A sustainable approach to environmental investment in modern Russia

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Abstract: This paper is relevant due to the critical need for changing the consumption-oriented economic growth model to an investment one for the long-term sustainable development of Russia, considering global environmental challenges. Environmental investments (EIs), responsible and transformative, are positioned as the growth driver. The study aims to assess the mechanism of environmental investment (EI) in modern Russia, determine limitations, and form the resource-saving principles adequate to the latest challenges. The developed regression models of EI resource potential indicate the inability in the current institutional environment to provide the amount of financing required to form a green economy in Russia. This work justifies the need to establish an integrated mechanism for EI economic incentives to increase their amount in the private sector and obtain socio-economic benefits (natural capital maintenance, efficient resource use, and poverty and unemployment reduction). Based on the world’s best practice analysis of state support for EI market instruments, it sets out proposals to establish this mechanism in Russia and confirms the need to create conditions in which it is more profitable for economic agents to invest in reducing their ecological footprint. This paper proves that EIs promotion should combine positive and negative motivation, engagement, and responsibilities.

Keywords: environmental challenges; environmental investment; state support for environmental investment; market-based environmental investment instruments

1. Introduction
1.1. Introducing the Problem

In today’s difficult situation, created by the global crisis of 2008–2009 and succeeded by “widely chronically low economic efficiency” [1,2] and the disastrous impacts of the ongoing COVID-19 pandemic on economic activity and other aspects of society, even the developed world’s economy is programmed for economic growth in the coming decades. Indeed, this means realizing the meaninglessness of the zero growth or anti-growth idea formulated by D.H. Meadows and his team in the famous Club of Rome reports “Limits to Growth” and “Beyond Growth” [3,4], as well as in the works of their contemporary followers [5,6]. For example, the German green politician and publicist R. Fuchs states: “Instead of fighting growth, like Don Quixote with windmills, it is easier just to change the growth type . . . Zero growth generates many troubles: capital outflow, emigration of active citizens, reduced rate of innovation, infrastructure erosion, aggravation of already difficult problems in the pension and health systems” [7].

At the same time, we must recognize that unrestrained economic growth (without changing its type) leads to increased pressure on the environment under the influence of growing consumption of natural resources, increased ecological footprint, and ecological debt of humanity, and is accompanied by environmental degradation (climate change and the problem of carbon sinks, reduction in biodiversity and freshwater reserves, soil degradation, depletion of primary natural resources, etc.).
These environmental challenges, which are global now, dictate the need for radical changes and timely responses to them. It is noteworthy that the World Economic Forum held in January 2020 in Davos focused on the environmental and economic priorities of countries’ development. Among the traditionally formulated priority risks in the forum reports, all were environmental risks this time around (extreme weather events, failure of climate action, natural disasters, loss of biodiversity, natural disasters of anthropogenic origin) [8] (for reference, in the Report of the World Economic Forum in 2007, among the five priority risks were named three economic (oil price shock, overheating of the Chinese economy, inflated asset prices), one technological (infrastructure degradation), and one social (chronic diseases) risks [9]). In this regard, it is possible to claim that the current trends in economic science in recent years, associated with the attempts of scientists to revise the traditional foundations of the economy toward better environmental friendliness, were also recognized by the world economic and political establishment.

In this context, it is of fundamental importance to raise the question of the need to move from the consumption-oriented economic growth model to an investment one (based on the component of investment costs) [10] and the development of a new macroeconomic investment strategy in which EIs become the growth driver. The latter is inherently adequate to the principles of Environmental, Social, and Governance-related (ESG) investing and is responsible [11], and in terms of its functional role in the economy, can be recognized as transformative (impact) investments “to adapt to the challenges and problems of the functioning of economic systems” [12].

