

Article

Analysis of Financial Outsourcing Management in Regional Environmental Systems

Viktor Koval ¹, Piotr Olczak ^{2,*}, Mira Hakova ³, Mykhailo Bilyi ⁴, Dmitry Kretov ⁵ and Olga Laktionova ⁶

¹ Department of Business and Tourism Management, Izmail State University of Humanities, 68600 Izmail, Ukraine; victor-koval@ukr.net

² Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, 31-261 Krakow, Poland

³ Department of Tourism and Hotel and Restaurant Business, Dnipro Humanitarian University, 49033 Dnipro, Ukraine; gakova@ef.dnu.edu.ua

⁴ Finance Department, Vasyl Stefanyk Precarpathian National University, 76000 Ivano-Frankivsk, Ukraine; mykhailo.bilyi@pnu.edu.ua

⁵ Banking Department, Odesa National Economic University, 65000 Odesa, Ukraine; dmitriy.kretov@gmail.com

⁶ Department of Finance and Banking, Pryazovskiy State Technical University, 49000 Dnipro, Ukraine; laktionova.loa@donnu.edu.ua

* Correspondence: olczak@min-pan.krakow.pl

Abstract: This study contributes to the creation of a model of effective economic relations by the organizer—the outsourcer between the participants of the regional ecological financial system—financial services clients, creditors, investors, insurers, and municipalities. This study proposes to reduce the financial limitations of business entities that are environmentally active by forming a regional ecological financial system, organized by an outsourcer for the provision of financial services. The outsourcer attracts financial instruments (FIs), including special environmental financial instruments (GFIs) and financial management mechanisms (FMs), to accelerate capital turnover. When calculating the financing models, the well-known concept of the innovation life cycle was used. Research on the relationship between variables “revenues from environmental taxation by country” and “the sum of all environmental revenues” in the EU27 budget for the period 2012–2021 made it possible to determine the Pearson coefficient, according to which countries were distributed according to the degree of connection strength according to the Chaddock scale: 32% of countries had a very high connection (0.9–1.0) during the study period, and 53% of EU countries had a noticeable and moderate connection (0.7–0.9). The proposed method for studying the relationship can be useful in managing financial flows attracted to the ecological financial system by an outsourcer.

Keywords: regional financial systems; environmental projects; financial services outsourcer; greenhouse gases; environmental taxes



Citation: Koval, V.; Olczak, P.; Hakova, M.; Bilyi, M.; Kretov, D.; Laktionova, O. Analysis of Financial Outsourcing Management in Regional Environmental Systems. *Sustainability* **2023**, *15*, 11966. <https://doi.org/10.3390/su151511966>

Academic Editors: Francesco Tajani and Assunta Di Vaio

Received: 19 June 2023

Revised: 12 July 2023

Accepted: 31 July 2023

Published: 3 August 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

With the growing resource requirements for industrial development and the need to support economic growth, the environmental threat is increasing, which requires increasing energy efficiency and striving to minimize greenhouse gas emissions in industries. To do this, it is necessary to develop and implement environmental and innovative projects. However, there are significant financial constraints, especially for small and medium-sized businesses (SMEs). Empirical evidence supports a strong causal relationship between financial inclusion and the development of clean processes [1].

A positive effect on the development of greening processes is observed in countries or regions with a high level of income, significantly higher than the world average. This suggests that high-income countries have well-developed financial systems that can provide a range of financial instruments for green economy investment and innovation. In lower-middle-income countries, limited access to financial instruments is holding back the development of a green economy.

In this study, to solve the problems of reducing the financial limitation of environmental activity at the regional level, it is proposed for the first time to use insourcing and outsourcing technologies [2]. Independent search and attraction of financial instruments and financial management mechanisms in the field of environmental protection by each economic entity, especially small and medium-sized businesses (SMEs), are not rational, not efficient, very expensive, and unrealistic, especially in stock markets. The search for financial instruments, financial management mechanisms for clients, including small and medium-sized businesses active in greening, is proposed by the authors for the first time to be carried out in the mode of financial outsourcing (F&A). Financial outsourcing services for clients in the field of organizing financial activities have been carried out for many years [3,4]. The outsourcer significantly improves financial performance, increases the profitability of business entities, provides a strategy not only to reduce costs, but also to provide tactics for increasing the budget and increase productivity in the formation of a portfolio of innovative projects, taking into account not only financial goals, but also social and environmental goals [5–7]. Outsourcing provides guidance for public sector leaders in evaluating the impact of outsourcing on business continuity strategies [8–12]. Financial outsourcing is taking on new forms of expression that can help businesses gain competitive environmental advantages. As an advantage, financial outsourcing provides flexibility in the choice of financial instruments and facilitates the attraction of green fintech. All this cannot be provided independently by small, medium, and large businesses. The authors propose to reduce the financial limitations of business entities that are environmentally active by forming a regional ecological financial system, organized by an outsourcer for the provision of financial services. The outsourcer ensures the continuity of financial flows in the regional ecological financial system, optimizes them by using green financial instruments and financial management mechanisms, preventing “cash” gaps, and helps to reduce the cost of attracting financial resources.

Outsourcing in the development of environmental measures can also involve green insurance, which covers insurance products related to sustainable practices that contribute to the protection of the environment and the prevention of environmental damage. Insurance indemnifies third parties who are exposed to environmental risks, such as air, water, and land pollution, which reduce the cost of enterprises for environmental protection, improve the economy, and attract investors by reducing investment risk. At the strategic level, outsourcing allows access to additional capital, as well as to new (innovative) resources and technologies [13,14]. Outsourcing provides flexibility in the choice of financial instruments. It is proposed that outsourcing be considered as a tool for the interaction of various stakeholders in the organization of new processes. The outsourcer forms effective economic relationships, including financial relations between clients, creditors, investors, insurers for the timely attraction, distribution, use and control of financial resources for business entities, i.e., clients of services that are active in the greening of regions. This confirms the relevance of this study, aimed at reducing the financial limitations of greening activities.

The Section 2 presents works that show the role of outsourcing in the development of a sustainable economy. Theories and concepts of outsourcing, which may be relevant to the organization of regional financial and environmental systems, are considered. The concept of organization by an outsourcer of economic relations between the participants of the regional financial system is proposed. Analysis of the study of “green” financial instruments showed that they are being actively developed and used. However, there is not a single publication devoted to a financial services outsourcer as an organizer and intermediary between clients, SMEs, and large businesses, investors, regional budgets, and other infrastructure links in organizing effective economic relations to attract and use finance, financial instruments, and mechanisms. It is shown for the first time that in order to improve the ecological situation in certain regions, it is necessary to organize regional ecological financial systems.

