing sustainable business development.

In Russia, more and more attention is being paid to the environmental status of investment projects, which is associated with global trends in life, the image component of the business, and the outflow of labor from disadvantaged regions of the country. The economic approach, based on the fact that living conditions are a blessing, a limited resource, which is part of the interests of an economic entity, is becoming increasingly important. Economics studies human behavior in terms of the relationship between its goals and limited means that allow alternative use. That is, it is necessary to study not only changes in the quality parameters, but also to assess the value of the environmental good and relations regarding the appropriation of living conditions.

All this should be taken into account when forming the investment policy of industrial enterprises, where the availability of investment is largely determined not only by the economic, but also by the environmental status of the projects.

From the point of view of the safety problems of production systems, it is necessary to prioritize the environmental and economic problems of enterprise sustainability, which allows you to take into account environmental changes depending on the specific situation and plan certain strategic decisions. According to V.V. Krivorotova and A.V. Kalina, the implementation of this procedure requires recognition of the inextricability of the problems associated with economic and environmental risks, which have the same nature of threats and consequences [24].

When implementing the strategy for sustainable development of an industrial enterprise, forming an investment policy, and assessing risks, according to O. Rostova et al., the primary threats in terms of the magnitude of the consequences are experienced by the following basic properties of the system: the ability to self-development and the ability to counteract destabilization factors [22,23]. That is why indicators that characterize the basic properties of the system—adaptability of the control mechanism to environmental influences and sufficiency of resources for reproduction—should be singled out as criteria for assessing the level of the state of the enterprise.

According to the resource approach to assessing the economic and environmental status, one should be guided by general basic quantitative indicators. An indicative approach to risk assessment is aimed at determining the quality of the external and internal environment, the level of environmental safety, and involves the use of indicators and indices to assess the state of the ecosystem and the level of environmental impact of business entities.

Many researchers, in particular, P. Horvath, R. Gleich, and M. Seiter, suggest, evaluating all sorts of risks, to apply balanced indicators that allow you to track the dynamics of development and deviations from planned indicators. They are associated with changes in the production base, updating the product range, the introduction of new technologies, and social reforms [25].

This study is based on resource and indicative index approaches, which allow to fairly accurately determine environmental and economic risks and assess them. As quantitative characteristics for evaluating projects, according to T.A. Akimova, the indicators of technological intensity, environmental capacity, and enterprise potential should be used [5].

The well-known approach of J. Forrester was also used, which, when developing a model, suggests considering the company as a set of interacting divisions. This interaction takes into account temporal and spatial factors, where the relationship and interaction of both internal elements of the system and external are traced. This allows you to find the right managerial decisions for both departments and the company as a whole, linking the firm's strategy with the situation on the market [26,27].

Modeling the management of a complex ecological and economic system, such as an industrial enterprise, requires special attention to the algorithms for implementing these processes, which is thoroughly considered in the works of the Shiryaevs. They proposed very interesting methods of constructing mathematical models that allow us to describe the interaction of structural units of the company and the corresponding financial, material, and communication flows [27].

This work also offers tools for adapting an industrial enterprise to changing environmental conditions, which logically follows from the recommendations of K. Waren on the formation of an enterprise management mechanism in conditions of uncertainty and instability of economic relations and relations of market entities [28].

Since the possibility of obtaining affordable investments by industrial companies is most closely linked to the assessment of the environmental and economic status of the enterprise, it is necessary to take the approaches to modeling the strategic management mechanism of the company that V.V. Leontiev and J. Forrester supplemented by the achievements of a number of modern authors [27,29]. So, according to B. Sharp, D. Bergh, and L. Ming, the model should include modules of managerial actions based on the basic functions of management-controlling, feedback, social responsibility of the business, motivation system, and elements of reputation capital [30]. Thus, it is possible to ensure close interaction of the production system with the environment in the external environment and timely identify and respond to possible destructive threats.

The process of modeling the mechanism of strategic management of sustainable development of an enterprise, as indicated by F. Mousavifard, A. Ayoubi, and M. Sanie, must include a component of automated information and communication systems. This allows you to improve the quality of diagnosis and assessment of environmental and economic threats, and to timely plan actions aimed at reducing the possibility of the transition of the economic system to a state of uncertainty [31].

The stable state of enterprises in modern conditions depends on many factors, but among them, according to a number of researchers, the technological development of the company and the availability of investments for implementing business projects are determining factors [19].

The presented study, as an important component of the strategic management system, distinguishes precisely investment policy, its close linkage to the enterprise ecosystem, and the security of the territory of operations, which is also associated with the introduction of environmentally friendly or acceptable technologies. At the same time, these advanced and safe technologies provide an economic effect and contribute to the sustainability of the company. The works of S.G. Kalinin, V. Tribushnaya, and other scientists presented approaches and methods for forming investment strategies and optimizing the structure of investment capital [32]. In particular, when modeling the mechanism of managerial decision-making, it should be possible to pre-identify and correctly respond to emerging gaps in the process of strategy implementation. These gaps appear when an insufficiently accurate risk assessment is made, when the technologies do not meet the environmental requirements, and the investment potential does not meet the needs of the enterprise.