1.2. Exploring the Importance of the Problem

Environmental challenges and problems in contemporary Russia, arising as a result of the consumption-oriented (export–raw) model of economic growth and manifested in the development of so-called anti-sustainable trends (high level of nature intensity and pollution intensity; depletion of natural capital; structural shifts in the economy, increasing the share of nature-exploiting and -polluting industries; underestimating the economic value of natural resources and services; the natural resource character of export; environmentally unbalanced investment policy, etc.) pose severe risks to the long-term growth potential and sustainable development of the country. These trends threaten the country’s competitiveness at the global level [13,14]. As a result, 56 million people in Russia (53 percent of the urban population) live in areas with poor air quality. About 7 percent of the population, including 5% of urban dwellers and 23% of rural dwellers, have no access to safe drinking water. Russia produces twice as much waste as the EU countries, including 90% of mineral waste from the extractive industries. Only slightly more than 8% of waste is recycled at waste plants [15]. According to the World Bank expert group, the economic costs caused by poor management of natural resources in the Russian Federation and environmental degradation range from 1% to 6% of GDP, which is significantly higher than in developed countries [16].

In other words, the economic growth without considering the environmental impacts, typical for the export–raw model of the national economy of Russia, is the outdated paradigm of development. It is no coincidence that in the Strategy for Economic Security of the Russian Federation for the period until 2030, approved by Decree of the President of the Russian Federation on 13 May 2017, No. 208, the mentioned growth model is recognized as one of the main threats to the country’s progressive development and ensuring its economic security (Section II, para. 9) [17].

Notably, the year 2017 was officially called the Year of Ecology in Russia, which ensured a high level of attention of various stakeholders to environmental protection, the development of the green and circular economy, and financial support of EIs.

It is noteworthy that official initiatives are often not implemented in fact. Just 10% of the population believe that federal authorities take major action to solve ecological problems, another 36% do not consider results of that as significant. One-third of Russian people do not see any practical results of authorities’ work, and 15% of them believe that ecological
problems are intensifying. Among the most critical ecological problems, Russian Federation citizens call air pollution (22%), dumps (16%), untimely garbage removal (11%), low quality of tap water (6%), and problems with parks and forests landscaping (6%). Only one-fifth part of Russians (21%) does not recognize significant ecological problems currently.

Thus, existing limitations do not allow many of the Russian economic sectors to practically use the aforementioned impulse for the active development of the ecological investment. To stimulate such investments within the country, the Russian Federation needs to give a powerful and coordinated political signal, followed by tighter control over the implementation of relevant regulatory legal acts in the field of environmental protection and environmental management, as well as the more active development of progressive financial and economic mechanisms and instruments to regulate EI volume and direction.

1.3. Background/Literature Review

Any science, as its basis, has a specific categorical and conceptual apparatus that not only reflects the basic properties and logical connections of the studied phenomena but also reveals the logic of the scientific knowledge development in the process of the evolution of socio-economic systems and the changing of paradigms (general scientific and particular). At the same time, recognizing the non-static nature of the categorical system, it is difficult to deny the idea that a so-called genetic nucleus is steadily present in it—concepts that are applicable within the framework of different theories and paradigms [18]. This category includes the definition of investments, whose content and criteria fully reflect the complexity of the mechanism for adjusting the reproduction process in qualitatively complicating conditions [19].

Despite the prevalence of the designated category in the literature, it remains an intensely debated scientific problem and a difficult task in economic practice. J.M. Keynes, following the direction of economic thought typical of an investment school and especially the point of view presented by K. Wicksell [20], in his well-known book *The General Theory of Employment, Interest, and Money*, positioned investments as an active starting point, a strong contributor in production that has a multiplying effect on the economy and conditions its cyclical development. At the same time, according to the scientist, swings in the incentive to invest are determined by three main factors: expected income from new capital goods, their costs, and the interest rate [21].

The American economist E. Hansen, who laid the foundations of countercyclical regulation with his theory of growth, considers investment a dynamic component of national income and identifies it by its components: new construction, non-expendable production equipment, changes in inventories, and net foreign investment [22]. From the position of a super-cumulative process, based on the multiplier and accelerator interaction justified by Hansen [22], new net investments will be reduced to zero if there is no (a) growth in income (production); (b) decrease in the interest rate; (c) further technical development.