The outsourcer will reduce the financial constraints of clients—environmental activists who develop and implement eco-events in the regions. The present study is devoted to

solving these problems. To identify the prerequisites for the development of the theory of financial outsourcing in reducing the financial limitations of service clients whose activities are aimed at the development and implementation of greening projects and who are participants in the regional ecological financial system, theories and concepts of outsourcing were involved.

In Section 3, a hypothesis is formulated: the outsourcer is the organizer of the regional innovative ecological financial system, which includes outsourcing customers, creditors, investors, insurers, the municipality, and other links. A research methodology is proposed that includes various methods of analysis: bibliometric, econometric, predictive, etc. In Section 3, the process of developing “green” financial instruments (GFIs) is actively underway: green bonds, green investments, green innovation systems, and regional economic systems. This study showed that over the period 2008–2021, revenues from environmental taxes in some EU countries increased. These are mostly developed countries. A slight increase and, in some countries, a decrease in environmental tax revenues in the EU budget are typical for developing EU countries. In Section 4, it is shown that despite the measures taken to improve the environment, there is an increase in greenhouse gas emissions in the atmosphere.

Environmental revenues in the budgets of the countries are spent purposefully; however, they are an insufficient source of financing for environmental activities. The efficient use of environmental tax revenues depends on the specific goals and strategies that can be used to finance the following activities:

- Investments in environmental projects for the development and implementation of environmentally friendly technologies, renewable energy sources, energy efficiency, and a reduction in harmful emissions;
- Protection of the environment and biodiversity;
- Support sustainable development by stimulating the use of environmentally friendly technologies in various sectors of the economy;
- Support for environmental research on climate change;
- Social measures related to environmental protection, such as subsidies for environmentally friendly technologies for the population.

This informs us that those environmental revenues as an independent and sufficient source of financing for eco-activities should not be counted on, despite the fact that there has been an increase in environmental tax rates for greenhouse gas emissions into the atmosphere. It is shown that the sale of permits for greenhouse gas emissions has slightly increased revenues for the EU budget and cannot be considered a sufficient independent source of financing. This study will show a well-known model for the development of innovations and demonstrate that most eco-projects are unprofitable and require a certain financing mechanism that can be provided by an outsourcer to provide financial outsourcing services. The capital that is attracted to the regional ecological financial system by the outsourcer is mixed capital. Most often, researchers describe the following capital structure: equity and debt components; owned and borrowed capital. The authors propose to form the structure of mixed capital attracted by an outsourcer to finance eco-events by organizing a regional ecological financial system that includes owned and borrowed capital.

This study proposes a mechanism for obtaining attracted capital, which until now has not been used in eco-events. As for the Section 5 on the discussion of the results, the most attention is paid to solving the problems of increasing financial availability for the development and implementation of eco-events through the use of financial outsourcing services; attracting financial instruments, including environmental ones; identifying approaches to organizing the optimization of the structure of mixed capital; and others that were not considered in well-known sources.

The Section 6 describes areas that require further research to reduce the financial constraints of entities that are active in the development and implementation of eco-events.

2. Literature Review

2.1. Theories and Concepts of Outsourcing in the Organization of Regional Financial Environmental Systems

The theoretical foundations of modern financial and tax outsourcing are theories and concepts: the concept of the nature of the firm [15] and the resource theory of the firm [16]; the theory of core competencies [17]; the concepts of outsourcing and delegation of authority [15,18,19]; concepts and theories of finance and the investment portfolio [20]; the theory of capital structure [21]; and in [22–26], the theory of investment management is described. In the study of the transformation of financial and tax outsourcing services, methodologies were used to predict the development of research directions based on the theory of using green finance and environmental taxation in the transformation of financial and tax outsourcing [27,28]. Regarding the investigation of the mechanism of the impact of green finance on the quality of green innovation in private enterprises based on data from China in the context of the strategic goals of “peak carbon emissions” and “carbon neutrality”, an important issue to be addressed was how green finance can encourage private enterprises to achieve green modernization [29–34].

This study empirically investigates the mechanism of the impact of green credit policies on green innovation by private enterprises using a difference-of-differences model based on data on green patents of private enterprises registered in China, from 2009 to 2019, who found that the implementation of green credit policies had a significant negative impact on the quality of green innovation by highly polluting private firms compared to non-highly polluting private firms. Further research showed that commercial banks could reduce their NPLs and increase their revenue growth by providing green credit funds to improve the efficiency of their business. This provides insight into more efficient implementation of green credit policies and the promotion of green economy development [35–39]. The results of research by American scientists [40–42] show that under the conditions of market relations, the “functions” of finance and their role are becoming more and more significant in the management of business entities. Financial outsourcing is considered as a qualitatively new management model aimed at implementing the strategy of enterprises in a highly competitive environment, which also meets the conditions for the development of a sustainable economy. With the development of information technologies, there is a transformation of financial and tax outsourcing services. Innovative environmental (green) financial instruments are emerging that are involved in financing activities to prevent and mitigate the consequences of man-made disasters, their lending and insurance provided by outsourcers.

The outsourcer’s specialists are also involved in the formation and use of funds aimed at the development of clean technologies [43–45]. The outsourcer’s specialists attract financial environmental resources from local and regional budgets, but given their insignificance and scarcity, they search for and attract additional financial instruments and financial management mechanisms. This requires additional investment in the professional development of the outsourcer’s specialists. Knowledge is required in the field of new methods of financial management, development of theory, methodology, and improvement of methods. Financial management of business entities (enterprises of different forms of ownership) today does not meet the requirements for the development and efficiency of the national economy, the financial system of the state, and solving the problems of socio-economic, environmental, and innovative development.

The financial management mechanism requires constant improvement under the influence of new information, telecommunications, and other technologies [44,46,47]. Effective financial management of regional budgets can also be ensured with the participation of financial outsourcing specialists. There is a need to organize a regional ecological financial system [45,48–50] aimed at the development of clean technologies at the enterprises of the region. The organizer of such a system can be an outsourcer for the provision of financial and tax outsourcing services (Figure 1).