Improving the strategic management of the sustainable development of the enterprise provides for a set of actions with close attention to each component of management [33]. One of these components is the analysis and assessment of the solvency of the enterprise, taking into account possible risks.

In the international practice of analyzing the sustainable development of an enterprise, including the possible likelihood of bankruptcy, there are various methods: the Altman method, the four-factor forecasting Tuffler model, the Lis model, and others. For Russian companies, a modified five-factor model suggested by G.V. Savitskaya, which takes into account the specifics of domestic enterprises, is often used [34]. These methods are used to determine financial stability, without taking into account the social and environmental sustainability of the enterprise.

The Altman model allows you to accurately assess and predict the possibility of bankruptcy of large industrial companies using the Z-factor. The coefficient is calculated according to the following Equation (1).

$$Z1 = 1.2 X11 + 1.4 X12 + 3.3 X13 + 0.6 X14 + 1.0 X15, \quad (1)$$

where X11 is working capital/total assets; X12 is retained earnings/amount of assets; X13 is operating profit/amount of assets; X14 is market value of shares/debt; and X15 is revenue/amount of assets.

You can also calculate the insolvency risks of an industrial company using the well-known Lis model. The discriminant model includes four factors and is calculated by Equation (2).

$$Z2 = 0.063 X21 + 0.092 X22 + 0.057 X23 + 0.001 X24, \quad (2)$$

where X21 is working capital/total assets; X22 is profit from sales/total assets; X23 is retained earnings/amount of assets; and X24 is carrying amount of equity/borrowed capital.

Features of the economic activity of industrial enterprises in Russia led to the need to improve the Altman model (Equation (3)).

$$R = 0.111 X31 + 13.239 X32 + 1.676 X33 + 0.515 X34 + 3.8 X35, \quad (3)$$

where X31 is the share of working capital in the formation of current assets, coefficient; X32 is accounts for working capital per ruble of the main; X33 is total capital turnover ratio; X34 is return on assets of

the enterprise; and X35 is coefficient of financial independence (share of equity in the total currency of the balance sheet).

Sustainable development of the enterprise involves minimizing the risks of bankruptcy and insolvency of the company. Therefore, it is necessary to pay close attention to the calculation of the corresponding coefficients, trying to apply the most appropriate method for calculating the sustainability of an industrial company, and taking into account the specifics and conditions of activity of industrial enterprises of the Russian Federation.

The above methods used in Russia do not allow to fully take into account all aspects of assessing the sustainable development of enterprises, which requires the introduction of appropriate amendments to existing models for assessing business sustainability.

### *3.2. Methodology of Enterprise Development Management in the Context of Social, Environmental, and Economic Sustainability*

Traditional methods of analyzing the state of an industrial enterprise, unfortunately, do not fully reflect the fundamental directions of the concept of sustainable development within the framework of decisions and recommendations of the UN. In Russia, whose economy has been characterized in recent decades by serious fluctuations from growth to recession and is characterized by a high degree of instability, they did not pay enough attention to the triad of sustainable development in the coordinate system: nature–society–people. According to this approach, reflected in the United Nations Millennium Declaration in 2000, sustainable development can be represented as a process of large-scale changes of a global nature. This process involves the coordination of scientific and technological transformations, business projects, the exploitation of natural resources, personality development, and changing public institutions in order to strengthen existing and future development potentials to meet social needs and harmonize relations. Based on this, there are three equal components of sustainable development: economic, environmental, and social. The interaction of these systems ensures the progressive development of the world economy and its individual representatives. In order to achieve optimal interaction of these three components, new, modern methods of a comprehensive assessment of stability are needed. This study proposes the development of additional indicators of sustainable development, which are typical for enterprises of a particular selected industry. As part of the reporting, three groups of indicators of sustainable development are identified, which represent three aspects: economic, environmental, and social (Table 1, Figure 1).

Given the insufficient data and the confidentiality of corporate information in each dimension, a number of indicators were identified, the values of which were taken from company reports or estimated by experts [35]. Thus, based on the analysis of the above works, as well as the works of T.A. Khudyakova, A.V. Shmidt, S.A. Shmidt, [19], V.I. Shiryaev, I.A. Baev, and E.V. Shiryaev [27], we proposed the following scheme for assessing the environmental and economic status of an economic entity.

Estimated indicators of the respective components are combined on the basis of the above criteria for the availability of adaptation mechanisms to environmental influences and the adequacy of resources for the reproduction of the company's activities in the relevant territory.

A comprehensive risk assessment allows you to start the process of making managerial decisions related to the further development of the company and the implementation of investment projects. Here, one should strictly observe the procedural aspects, the sequence of stages and steps of development and decision making, and their adequacy to the firm's strategy, as V.A. Barinov points out in his work [36].

The model of V.V. Leontiev reflects the main parameters of the activities of industrial companies [29]. This model is simple and allows you to make additions to it to reflect the specific characteristics of the activity of the object of study.