It is no coincidence that in the current situation, in which the anthropogenic load on nature and the noosphere have approached a threshold that is truly critical for humanity [23], many scientists and specialists associate the restoration of long-term economic growth potential and the radical transformation of the economy of the twenty-first century primarily with a change in the balance between consumption and investment in the economy, in favor of the latter [1,10,24], and more specifically, with substantial advance environmental investment [25–29]. Supposedly, the latter should focus on resource efficiency, the transition to renewable energy and clean technologies, green business, climate change adaptation, and improvement of ecosystems, goals that follow from the United Nations Environment Programme’s Global Green New Deal [26,30].

In this understanding, EIs are adequate to ESG-investing principles, the criteria and driving forces of the Fourth Industrial Revolution (Industry 4.0) [31,32], and the neo-industrial paradigm of modern development, positioned by the Russian economic school [33].
Undoubtedly, the formation of the subject area, EI content, and features, its impact on labor productivity, interaction with supply and demand, and others require a detailed study. However, such tasks are beyond the scope of this study. It will focus on identifying efficient mechanisms of the state economic policy that can stimulate EI, which are among the main prerequisites for economic growth and social progress.

1.4. State Hypotheses and Their Correspondence to Research Design

The working scientific hypothesis of the study is based on the following assumptions:

**Hypothesis 1 (H1).** *In the context of planetary manifestations of large-scale environmental challenges and threats to ensure sustainable socio-economic development of the country, it is extremely important to raise the issue of the investment model of economic growth (based on the “investment spending” component);*

**Hypothesis 2 (H2).** *Within the framework of this formulation, first of all, environmental investment, being inherently responsible (adequate to the principles of ESG investments) and transformative (by its functional role in the economy), should be considered as a “pillar” of long-term economic growth “without damage to the environment” and radical transformation of the 21st-century economy;*

**Hypothesis 3 (H3).** *There is an objective need to create a comprehensive mechanism of economic stimulation of environmental investments in modern Russia. Effective state financial support of such investments should be combined with extensive use of various market instruments and methods of their economic stimulation.*

2. Methods

The study methodology represents a set of procedures and methods that allow for obtaining objective conclusions about the object of study.

2.1. Creation of Databases

The creation of databases is necessary for displaying the current costs of environmental protection and management in Russia and certain countries between the years 2000 and 2019. It is also essential for studying the factor dynamics of the EI structure due to their competing goals in the Russian Federation and some leading economies of the world in the designated period. The information database of this study included the official data of Rosstat, the Ministry of Natural Resources and Environment of the Russian Federation, the State Environmental Protection Service of the Ministry of Natural Resources and Environment of Russia (access mode: https://rosstat.gov.ru/storage/mediabank/nmV0UuE3/Ochrana_2020.pdf (accessed on 1 August 2021)), Organization for Economic Cooperation and Development (OECD) (access mode: https://data.oecd.org/oda/net-oda.htm (accessed on 1 August 2021)), the Bulletin of the Accounting Chamber of the Russian Federation 2020. No. 9 (Garbage Reform), and The Global Social Mobility Report 2020 “Equality, Opportunity and a New Economic Imperative” (access mode: https://reports.weforum.org/social-mobility-report-2020/ (accessed on 1 August 2021)).

2.2. Data Mining with Statistica Tooling

Data Mining with Statistica [34] tooling included the following:

- Mathematical model specification (expression in the mathematical form of detected links and relations, setting the composition of variables, formulation of the initial assumptions and limitations of the model);
- Multifactorial regression data analysis, which was used to assess the resource provision of environmental investment in Russia, and hence the effectiveness of state support measures. In this model, the volume of investments in fixed capital aimed at environmental protection and rational use of natural resources was selected as an effective feature (Y). Table 1 presents initial data for regression analysis of these indi-
ators on the value of investments in fixed capital aimed at environmental protection and rational use of natural resources.