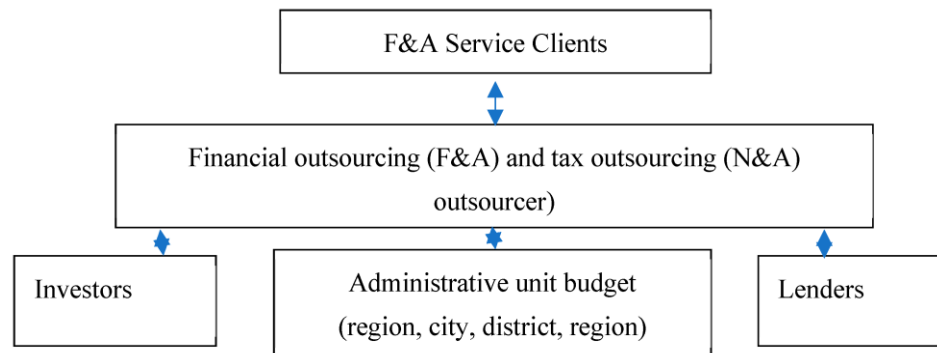


Figure 1. Outsourcer as an organizer of effective economic relations between the participants of the regional innovative and environmental financial system.

Hypothesis 1. *The outsourcer is the organizer of the regional innovation ecological financial system, which involves outsourcing clients, creditors, investors, insurers, the municipality, and others.*

To prove this, there is a need to identify and explore the development trends in the participants that the outsourcer uses to attract modern financial instruments and financial management mechanisms.

2.2. Financial Outsourcing in Improving the Efficiency of Economic and Environmental Development

The introduction of environmentally friendly technologies according to the needs of society is carried out by many entrepreneurs–manufacturers. There are works based on the results of research on the development and implementation of environmentally new products (ENPDs), which are integrated with the philosophy of environmental management. This integration of several technologies in management significantly increases the productivity and competitiveness of companies. It is shown that a large number of jobs are transferred to outsourcing and the globalization of outsourcing continues [48]. The study [51] explores the issue of green technology development (GTD) of an entrepreneur–manufacturer with limited capital who seeks financial support from external and internal multilateral platforms (MSPs), which are an alternative to outsourcing. In combination with a developed trade-credit mechanism and a mechanism for income distribution, as well as an innovative approach of the state to social security, the internal SME system does not always outperform the external alternative of outsourcing. However, in power struggle scenarios, GTD participants favor the internal MSP over the external MSP. An analysis of the relationship between outsourcing, which is based on the division of labor, and productivity, carried out by foreign scientists, showed that outsourcing is a more efficient and qualitatively perfect production factor that has a positive impact on labor productivity [51–53].

The internal audit function (IAF), which has traditionally been an internal function, is increasingly outsourced to external consultants in line with global trends in other services. Studies [50,54] have summarized the results of outsourcing and sharing of internal audit services over the past three decades and suggested directions for future research.

Outsourcing is shown as an integral part of the theory of delegation of authority and responsibility. In particular, papers [55,56] developed an approach to including outsourcing and delegation of authority in the company’s reengineering and development strategy in the 21st century. Later, outsourcing tools in domestic research began to be considered as a component of the management strategy, including the process of transferring work or services to the contractor, based on the division of labor and management functions [57]. Accounting outsourcing expands the possibilities of its use in EU countries [14]. Five factors are proposed to make rational outsourcing decisions: cost, speed to market, risk, profitability, and the possibility of obtaining additional financing.

These factors add important quantitative financial and economic indicators to the decision-making process. Some aspects are added to these indicators: the choice of partners, the conclusion of contracts, the monitoring of progress, and the conditions for accepting and executing outsourcing contracts [58].

2.3. *The Role of Financial Outsourcing in the Development of a Sustainable Economy*

The role of financial outsourcing can be judged from the definition of a “sustainable economy”, which can combine economic growth and environmental protection, and which has emerged in response to the limitations of current modes of production and consumption. Recognized by public opinion, this new economic model, an alternative to the linear economy, is also integrated into the state policy and strategy of the socio-ecological and energy transition in various countries [32]. The role of financial outsourcing is determined by the fact that its clients, namely small and medium-sized enterprises (SMEs), should be key participants in the implementation of the concept of a circular economy (CE) as the basis for creating a stable society [59,60].

Key strategies and resources that can contribute to the introduction of the circular economy (CE) in SMEs have been identified. Financial outsourcing will help SMEs implement the circular economy in business processes [61]. A sustainable business model for innovation is to create superior value for customers and companies by meeting social and environmental needs through business. Recently, in various studies, circular economy approaches have been considered as innovative territorial approaches to sustainable development [62]. The circular economy describes a concept that aims to conserve resources by minimizing the use of materials and energy throughout a product’s life cycle, including manufacturing and repair, as well as reuse and recycling. Circular economy innovations help realize sustainable development goals by focusing on the environmental, economic, and social aspects of sustainability [63–65]. Firms with CE innovations perform significantly better financially. Outsourcing as part of the financial management strategy in municipalities is used to modernize their infrastructure and optimize tax revenues [66]. This increases economic efficiency in addressing climate change and providing public services with limited investment budgets.

Outsourcing as a management strategy allows its clients, i.e., small and medium-sized businesses, to transfer accounting and financial management and the associated risks of introducing a circular economy to financial outsourcing [67]. When it comes to the transfer of financial management functions, we are talking about financial outsourcing (“F&A”), as a specific type of outsourcing [68,69]. The functions of F&A as a scientific and practical direction were formed following the development of the theory of financial management of organizations and the institutional requirements for their management [70].

Changing the functions and directions of financial outsourcing (F&A) and tax outsourcing (N&A) in international practice is associated with outsourcing financial services (budgeting, tax planning, financial analysis, and making optimal management decisions) based on the use of modern interactive business intelligence tools. Matrix methods for assessing expedient accounting in international practice are presented in [59], especially the rapid development of F&A that occurred in India.

The need for outsourcing is reported in [59]. One of the first articles on the use of accounting outsourcing in practice was written by Kaplan [58]. Then, F&A was developed in the financing of innovative, circular, and ecological economy and in other directions.

When the outsourcer–organizer forms an ecological regional system, the outsourcer for the provision of F&A services becomes an intermediary between clients—small and medium-sized businesses (developing “environmental” innovations), investors, creditors, the local budget department, and other infrastructure links. The outsourcer should build its relations with the participants of the financial system, taking into account the achievements in the field of financial management [64,65] and the theory of the firm [66], future competition, and capital structure [67].