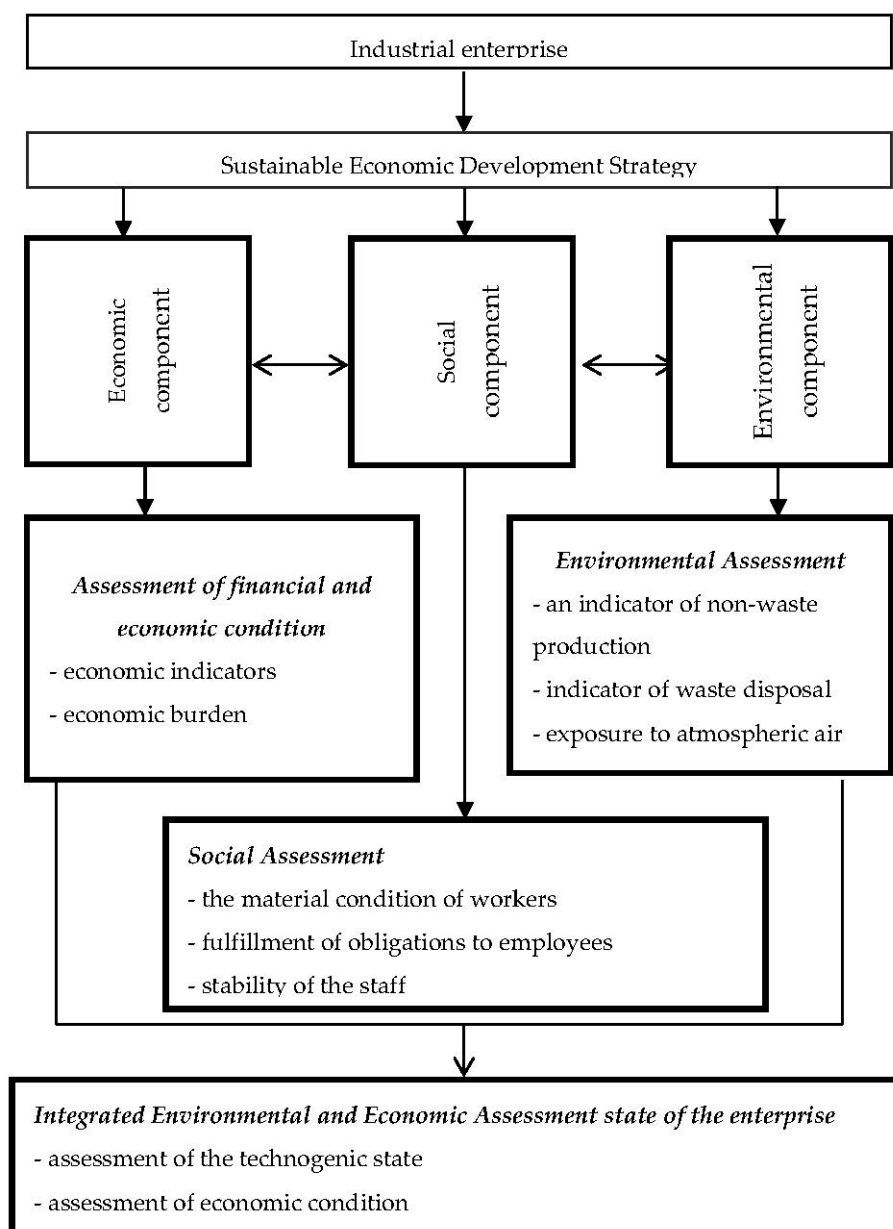
The management system should ensure timely response to possible gaps and close interaction of the strategic management components of sustainable development. For this, it is necessary to provide



components, algorithms of actions, common to different control subsystems, in an improved model for making managerial decisions [37].

**Table 1.** Indicators of financial, economic, social, and environmental sustainability of the enterprise.

Indicator	Economic Content	Calculation Algorithm
Financial and economic sustainability		
1. Total liquidity ratio	The company's ability to repay current (short-term) liabilities using only current assets	<p>The ratio of the weighted amount of assets with varying degrees of liquidity to the weighted liabilities of the enterprise:</p> $Kol = \frac{A1 + 0.5A2 + 0.3A3}{P1 + 0.5P2 + 0.3P3}$ <p>where Kol is the general liquidity ratio of the enterprise; A1, A2, A3 are the assets of the enterprise by the degree of feasibility; P1, P2, P3 are liabilities of the enterprise by the degree of maturity. According to the normative values, <math>Kol \geq 1</math>. The higher the value of this indicator, the higher the ability of the enterprise to pay off its obligations. Excessively high values may indicate poor asset management of the enterprise, i.e., the presence of a large volume of stocks, financial investments, etc.</p>
2. Plan completion percentage	It characterizes the degree of implementation of the production plan	The ratio of actual gross output to the planned gross output
3. Cash flow plan performance ratio	It characterizes the share of the plan's implementation in terms of total cash flows (how much is the cash flow plan fulfilled)	The ratio of total actual cash flow to the planned cash flow
Social sustainability indicators		
1. Staff stability coefficient	The stability of the staff of the enterprise	(Number of staff hired-Number of laid-off)/average number of employees
2. The ratio of the average salary in the enterprise to the industry average	The level of material condition of employees in the enterprise	Average salary/average salary in industry
3. The coefficient of absence of wage arrears	The degree of fulfillment of obligations to employees by the enterprise	(Total salary for a certain period-Salary on debt)/Total salary
Environmental sustainability indicators		
1. Non-waste production rate	It characterizes the full use of mineral and energy resources in the production and the intensity of their impact on the environment	(Used resources-production waste)/used resources
2. Production waste utilization rate	It shows the level of processing or reuse of waste generated by the company and the movement of this coefficient to the target value of 100%, which many states and industries are striving for	Waste recycled or reused/Total waste generated
	(1)	The ratio of disposed substances to the total amount of pollutants