Table 1. Initial data to build the model of EI's resource potential in constant prices\(^1\), million rubles (listed by the authors according to the Federal State Statistics Service of Russia [35]).

| Year | Investment in Fixed Capital Aimed at Environmental Protection and Rational Use of Natural Resources (Y) | Budgetary Investment in Fixed Capital (X\(_1\)) | Own Funds Invested in Fixed Capital (X\(_2\)) |
|------|--------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| 2000 | 16,934                                                                                           | 214,119                                        | 379,439                                       |
| 2001 | 19,390                                                                                           | 215,292                                        | 462,036                                       |
| 2002 | 15,030                                                                                           | 192,675                                        | 389,334                                       |
| 2003 | 18,712                                                                                           | 197,922                                        | 436,065                                       |
| 2004 | 16,888                                                                                           | 172,278                                        | 418,760                                       |
| 2005 | 21,258                                                                                           | 218,887                                        | 465,853                                       |
| 2006 | 22,359                                                                                           | 258,740                                        | 525,824                                       |
| 2007 | 20,157                                                                                           | 300,542                                        | 551,900                                       |
| 2008 | 28,865                                                                                           | 402,685                                        | 746,676                                       |
| 2009 | 20,283                                                                                           | 331,883                                        | 555,483                                       |
| 2010 | 18,911                                                                                           | 279,308                                        | 576,277                                       |
| 2011 | 18,128                                                                                           | 310,814                                        | 670,728                                       |
| 2012 | 21,005                                                                                           | 314,724                                        | 770,428                                       |
| 2013 | 21,520                                                                                           | 337,941                                        | 790,863                                       |
| 2014 | 26,050                                                                                           | 293,170                                        | 778,749                                       |
| 2015 | 22,525                                                                                           | 289,369                                        | 782,202                                       |
| 2016 | 19,297                                                                                           | 260,136                                        | 792,745                                       |
| 2017 | 19,603                                                                                           | 235,158                                        | 763,299                                       |
| 2018 | 17,720                                                                                           | 251,070                                        | 811,294                                       |
| 2019 | 20,520                                                                                           | 318,443                                        | 1,081,385                                     |

\(^1\) Revaluation of indicators into constant prices (1999) was carried out by deflation using the price index of industrial producers.

For obtaining the correct picture of communication, undistorted by autocorrelation, the primary trend was eliminated from the levels. The significant correlation coefficients obtained for trend residues (0.613 for Y and X\(_1\) and 0.657 for Y and X\(_2\)) suggest a linear relationship between the initial data series distorted by autocorrelation.

As a result of the regression analysis, one-factor regression equations were obtained, having the following form:

\[
\hat{Y}_t = 10,077.75 + 0.04 \times X_{1t}, \quad (1)
\]

\[
\hat{Y}_t = 124,00.13 + 0.01 \times X_{2t}, \quad (2)
\]

Checking the residues of the obtained models indicates the absence of autocorrelation in them (actual Durbin–Watson model values are higher than \(d_U = 1.38\) at a 5% significance level). The multiple correlation coefficients characterize the linear relationship tightness between the effective and factor features. According to the Chaddock scale, there is a high statistical dependence between budgetary investments and investments in fixed capital aimed at environmental protection and rational use of natural resources (71%). The evaluation of the model parameters was carried out by the method of least squares (MLS).

3. Results

Since the environmental dimension of human life has become imperative, EI should play a key role in overcoming the abovementioned anti-sustainable trends and maintain the potential for long-term economic growth. Based on its well-known, competing goals (reduction in CO\(_2\) emissions into the atmosphere, resource efficiency, replacement of non-renewable resources with renewable ones, green business development, the transition to clean technologies, climate change adaptation, ecosystem improvement, etc.), it seems
advisable to consider this definition as a specific type of economic resource (monetary or material investments). This can be aimed at the following aspects:

- Improving resource efficiency, resulting in savings (e.g., energy efficiency, waste reduction, and recycling);
- Replacing traditional technologies with clean or low carbon ones, operating under the principles of a closed-resource cycle (e.g., renewable energy sources and industrial reproduction of raw materials from waste);
- Improving ecosystems and environmental quality (e.g., climate change adaptation, forest planting, renewal of wetlands, and others [26]).

In this sense, EI is consistent with global Sustainable Development Goals (SDGs) for 2016–2030, formulated in the UN concept papers and approved at the UN conference in 2015. Remember that the SDG system includes 17 goals covering the sustainable development components: social, economic, and environmental. It also considers its institutional aspects, including systemic and structural barriers (poverty, inequality, environmental challenges, institutional structures, etc.) and how to overcome them (Figure 1).