However, the need to become an outsourcer for the provision of financial outsourcing services as an intermediary between clients—small and medium-sized businesses (developing “environmental” innovations), investors, regional budgets, and other infrastructure links—in organizing effective economic relations to attract and use finance, financial instruments, and mechanisms is practically unexplored. Analysis of the above studies led to the conclusion that in order to further accelerate the development of a sustainable economy as an economic model that can combine economic growth and environmental protection, there is a need to involve SMEs, which are a key participant in the implementation of the circular economy; create a stable society; and develop eco-innovations. Circular economy development approaches are considered innovative territorial approaches that require deliberate design, which can be financed by an outsourcer [36,68,69]. The circular economy has been found to manifest itself at smaller scales, such as industrial plants and areas of activity, or even within the company, which can also be provided through the activities of an outsourcer of F&A services. There is a transformation of F&A services, which are provided by an outsourcer as an organizer of effective economic relations between clients, creditors, investors, and municipal budgets [68].

3. Methodology

In this study, various methods of analysis were used, namely bibliometric, econometric, predictive, and others, to identify trends in the development of financial instruments and financial management mechanisms involved in the formation of regional eco-innovative financial systems. Documents related to green, environmental, and sustainable technologies for lending, investment, and insurance, as well as methods for improving the efficiency of forming the revenue side of municipal budgets and its optimization, were subject to analysis.

For this purpose, an analysis methodology was developed, which included several stages: data collection, visualization of bibliographic links, visualization of co-occurrence, content analysis, and more. The first stage is devoted to the collection of a selective set of documents for research from the Scopus database [70]. A set of input keywords in the search query was used to obtain the most accurate result. The areas of research necessary for integration and a list of participants that ensure continuous actions to attract financial instruments and financial management mechanisms in the provision of financial outsourcing services and the formation of a regional ecological and innovative financial system were identified.

This study proposes an approach to organizing a regional ecological financial system, in which the links are F&A service clients who outsource the process of financial accounting and financial management. Clients initiate the development and implementation of environmental projects aimed at developing a sustainable economy, including investors; creditors; insurance companies; and the Department of Local Finance. The organizer of the regional ecological financial system is a financial services outsourcer, who performs the functions of a financial manager—to effectively attract, efficiently distribute, and effectively use and control financial resources by searching and attracting financial instruments and financial management mechanisms (Figure 2).

This is another type of F&A service—the organization of effective economic relations in the regional ecological financial system. Financial instruments (FIs) and financial management mechanisms (FMs) are different for each client. The role of a financial outsourcer in an organized system is to form effective economic relations between service clients and other participants that provide financial resources for clients’ activities aimed at the development or implementation of technological or environmental innovations.

As practice has shown, without the organization of such a regional financial system by an outsourcer, there is no formation of effective economic relations. The outsourcer searches for financial instruments and financial management mechanisms in capital management aimed at developing and implementing eco-technological activities for clients. Such activities are necessary, since usually the client cannot independently provide financing and

investment for such projects; therefore, he turns to the services of an outsourcer. The formed concept of transformation of financial outsourcing considers the outsourcer as the organizer of effective economic relations between service clients, creditors, investors, municipal budgets, tax authorities, and insurance companies in the formed regional economic system, the basis of which is the regional financial system. This is especially effective when the problems of ensuring the economic, environmental, and social security of the regions come to the fore. Bonds, including green bonds, can be attracted as financial instruments.

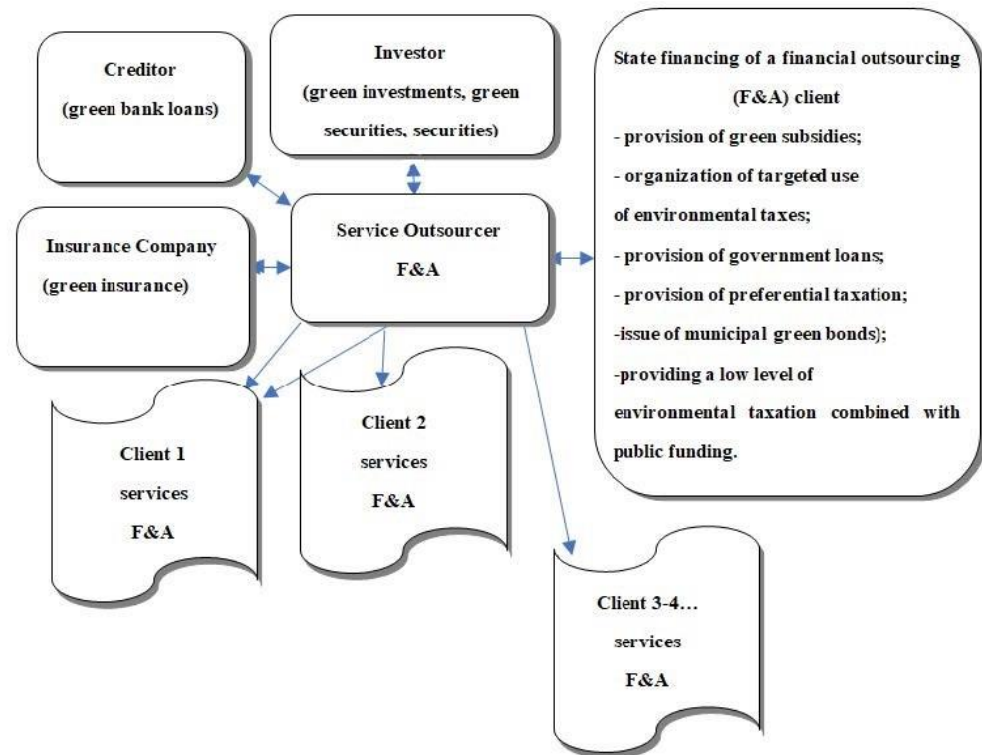


Figure 2. The concept of organizing economic relations by an outsourcer between participants in the regional financial system.