**Figure 1.** Ecological and economic assessment of an industrial enterprise.

When developing the appropriate strategic management algorithm for the sustainable development of an industrial enterprise, one should focus on the works of the authors, which give a thorough analysis of the activities of industrial companies in Russia over the past 5–6 years of activity. They take into account the specifics of the functioning of Russian business in a crisis state of the economy. Such an algorithm is presented in the works of N. Yu. Varkova, A.V. Aliukov, T.A. Khudyakova, and V.V. Zhuravlev, devoted to optimizing the mechanisms of assessment, development, adjustment, and control of strategic management decisions [38].

Having analyzed the practice of managing industrial enterprises of the Urals and the scientific works of a number of foreign and Russian researchers, it is proposed to make certain improvements to the methodological tools, process, and strategic management mechanisms of an industrial enterprise.

Strategic management should be based on the close interaction of two subsystems: the subsystem of managerial decision-making and the formation of investment policy. Synergy will be achieved by identifying the connecting components of this process, which include a diagnostic assessment

of the environmental and economic condition of the territory of the company and the investment opportunities of the enterprise.

The main elements of the improved mechanism are presented below. A graphical model and proposals for economic and mathematical modeling are also presented, which reflect the relevant processes for managing the sustainable development of industrial companies in Russia.

Strategic management of the sustainable development process is considered from the point of view of efficiency for all functional aspects of the enterprise, that is, social, economic, environmental. Management of complex systems involves fine-tuning the control mechanism, taking into account the whole variety of environmental factors, detailing plans, optimal selection of methods and technologies, proactive management of the company, and the ability to timely adapt the company's strategy to possible changes in operating conditions [39]. So, in order to achieve the sustainability of the functioning of the coal mining company, an algorithm is proposed for improving the strategic management of the investment activity of the enterprise, which consists of the following steps.

1. Proactive-analytical phase. This stage is characterized by the search for points of contact of the company with environmental elements, the establishment of positive interaction with the socio-economic and environmental environment of the enterprise, and the formation of peculiar "islands" of the future close integration of the company with all subjects of economic, environmental and socio-political interaction. Accordingly, at this stage, an analysis of environmental factors is also carried out, where the main development trends, problems, opportunities, threats are identified. This will determine the set of indicators of sustainable development and determine the contours of the interactions of the enterprise, as an economic and environmental system, in the external and internal environment.
2. The forecast stage. At this stage, you should understand how to integrate management tools into the planning system of business processes necessary to implement the appropriate company strategy. Here, the possibility of sustainable development will be assessed for each component of the strategy—economic, social, environmental—as well as identification of possible problems. The priorities of solving the identified problems are determined on the basis of the methodological tools available to the enterprise management. Based on this, a hierarchical system of goals and objectives is built. As a result, the company's management determines the direction of investment policy and the structure of investment capital.
3. Integrated phase. This stage involves the most accurate use of existing tools and the full inclusion of the mechanism for making and implementing managerial decisions in the process of economic activity of the company. Additional opportunities for business development should be given by the synergy of the relations of the enterprise with the elements of the environment. The result of this stage should be to increase the level of sustainability of the company as a single environmental and economic system.
4. The control and adaptation phase. At this stage, we compare the planned results with the normative indicators of the implementation of the firm's strategy, adjust the investment policy, and form a system of adaptation measures for the implemented sustainable development strategy. The process of adaptation of an enterprise to changing operating conditions should be considered as an investment process at the micro level in the short and medium term. This means the possibility of using different methodological approaches to company management.

A model for the development of strategic decisions on managing the sustainable development of an industrial enterprise and forming investment strategies should take into account the fact that these enterprises are business entities operating in resource-type territories. They use reproducible and non-reproducible natural resources. Therefore, an important condition for their functioning is the implementation of a system of measures that contributes to the reproduction of the natural resource subsystem. This necessitates a thorough assessment of environmental and economic risks.

Also, establishing close ties and interactions between the mechanisms of making managerial decisions and shaping the investment policy of an industrial company [40].