![UN Sustainable Development Goals](image-url)

**Figure 1.** UN Sustainable Development Goals [36].

Significantly, the six objectives (6, 7, 12, 13, 14, and 15) in this list are environmental. At the same time, a study conducted by Belmonte-Ureña [37] indicates that modern scientists have not sufficiently disclosed the environmental component of SDG concerning specific, state, policy instruments.

Comparative analysis of the SDG and EI content indicates that their significant parts are interconnected and complement each other, and their joint solution can give environmental, economic, and social effects (Table 2).

**Table 2.** SDG and EI priority areas (outlined by the authors).

| EI Main Priorities                                                                 | SDG       |
|----------------------------------------------------------------------------------|-----------|
| 1. Improve resource efficiency (e.g., energy efficiency, waste reduction)       | + + + + + |
| 2. Replacement of traditional technologies with clean or low carbon ones operating under the principles of a closed resource cycle (for example, renewable energy sources, recycling) | + + + + + + + + |
| 3. Improving ecosystems and environmental quality (climate change adaptation, forest planting, renewal of wetlands, etc.) | + + + + + + + + + + |
The interrelation between SDG and EI is the basis for concluding that such investments are responsible (sustainable) and transformative. Els for business entities can bring high profits and meet their growing need for environmental protection systems. Els benefit society in the creation of new high-tech jobs, natural capital maintenance, ecosystems improvement, energy independence, and the transition to a circular (green) economy [38].

However, despite the possibility of obtaining these benefits from EI, some factors remain in modern Russia that limit the activity of this process. In particular, the market imperfection in the environmental field (the problem of so-called negative externalities and the effect of collective refusal), inertia in institutional and technological development, investor’s uncertainty in the circular (green) economy, and weak development of competencies in the financial sector.

The presence of these factors, combined with the high initial cost of environmental projects, makes it necessary to raise and promptly address the issue of economic incentives for Els. In this study, economic incentives are a unique link between environmental, sustainable development, and economic interests. For creating incentives for EI development, the economic instruments of encouragement, sanctions, promotion, and responsibility measures must work together [15].

Note that recently, many countries are increasingly using various mechanisms and instruments of EI state policy, such as taxation, financial and credit mechanism of environmental activities, price policy, a system of environmental certification creation, formation of a market for environmental works and services, implementation of a policy of trade in pollution rights, the introduction of accelerated depreciation of environmental assets, licensing of the use of natural resources, etc. to ensure its comprehensiveness. Table 3 shows the most popular Els economic incentive instruments.

| Elachievable Priority | Country       | Goal                                                                 | Mechanisms and Instruments Used                                                                                   |
|-----------------------|---------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Improve resource efficiency | **UK**         | Recycling of 50% household waste by 2020 and reduction in landfills of biodegradable municipal waste by 35% by 2020 compared with 1995 (EU Waste Framework Directive) | Introduction of landfill tax in 1996  Contributions to maintain extended producer responsibility (packaging, batteries, automobiles, electrical appliances, and others) |
|                        | **South Korea** | Reducing information risks in environmental projects                  | Green certification system                                                                                   |
|                        | **China**      | Cost-effective use of resources through the introduction of energy-saving advanced technologies to increase coal energy utilization from 20% to at least 50% | Special investment fund to finance resource savings programs (transfer of 20% depreciation charges) |
| 2. Replacement of traditional technologies with clean or low carbon ones operating under the principles of a closed resource cycle | **UK**         | 80% reduction in carbon dioxide emissions by 2050 compared with the base year 1990 | Green investment bank: loans and equity investments, funding through investment fund and guarantees |
|                        | **Canada**     | Production of 15% of all energy from renewable sources (EU Renewable Energy Directive) | Tax deductions when purchasing energy-efficient and low-emission CO₂ equipment |
|                        | (Ontario)      | Green economy growth                                                  | Ontario Green Bonds, direct government funding through green funds, energy efficiency credit program, preferential tariff program |
|                        | **South Korea** | 30% reduction in greenhouse gas emissions by 2020                    | 75% annual growth in the production of renewable energy equipment, high-efficiency electrical equipment, environmentally friendly vehicles, and climate change adaptation |
Table 3. Cont.