Green bonds are similar to simple regular bonds, but with a targeted environmental use of proceeds. There is great promise for green bonds as new debt instruments in a sustainable economy. There has been an increase in research on green bonds, reflected in the articles (Figures 3–5). Taxation should be aimed at attracting green investment. Municipal bonds may be issued by the Department of Finance. The outsourcer is also engaged to perform the following services: F&A for the client, in order to increase the efficiency of his financial activities; and for the municipality, in order to increase efficiency and optimize the formation and distribution of the budget. In response to new trends, the concept of green insurance has emerged, covering insurance products related to sustainable practices. Green insurance contributes to the protection of the environment and the prevention of environmental damage, thereby reducing environmental risks.

For clients, the outsourcer should provide services for attracting financial resources: own—profit, as well as debt and equity financial instruments. The role of environmental taxes was seen as a source of income in order to transfer taxes from labor and capital to resources and environmental pollution as revenue potential in achieving the goal of a climate neutral zone. The second goal is possible with sufficient funding for eco-projects.

The strength of the relationship between tax revenues and the total value of all budget revenues was determined by the formula for calculating the Pearson correlation coefficient:

$$r_{xy} = \frac{n \times \sum(x_i - y_i) - (\sum x_i \times \sum y_i)}{\sqrt{n \times \sum x_i^2 - (\sum x_i)^2 \times n \times \sum y_i^2 - (\sum y_i)^2}} \quad (1)$$

where r is the Pearson correlation coefficient; n is the number of events; X represents the values of the variable; Y represents the values of the variable; \bar{X} is the arithmetic mean for the variable X ; and \bar{Y} is the arithmetic mean for variable Y . Values are taken as variables X and Y for calculating significant and insignificant factors, respectively. Different values were taken as input factors in this study. The results of the correlation analysis are presented in Table 1.

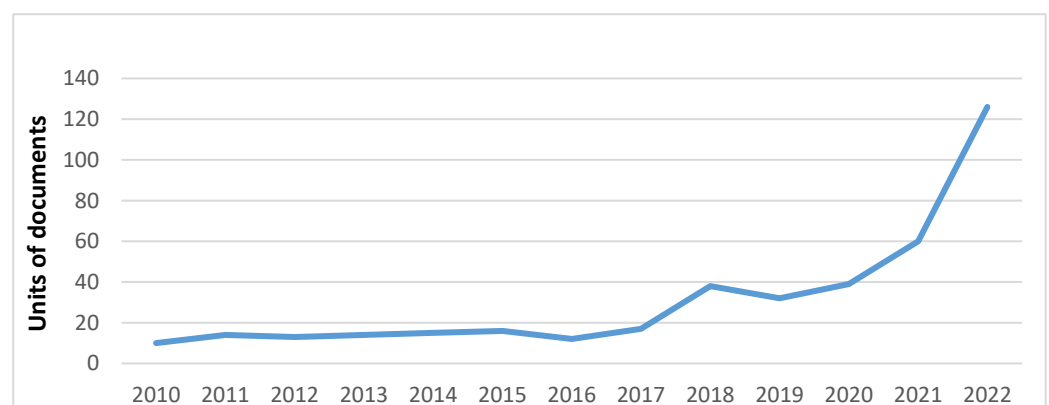


Figure 3. Dynamics of documents aimed at researching “green” financial instruments (GFIs) in international scientometric databases. Adapted with permission from [70].

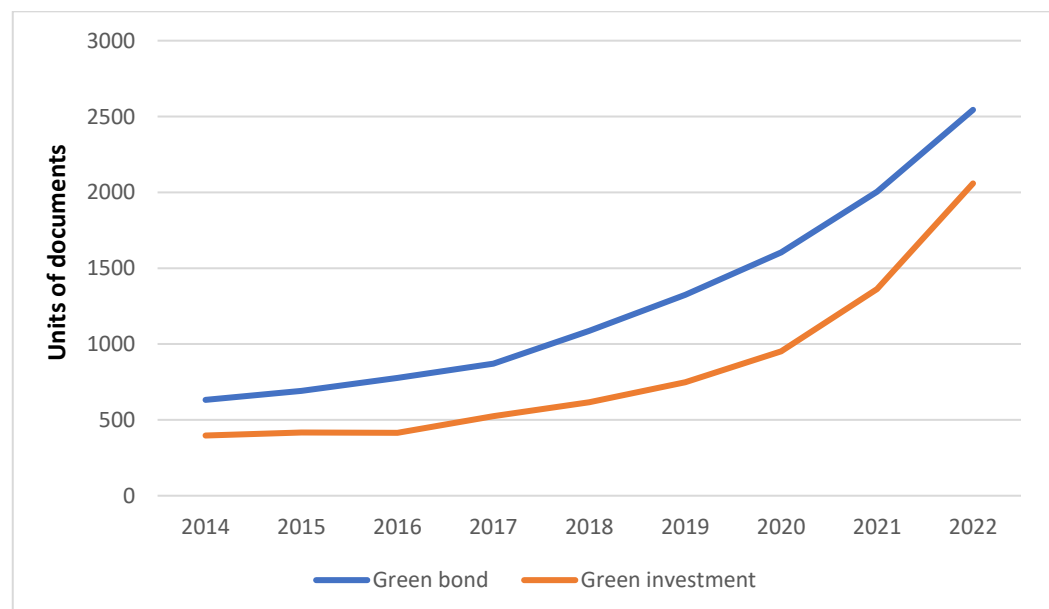


Figure 4. Dynamics of documents aimed at researching the development of green financial instruments (GFIs): green bonds, green investments. Adapted with permission from [70].

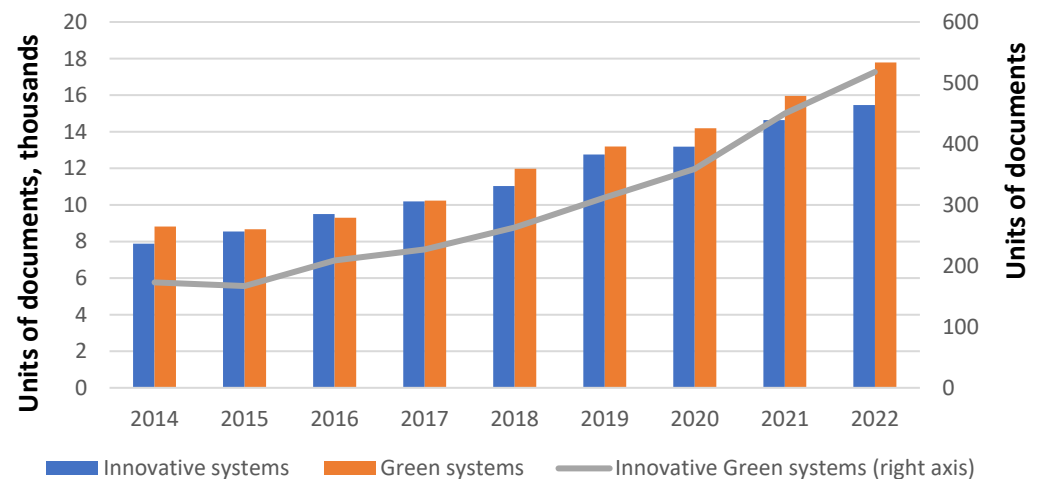


Figure 5. Dynamics of documents: innovative systems, green systems, innovative green systems. Adapted with permission from [70].