In Russia, as in many industrialized countries, various regulatory instruments of a compulsory, exacting, and stimulating orientation are used to preserve the environment and ensure safe economic development. In the framework of economic incentives for enterprises in order to prevent the impact of anthropogenic character on the ecological and social environment, limits and quotas on the use of natural resources are used. The framework also applies payments and fines for environmental pollution, environmental insurance, and more. Unfortunately, the size of such payments and deductions is not so large as to have a serious impact on the economic policies of Russian enterprises.

However, due to the fact that, in the last 4–5 years, Russia has encountered problems with the availability of investments, which was mentioned at the beginning of the article, new opportunities have appeared for implementing the strategy of sustainable development of enterprises [38]. In this case, the condition for ensuring environmental and economic protection of the territory of activity and improving the investment policy of the company should be implemented. Let us highlight these features.

First, the Government of the Russian Federation, in order to stimulate business development and improve the social situation, identifies special development zones in hard-to-reach and disadvantaged territories. It is in these zones that companies that are the subject of our attention carry out their activities. These companies are provided with substantial benefits and certain preferences in the field of financing investment projects but while ensuring environmental protection.

Secondly, there was a reorientation of Russian industrial enterprises to that of East China, India, Japan, Turkey, and other countries. This led to a rethinking of investment policy, which required a serious change in approaches to assessing the ecological and economic state of the environment. It is also necessary to improve the process of making managerial decisions. In modern conditions, decisions require the development of measures and the use of tools to ensure the preservation of the ecosystem and the reproduction of natural resources.

All of the above had an impact on proposals for improving the strategic management model for the sustainable development of an industrial enterprise, as shown in Figure 2.

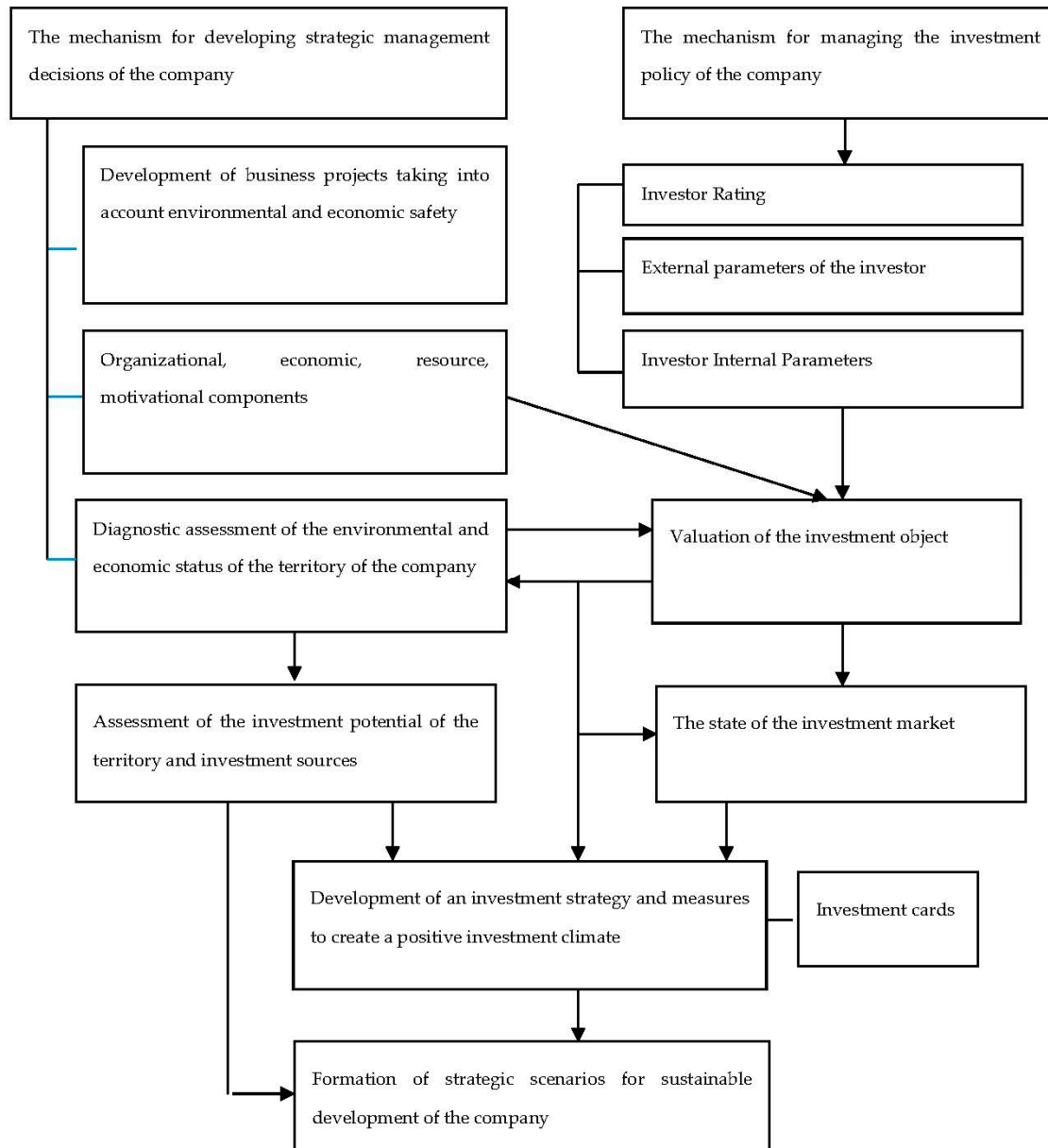
System management of enterprise development, according to J. Sterman, means achieving close and well-developed interaction between the main subsystems and elements of the company. Business dynamics aims for management to achieve a synergistic effect, taking into account the influence of the external environment [41]. That is why, and also based on the development trends in the coal mining industry of the Russian Federation, the main focus of this study was targeted on the two most important subsystems of strategic management of the company. This is a mechanism for developing strategic decisions and a mechanism for managing the company's investment activities. Both subsystems should closely interact with each other, ensuring a minimum of errors in the development and implementation of the enterprise strategy.