| Elachievable Priority | Country   | Goal                                           | Mechanisms and Instruments Used                                                      |
|-----------------------|-----------|------------------------------------------------|---------------------------------------------------------------------------------------|
| 3. Improving ecosystems and environmental quality | UK        | Reducing environmental problems               | Socially responsible investment funds for social and environmentally oriented (ethical) projects and consumer awareness |
|                       | South Korea | A five-year plan for green growth provides for the growth of green investments up to 2% of GDP | Green lending (direct lending, relending, green deposit scheme)                         |
|                       |           | Preventing environmental degradation caused by economic growth | Green Card system                                                                      |

Unfortunately, the integrated mechanism absence and the non-use of efficient EI incentive instruments have an extremely negative impact on its financial support [38] (Table 4).

Table 4. Dynamics of indicators of the investment structure in fixed capital, aimed at environmental protection, and rational use of natural resources in Russia in 2000–2019 in the context of funding sources 1, % (listed by the authors according to the Federal State Statistics Service of Russia [35]).

| Year | Total Investments | Including at the Expense of Funds | The Federal Budget | Budgets of the Subjects of the Russian Federation and Local Budgets | Total Budget Investments | Own Funds of Enterprises | Other Sources |
|------|-------------------|---------------------------------|--------------------|---------------------------------------------------------------|--------------------------|-------------------------|---------------|
| 2000 | 100               |                                 | 3.8                | 17.7                                                          | 21.5                     | 74.3                    | 3.5           |
| 2005 | 100               |                                 | 7.8                | 15.0                                                          | 22.8                     | 75.9                    | 1.4           |
| 2006 | 100               |                                 | 10.4               | 18.2                                                          | 28.6                     | 70.0                    | 1.4           |
| 2007 | 100               |                                 | 14.0               | 20.2                                                          | 34.2                     | 63.6                    | 2.1           |
| 2008 | 100               |                                 | 8.6                | 20.7                                                          | 29.3                     | 68.0                    | 2.7           |
| 2009 | 100               |                                 | 11.2               | 12.0                                                          | 23.2                     | 75.5                    | 1.3           |
| 2010 | 100               |                                 | 12.1               | 14.6                                                          | 26.7                     | 72.5                    | 0.8           |
| 2011 | 100               |                                 | 13.0               | 13.3                                                          | 26.3                     | 72.0                    | 1.6           |
| 2012 | 100               |                                 | 13.1               | 9.7                                                           | 22.8                     | 69.4                    | 7.8           |
| 2013 | 100               |                                 | 10.3               | 6.3                                                           | 16.8                     | 78.7                    | 4.4           |
| 2014 | 100               |                                 | 11.5               | 4.1                                                           | 15.6                     | 83.4                    | 1.0           |
| 2015 | 100               |                                 | 4.2                | 4.9                                                           | 9.1                      | 88.0                    | 2.8           |
| 2016 | 100               |                                 | 5.4                | 6.1                                                           | 11.5                     | 86.9                    | 1.6           |
| 2017 | 100               |                                 | 4.4                | 6.3                                                           | 10.7                     | 86.5                    | 2.8           |
| 2018 | 100               |                                 | 4.9                | 4.0                                                           | 8.9                      | 90.5                    | 0.6           |
| 2019 | 100               |                                 | 5.1                | 4.6                                                           | 9.7                      | 89.1                    | 1.2           |

1 In actual prices.

The data of Table 4 show the tendency of budget-financing reduction in environmental investments (from 34.2% in 2007 to 9.7% in 2019) with the growing dominance of own funds of enterprises (up to 89.1%) in the structure of these funding sources. Other sources include attracted and environmental funds allocated from the federal, regional, and local budgets. However, their role in financing investments is dismal: 1.2% in 2019.