Table 1. Correlation matrix input fields: environmental tax revenues; output fields: tax revenues, GDP, EU budget [71].

Input Fields	Correlation with Output Fields		
	Total Tax Revenues	Total Environmental Taxes	EU 27 Countries
Energy taxes	0.967	0.996	0.960
Transport taxes	0.868	0.867	0.878
Pollution/Resource taxes	0.977	0.964	0.973

The correlation matrix presented in Table 1 shows a high degree of correlation between environmental revenues and the final indicators, namely GDP and the revenue side of the EU budget. Thus, it can be concluded that the environmental revenues in the EU budget for the period 2002–2021 tend to increase in amount, but a small share of the budget tends to slightly decrease. Energy taxes have the largest share, followed by environmental taxes on transport. Taxes on resources and greenhouse gas emissions represent an insignificant part of environmental tax revenues. To increase the credit and investment attractiveness of F&A financial outsourcing clients' projects, it is proposed to additionally attract financial instruments (debt and equity, including environmental securities, such as environmental bonds) combined with other environmental financial instruments. It is necessary to compose the portfolio in such a way that it is balanced in terms of income and expenses, while the resulting value of $\sum_{N=n}^N NPV$ at a certain point in time should correspond to the following:

$$\sum_{N=n}^N NPV \geq 0 \quad (2)$$

Numerous studies devoted to the development and implementation of environmental measures do not concern the study of funding sources. As sources of financing (*IF*) can be personal capital (*SK*), debt capital (*QK*), equity capital (*GK*), and attracted capital (*PK*):

$$IK = SK + QK + GK + PK \quad (3)$$

To achieve this condition, it is proposed to not only use financial instruments, but also to involve financial management mechanisms to increase the turnover rate of the formed mixed capital. It is necessary to balance positive and negative cash flows by volume for each client of F&A services.

4. Results

4.1. Analysis of the Study of “Green” Financial Instruments

Dynamics of documents aimed at researching “green” financial instruments (GFIs) in international scientometric databases (Figure 3).

The dynamics of documents on the development of green financial instruments (GFIs) (green investments, green bonds) are shown in Figure 4.

Simultaneously, with the development of GFIs, there is the development of innovative systems, green systems, and innovative green systems (Figure 5).

The dynamics of documents on regional economic systems (RFS) in relation to financial outsourcing (F&A) are shown in Figure 6.

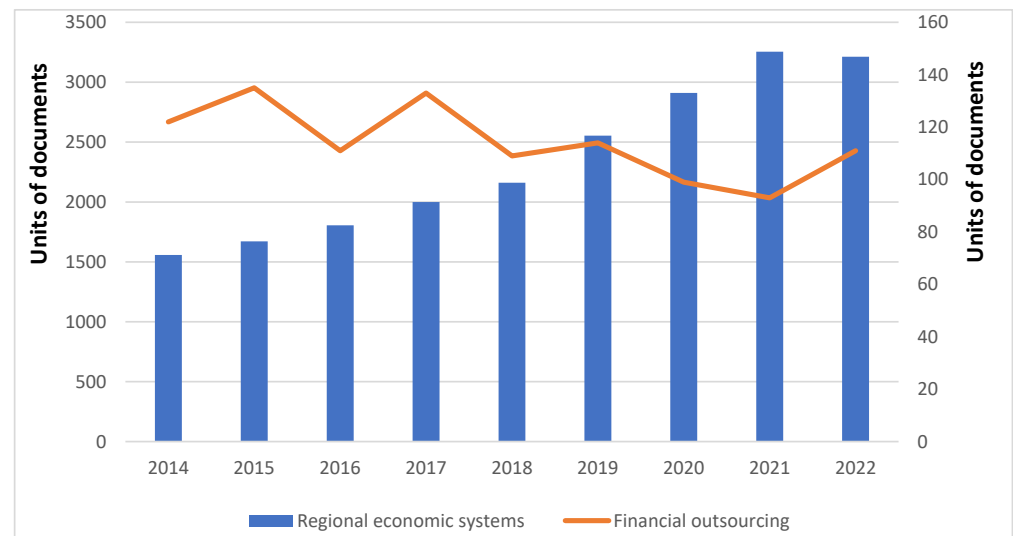


Figure 6. Dynamics of publications devoted to the development of regional economic systems (RFS) and in connection with financial outsourcing (F&A). Adapted with permission from [70].

According to Figures 3 and 4, there is an active development of green financial instruments (GFIs) as sources of financing for eco-projects of large businesses. To reduce the financial limitations of SMEs, it is proposed to use the services of an outsourcer as the organizer of the regional ecological system.

4.2. Correlation Analysis of Environmental Tax Revenues

The payers of environmental taxes to the budget of the European Union are EU member states (27 countries from 2020). Total tax revenues include revenues from three taxes: energy taxes; transport taxes; and taxes on greenhouse gas emissions and production. These taxes should be purposefully used as sources of financing for eco-projects aimed at the development of clean technologies. For the period 2000 to 2021, there was an increase in environmental tax revenues in EU budget revenues (Figure 7).

However, receipts from environmental taxes as income to fill the EU budget or as a goal of transferring taxes from labor and capital to resources and environmental pollution cannot be considered (Figure 8).

The notion that environmental tax revenues could be shared with taxes on labor and capital and help reduce these taxes was subsequently refuted. Environmental taxes as a share of the total amount of taxes and social contributions for the period of 2008 to 2021 (Figure 8) cannot be considered since the purposes of these revenues are different and the amount of environmental revenues is much smaller and has a purposeful use—the development of clean technologies. Environmental revenues in the EU budget are an insufficient source of funding for eco-projects. They make up 5–6% of all tax revenues in the EU budget. Although this ratio varies by country (Figure 9), other financial instruments are required for the development of clean technologies.