The connecting component of this process is a diagnostic assessment of the environmental and economic state of the territory of the company and an assessment of the investment opportunities of the enterprise. The mechanisms for developing strategic decisions and managing investment policies are set up in such a way that, when implementing the corresponding management functions and assessing various risks, they allow taking into account the effect of various aggressive negative effects on the stability of the enterprise.

Great attention is paid to assessing investors, internal and external parameters of investment policy, and the state of the subjects of the investment market.

The result of optimally debugged mechanisms is the development of an investment strategy and a set of measures to create a positive investment climate for the company [40]. It is at this stage, in our opinion, that the mutual effect of the work of mechanisms for making strategic decisions and managing the investment activity of the company is manifested. It is expressed in the development of investment maps, which include matrices for assessing environmental safety, the likelihood of a

crisis and the occurrence of possible losses at the end of a given period of activity of the enterprise, taking into account changes in environmental parameters. At the same stage, investment strategies are proposed for implementation on the basis of improving the social, environmental, and economic status of business.



**Figure 2.** The graphical model of managing the sustainable development of an industrial enterprise based on the interaction of strategic decision-making mechanisms and investment activities.

Thus, the presented mechanism for managing the strategic activities of a coal mining company makes it possible to link together the whole range of strategic actions:

- the process of developing and making management decisions;
- investment design;
- strategic control;
- diagnosis of possible risks;
- assessment of environmental and economic parameters of the implemented investment strategies;

- adjustment of management decisions in the framework of achieving the course on sustainable development of the company.

One of the main components of the decision-making mechanism for strategic management of sustainable development of an industrial enterprise is the assessment of environmental and economic risks. This is due to the fact that industrial enterprises are the main consumers of natural resources and most often operate on land spaces, where the main activity is the extraction and processing of these natural resources. For such companies, the principle that takes into account the formation of investment policies and development strategies should be the principle of high-quality reproduction of resources and reduction of risks to the ecosystem of the company. Based on the assessment, decisions are made to develop an investment policy and adjust the basic strategy of the company. The evaluation procedure was schematically presented earlier.

A comprehensive assessment allows you to monitor the state of the environment and determine the parameters of the respective components of the enterprise strategy, and form the company's investment policy based on the assessment.

Further, in the framework of assessing the social and environmental component of the sustainable development of an industrial enterprise, we turned to the calculation of indicators of sustainable development (Equation (4)).

$$U_r = \sqrt[3]{U_{fa} \times U_{sr} \times U_{ak}}, \quad (4)$$

where  $U_{fa}$  is an indicator of financial and economic stability;  $U_{sr}$  is indicator of social sustainability; and  $U_{ak}$  is an indicator of environmental sustainability.

To determine the integral indicator of the financial and economic stability of the enterprise, which takes into account the coefficient of total liquidity  $K_{ol}$ , the percentage of the plan  $K_{vp}$ , and the coefficient of the plan for cash flows  $K_{dp}$ , we turn to the formula

$$U_{fa} = \sqrt[3]{K_{ol} \times K_{vp} \times K_{dp}}. \quad (5)$$

The integral indicator of the social stability of the enterprise, taking into account the coefficient of personnel stability  $K_{sk}$  and the ratio of the average wage in the enterprise to the industry average  $K_{szp}$ , the coefficient of the absence of wage arrears  $K_{oz}$  is determined by the formula:

$$U_{sr} = \sqrt[3]{K_{sk} \times K_{szp} \times K_{oz}}. \quad (6)$$

The integral indicator of the environmental sustainability of the enterprise, including the non-waste production coefficient  $K_{ot}$ , the utilization rate of production waste  $K_{ut}$ , and the coefficient of the industrial enterprise's impact on the air  $K_{zagr}$ , is determined by the formula:

$$U_{ak} = \sqrt[3]{K_{ot} \times K_{ut} \times K_{zagr}}. \quad (7)$$

To interpret the result of the integral coefficient of sustainable development, we use the class-by-class classification of the enterprise sustainability level—Harrington's scale of desirability level (Table 2). One of the main objectives of the study was the development of an integral indicator for assessing the level of sustainability of the enterprise. This indicator is reflected in formula (7). The criteria for its assessment are given in Table 2. Also, the criteria from Table 2 can be applied to assess separately the social and environmental component of the sustainable development of an industrial enterprise, financial and economic stability of the enterprise, or the social stability (Equations (4)–(6)).