The econometric model of resource provision of EIIs in the Russian Federation illustrates the validity of this conclusion (Table 5).

The statistical relationship of environmental investments with total investment in fixed capital is noticeable (63%). The determination coefficient values indicating which total variation part of the dependent variable is determined by the factor included in the statistical model indicate the acceptability of the resulting models (in particular, 50% for \( X_1 \) and 40% for \( X_2 \)). The regression coefficients obtained for all single-factor models should be considered significant since the probability of inverse hypothesis acceptance for them (\( p\)-value) is significantly less than 0.05.
Table 5. Regression analysis results of the impact of variables $X_1$ and $X_2$ on investment in fixed capital aimed at environmental protection and rational use of natural resources (the authors’ calculations).

| Criteria                                | Budgetary Investment in Fixed Capital ($X_1$) | Own Funds Invested in the Fixed Capital ($X_2$) |
|-----------------------------------------|---------------------------------------------|------------------------------------------------|
| Durbin–Watson model                     | 1.96                                        | 1.61                                           |
| Multiple correlation coefficient R      | 0.707                                       | 0.633                                         |
| Determination coefficient               | 0.50                                        | 0.40                                           |
| Standard error                          | 2447.51                                     | 2682.84                                        |
| $t$-test value                          | 3.68                                        | 4.73                                           |
| F-test value                            | 15.04                                       | 10.001                                        |
| Significance level, $p$-value            | 0.001                                       | 0.006                                         |
| Elasticity coefficient $Y$ with respect to $X$ | 1.02                                        | 0.56                                           |

Equation (1), which establishes the relationship between the volume of green investments and budget investments in fixed capital, demonstrated the best values of all regression indicators. According to the model obtained (Equation (1)), in the current institutional environment, the growth of budget investments in fixed capital by one billion rubles leads to an increase in investments in fixed capital aimed at environmental protection and rational use of natural resources by 40 million rubles. This, however, cannot be interpreted as a significant effect.

According to the model obtained (Equation (2)), in the current institutional environment, an increase in the volume of own funds invested in fixed capital by one billion rubles leads to an increase in investments in fixed capital aimed at protecting the environment and rational use of natural resources by only 10 million rubles. In our opinion, such a moderate increase in environmental investments in response to an increase in the volume of own funds invested in fixed capital is due to the residual principle of financing environmental actions. The high degree of primary equipment wear determines the priority of investments of own funds in the active part of fixed assets and only after that in environmental facilities.

Thus, the constructed dependencies demonstrated low EI elasticity for the values of the factors (funding sources) analyzed. Moreover, the elasticity coefficient of environmental investments by the total volume of budget investments in fixed capital was 1 (the so-called elasticity unit). The total volume of own funds invested in fixed capital was only 0.56 (not elastic). This proves both the inefficiency of Russia’s current environmental regulation system and the disinterest of economic entities in making investments in environmental protection and rational use of natural resources. The obtained models of EI’s resource potential, in our opinion, indicate the inability, in the current institutional environment, to provide the amount of financing required for the formation of a circular economy in Russia in the medium term.

4. Discussion

There are growing concerns worldwide, including Russia, about the environment and natural capital, with a general awareness of EI recognition as a strategic imperative for the importance of recovery, maintenance, and the potential for long-term economic growth for sustainable development. A best-practices analysis of the world’s use of various mechanisms and economic instruments of state policy related to EI incentives is the basis for making the following main recommendations, which are aimed at ensuring the comprehensive nature of such a policy in modern Russia:

(1) Achieving a rational (limiting) value of a generalized indicator of stability and safety of investment activities as a share of gross investment accumulation in GDP. EI, which involves replacing traditional technologies with environmentally friendly or low-carbon ones, improving the quality of the environment, focuses on developing knowledge-intensive, innovative, and, therefore, capital-intensive industries and economic sectors. Under these conditions, it is advisable to increase the share of gross investment accumulation in the Russian Federation’s GDP from 21.9% (as of 2020) to at least 28–30%, “directing them
through the Russian Development Bank to target investment of innovations, including the development of clean technologies...” [42]. For increasing this share, it is essential to create a reliable mechanism for transforming the funds accumulated by the population into EIs by guaranteeing the complete return of deposits related to any defaults and the accrual of increased interest when investing in green securities associated with environmental investment projects.