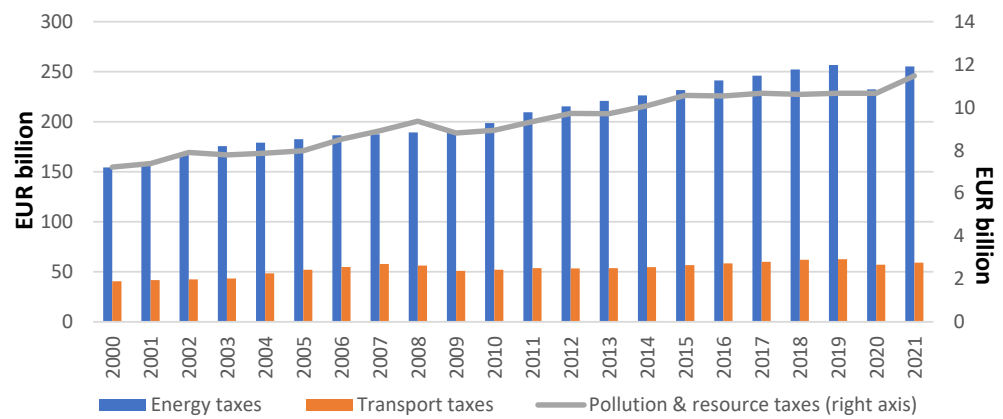


Figure 7. Growth dynamics of environmental taxes in the EU budget, 2000–2021. Adapted with permission from [71].

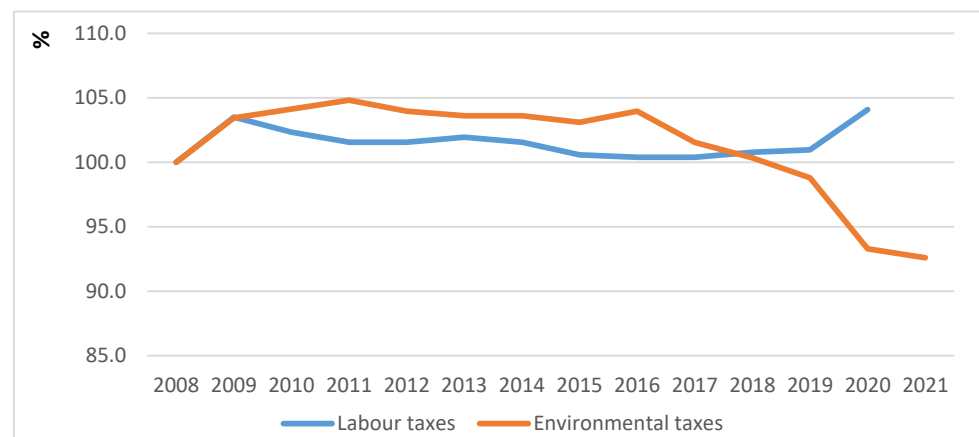


Figure 8. Dynamics of environmental taxes and taxes on labor and capital in the EU budget (index 2008 = 100). Adapted with permission from [71].

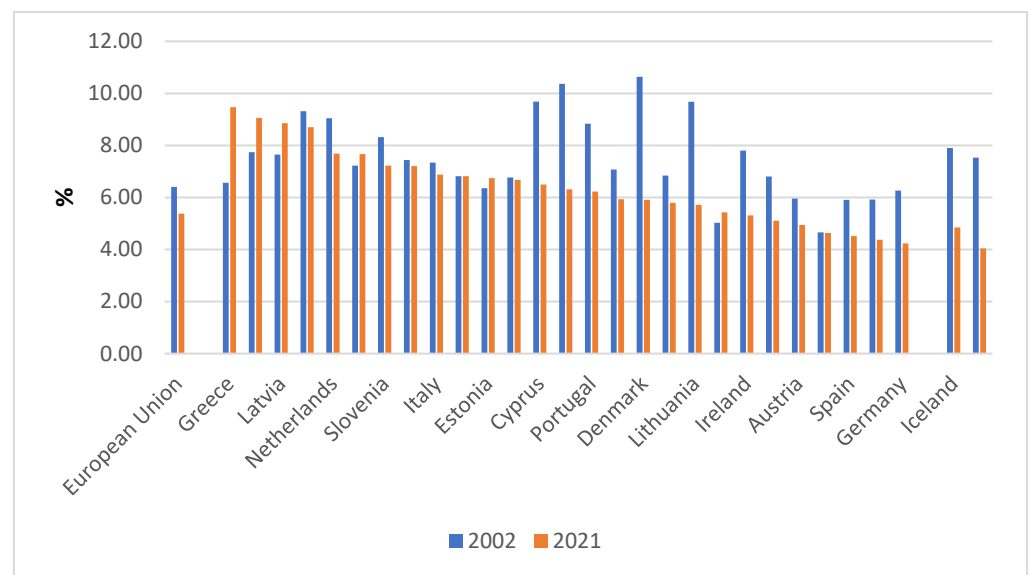


Figure 9. Environmental taxes as a share of total taxes and social contributions, %. Adapted with permission from [71].

Pollution and resource taxes make up a very small portion of environmental tax revenues. These are grouped into various taxes levied on, for example, waste storage, water

pollution, and abstraction. That is, as a source of financing, even taking into account the fully targeted use for environmental activities, the proceeds from this tax are insufficient (Figure 9). The need to have significant amounts of funding is also indicated by geopolitical reporting data, which present air pollutants and greenhouse gases in terms of CO₂ by industry (Table 2).

Table 2. Greenhouse emissions by sectors of the EU countries, million tons CO₂ [71].