**Table 2.** Interpretation of the level of sustainability of the enterprise.

Probability of Sustainability	Type of Sustainability
[0; 0.2]	Very low
(0.2; 0.37]	Low
(0.37; 0.63]	Average
(0.63; 0.8]	High
(0.8; 1]	Very high

In general, the graphical model for developing strategic decisions presented in the article is based on the possibility of achieving synergy by closely interconnecting the mechanism for forming managerial decisions of an industrial enterprise and the mechanism for managing investment policies, creating a favorable investment climate, and an appropriate reputation for the enterprise. The appropriate investment atmosphere can be created and maintained solely on the basis of the priority environmental and economic status of the company.

According to the proposed model, close interaction between the strategic decision-making subsystem and the investment policy management subsystem provides:

- assessment of the environmental and economic status and investment component;
- the presence of a connecting stage common to both strategic management subsystems, which is the development of an investment strategy and measures to form a positive investment climate.

These measures necessarily include measures to protect and restore the ecosystem of the territory of the company.

In order to develop and strengthen ties and interaction between the components of the mechanism of strategic management of the development of the company, it is proposed to develop investment maps. These cards include a matrix of values of the parameters of the ecological and economic system, priorities of investment design, and investment strategies developed on the basis of an assessment of the ecological and economic condition of the territory of the company's activity. Cards help management make decisions on the formation of investment policies and develop alternative development scenarios.

Thus, optimally established managerial interaction within the framework of the proposed model for strategic decision-making and investment policy management, the process and procedures for evaluating, analyzing, recording, and transmitting data on the state of the ecological and economic system of the company is an important mechanism in the formation of a sustainable development strategy for the mining company.

The proposed recommendations for improving the strategic management model should help enterprise management reduce the number of possible losses in the formation of the company's strategy, taking into account various aspects of environmental, social, business and economic risks. These recommendations are still far from perfect and raise certain questions; nevertheless, they indicate directions for further research in the field of improving the mechanisms for evaluating and implementing the strategic management of an industrial enterprise.

#### 4. Results

The proposed model was tested at a regional enterprise of the Ural Mountain Region (Russia). The calculations were made on the basis of data from the internal documentation of the investigated enterprise, including based on data obtained from accounting and management accounting. In the process of conducting research on the activities of an industrial enterprise, an analysis of the stability of the enterprise was carried out using the existing Altman and Lis models and an improved five-factor model that takes into account the specifics of Russian companies. The total indicators are presented in Table 3.

**Table 3.** Determination of the risk of insolvency of the investigated industrial enterprise.

Model	Normative Value	Indicators	
		2018 Year	2019 Year
Altman model	>2.9	5.2	5.8
Lis model	>0.037	0.67	0.72
The 5-factor model for Russian firms (Savitskaya G.V.) [34]	>8.0	16.46	18.24

Diagnostics based on traditional business valuation models showed that the enterprise under study is stable, as the indicators turned out to be higher than standard values. However, the results obtained on the basis of the model proposed in the study of a comprehensive assessment of the sustainability of an industrial enterprise showed a different trend (Table 4).

**Table 4.** The sustainability indicators of the studied industrial company.

Indicators	2018	2019	Type of Sustainability 2018 Year	Type of Sustainability 2019 Year
Financial and Economic Sustainability (Ufa)	0.89	0.895	Very high	Very high
Social Sustainability (Usr)	0.83	0.89	Very high	Very high
Environmental sustainability (Uak)	0.62	0.63	Average	Average
Integral coefficient of sustainable development (Ur)	0.77	0.79	High	High

According to the results obtained, the integrated coefficient of sustainable development demonstrates a high value. Nevertheless, environmental sustainability indicators are not high, which should be taken into account when developing strategic decisions of the enterprise. A comprehensive assessment allowed us to achieve greater objectivity in the formation of strategic scenarios for the sustainable development of the company.

This model is an attempt to achieve close interaction between the decision-making mechanism and investment policy management based on common components related to the assessment of environmental and economic risks, investment opportunities, and the development of investment strategies.

It was possible to convince the management of enterprises of the need to use the investment development tool proposed as part of an improved model, an investment map.

Based on the diagnosis of the enterprise ecosystem, alternative options for investment scenarios were proposed: inertial and innovative. The innovative scenario is associated with increased costs for new production technologies, for social and recreational activities related to the environmental and economic situation. However, at the same time, it also implies serious preferences related to the availability of private investment and preferential terms for financing projects from the state. Forecasts show that this investment strategy provides a significant social effect, increasing the level of environmental and economic status of the business, and contributes to the formation of a favorable investment climate.

Based on the results of the work, it was possible to improve the strategic management mechanism of industrial enterprises, close interaction of the subsystems for making strategic management decisions, and the development of investment strategies. The proposals are made aimed at the formation of the investment policy in the context of assessing the environmental and economic state of business, taking into account a set of indicators, including formal economic criteria and additional environmental and social indicators. Recommendations for improving the connecting components of this mechanism are given, including the assessment of sustainability decision making. We offer recommendations for assessing sustainability indicators affecting the development of investment projects, carried out with corresponding calculations.