(2) Increasing the attractiveness of EIs to private capital by implementing policies to reduce prices for low-carbon investment projects. Such policies lead to the development and introduction into business practices environmental standards and norms such as eco-management and auditing (ISO 14000, EMAS); increased natural resource taxation while reducing the tax burden on other production factors; eliminating subsidies that encourage the use of hydrocarbon energy (oil, coal) and deplete natural capital while subsidizing clean energy (solar energy, wind power, biomass, biodiesel, bioethanol, biogas, wave and tidal energy, small hydropower plants, geothermal and hydrogen energy) and clean technologies; development of a benchmarking system to test the reliability of environmental investments; the creation of test territories (a current initiative in China); a system of testing for trading carbon emissions rights and units of their reduction (loans or netting, units of CO₂ absorption and other carbon units). It is undeniable that such policies require strong political will; however, it is clear that they ultimately contribute to the gradual transformation of environmental responsibility into an economic asset.

(3) The formation of a new financial and economic mechanism. The distinctive feature of this mechanism is resource conservation and the maximum involvement of production and consumption wastes in economic turnover as sources of raw energy. This approach is adequate for meeting the latest global environmental challenges [43]. The implementation of this area of circular investment incentives involves the following:

– The modernization of pricing to respect the principle of social equity, which means that all production costs, including recycling costs, should be determined, with the payment for further recycling (in the form of a small amount) tied to the consumer. For example, in France, this amount is called an “eco-participation fee”;
– State guarantees in the form of subsidies for the reimbursement of part of the costs of interest payments on loans and borrowings attracted by private investors for the implementation of projects related to the following aspects:
  • The development of new technologies and adaptation of existing technologies for processing production and consumption wastes, oriented to the principles of the Zero Waste concept and the selection and localization of the best technological practices of waste processing and use (for example, pyrolysis).
  • Construction, technical upgrading, or reconstruction of production facilities for waste-processing enterprises.
– Providing a set of benefits and preferences (e.g., tax incentives and deductions, preferential treatment lending rates) to enterprises processing waste using green (circular) technologies and supplying recyclables with improved environmental qualities. At the same time, creating conditions under which the waste owner finds it to be economically unprofitable to store waste (waste collection and landfill taxes);
– Stimulating the use of waste products in the Russian industrial sector and the export of recyclables not in demand by domestic producers (for example, through direct financial support from funds, primarily innovative ones), etc.

(4) Improving environmental awareness among the population and businesses. This includes heightening public awareness and the understanding by businesses of what harms to the environment and human health the current concepts of production cause.

5. Conclusions

The study contributes to the development of the economic growth theory and the concept of sustainable development by recognizing environmental investments as responsible
and transformative, capable of providing long-term economic growth without damage to the environment, and the radical transformation of the economy in the 21st century.

To summarize the study, the following most important conclusions can be made, which constitute a certain perspective for further research work within the declared topic:

(1) One of the new global trends is an environmental investment, in support of which the state, rather than the market, plays a significant role in the world’s advanced economies. At the same time, as applied to today’s Russia, a tendency has been revealed of a decrease in the volume of budget financing of environmental investments with a growing predominance of economic entities’ funds in the structure of sources.

(2) In Russia, a system of state support measures for environmental investment is just being formed; the market mechanism here remains extremely underdeveloped and can only be referred to as co-financing, which large companies practice, but it does not appear to be widespread.

(3) In order to expand the volume of environmental investment in the Russian economy and extract from this known socio-economic benefits (conservation of natural capital, efficient use of natural resources, reduction in unemployment, GDP growth, etc.), it is necessary to create a comprehensive mechanism for its economic stimulation, in which the state financial support should be combined with various market instruments and methods of economic incentives for the above investments.

Note that the legislative consolidation of instruments to support environmental investment can occur both gradually, linking regulatory acts together step by step through strategies and “road maps”, and by quickly changing a whole set of legislative acts.

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