Testing the proposed methodology proved the adequacy of the tools. In addition, it made it possible to formulate a set of recommendations aimed at forming an investment policy in the context of assessing the environmental and economic state of a business, taking into account a set of indicators, including formal economic criteria and additional environmental and social indicators. The proposed recommendations allow industrial companies to rely on the corresponding economic, socio-environmental effect.

## 5. Discussion

Despite certain advantages and positive achievements of the presented study, it is necessary to pay attention to those aspects of the work that cause some doubts and certain dissatisfaction with the results.

There are no serious problems in the commercial evaluation of investment projects, involving the use of traditional formal criteria that reflect the return on investment, payback period, internal rate of return, etc. Difficulties are associated with the allocation of environmental and economic criteria that reflect the impact on the surrounding social and ecological systems. From a methodological point of view, this is justified both abroad and in Russia, but payments for environmental damage are not high. Therefore, the insignificant benefits from their reduction are not particularly interesting for managers of domestic companies in substantiating investment policies.

Further, in our opinion, indicators of prevented damage and other indicators having direct and indirect indicators to it should be included in the set of evaluation criteria (increase in the cost of operating environmentally hazardous equipment, risks of lowering human health, elasticity of pollution by the amount of product, etc.). Unfortunately, in the considered diagnostic system, it has not yet been possible to fully realize this intention due to the imperfection of the methodology for assessing and linking these indicators with the requirements for developing an investment strategy. Also, this is far from always met with understanding by the leadership of Russian companies and business partners, investors.

It is necessary to work on the formation of a ranking procedure according to priority criteria and a comparative rating assessment, which would draw the attention of management and investors not only to formal criteria, but also to additional ones related to environmental protection, which would add additional weight.

This procedure should be used to evaluate and select any investment projects, taking into account the environmental and economic consequences of the company's activities, ultimately influencing the formation of a basic enterprise development strategy.

In addition, the presented model did not reflect the mechanism of interaction between the company and investors with the government, in whose interests it is to ensure the socio-ecological state of business projects.

All of the above is the subject of scientific discussion and indicates the possibility of further research.

## 6. Conclusions

In the presented article, features and specifics of strategic management and development of industrial companies of the Russian Federation were considered, in the context of assessing the environmental and economic status of ongoing investment projects and the adoption of relevant management decisions.

The proposals presented in this article are methodologically aimed at supplementing and developing scientific research in the field of sustainable development of industrial enterprises.

The corresponding scientific base developed by the specialists of the South Urals, an analysis of the deep and informative works of foreign researchers, and an analysis of the practice of industrial enterprises in Russia led us to develop certain recommendations for improving some aspects of the strategic management of industrial companies in Russia.

The paper proposes an improved model for managing the development of an industrial enterprise, which is based on the mechanisms for developing strategic decisions and managing the investment policy of the company. There is a close relationship and close interaction of these components with each other and in the overall system of strategic management of the company. The proposed model makes it possible to increase the socio-economic stability of the enterprise and can be used not only for the current assessment of activities, but also for predicting the sustainable development of an economic entity.

The connecting components of these mechanisms are the proposed comprehensive assessment of sustainability, assessment of investment potential, and diagnostics of the ecological and economic state of the object of economic activity. The data obtained as a result of the proposed comprehensive assessment are more accurate, allowing to make strategic management decisions in accordance with the realities of the activity, taking into account the influence of environmental factors. The proposed model allows you to increase the socio-economic stability of the enterprise and can be used not only for the current assessment of activities, but also for predicting the sustainable development of an economic entity.

As tools for ensuring close interaction and improving the quality of the developed management decisions, the following are proposed: a procedure for assessing the ecological and economic status of a business and a general stage, a component of a management system related to the development of an investment strategy, and the formation of a favorable investment climate based on environmental safety considerations.

In our opinion, improving the strategic management mechanism of an industrial enterprise contributes to the unity of action of the main components of the company's management system. It makes it possible to make informed decisions in the field of evaluation, selection, and implementation of relevant investment projects aimed at achieving sustainable development of the enterprise.

**Author Contributions:** Conceptualization, T.K. and V.Z.; data curation, T.K. and S.A.; formal analysis, V.Z.; funding acquisition, N.V.; investigation, T.K.; methodology, T.K., V.Z., S.A., and S.S.; project administration, T.K.; resources, V.Z., N.V., S.S., and N.Z.; software, S.S.; supervision, T.K.; validation, S.A.; writing—original draft, S.A.; writing—review & editing, S.A. All authors have read and agreed to the published version of the manuscript.

**Funding:** The work was supported by the Government of the Russian Federation (Resolution No. 211 of 16 March 2013), contract No. 02.A03.21.0011.

**Acknowledgments:** The authors thank South Ural State University (SUSU) for supporting the research.

**Conflicts of Interest:** The authors declare no conflict of interest.

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