Industry	Q2-20	Q3-20	Q4-20	Q1-21	Q2-21	Q3-21	Q4-21	Q1-22	Q2-22	Q3-22
1	118.20	120.76	120.56	116.64	118.97	122.43	120.07	116.68	117.99	121.01
2	11.09	12.28	13.42	11.68	12.15	12.15	13.35	12.00	12.43	12.51
3	169.64	190.78	205.34	193.82	205.74	194.89	205.15	197.51	205.36	192.63
4	133.42	167.85	188.87	190.94	154.00	168.43	206.44	199.68	162.78	176.79
5	35.41	36.77	37.62	36.45	36.51	36.02	36.77	36.16	36.36	35.93
6	11.17	12.55	13.86	12.85	13.65	13.08	14.18	13.29	13.88	13.26
7	57.98	63.57	64.46	61.49	63.79	66.27	68.22	65.22	67.27	68.69
8	70.79	89.98	84.20	76.96	86.78	100.32	95.37	90.01	103.31	109.60
9	736.14	814.51	941.97	941.13	849.93	836.45	977.91	964.52	865.34	853.53
10	128.44	119.98	213.65	240.31	158.35	122.88	218.35	233.99	145.96	123.13
Σ	1472.29	1629.02	1883.94	1882.26	1699.86	1672.90	1955.81	1929.05	1584.72	1707.07

Designation: 1. Agriculture, forestry, and fishing. 2. Mining. 3. Production. 4. Power supply, gas, steam, and air conditioning. 5. Water supply; sewerage, waste management, and restoration work. 6. Construction. 7. Services (except transportation and storage). 8. Transportation and storage. 9. All NACE activities plus households. 10. General activity of households.

Significant greenhouse gas emissions in EU countries are observed in production. To reduce greenhouse gas emissions, there is a need to develop and implement eco-projects. As sources of financing, as shown, the following can be attracted: environmental tax revenues (Figure 10) from the budgets of different levels. The next source of financing for eco-projects is the proceeds from trading in quotas (permits) for greenhouse gas emissions, as well as cap-and-trade for emissions. This is especially effective in the initial period of development and implementation of greening projects.

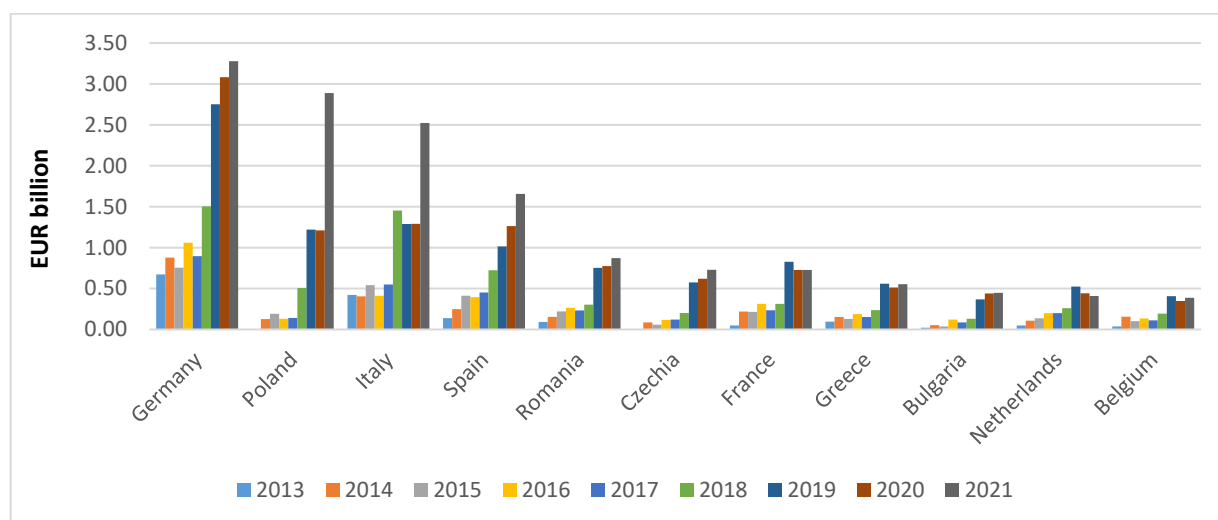


Figure 10. Total tax revenue from auctioning of emission allowances as reported by EU member states, 2013–2021, EUR billion. Adapted with permission from [71].

The total revenues from environmental taxes and emission allowances in the EU member states are shown in Figures 10 and 11.

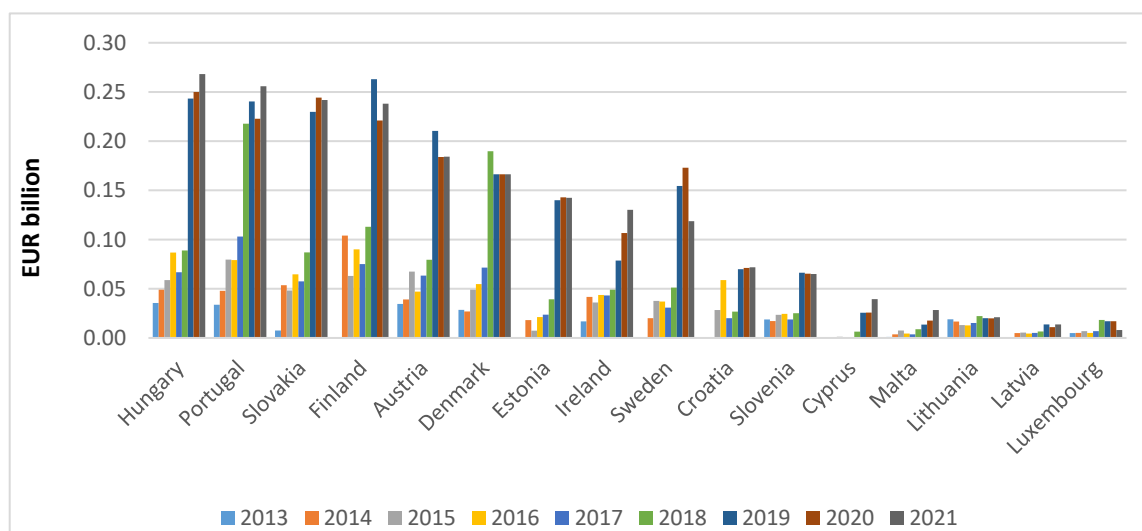


Figure 11. Total tax revenue from auctioning of emission allowances as reported by EU member states, 2013–2021, EUR billion. Adapted with permission from [71].

In developed countries, the largest total revenues from environmental taxes and emission quotas come from Germany, Italy, and Spain. Significantly lower tax payments are made by taxpayers of the following EU member states: Portugal, Slovakia, Finland, Austria, and Norway. There was a significant increase in the total values of environmental revenues from EU member states for the period 2019–2021. This took place due to an increase in taxation rates for emissions (Tables 3 and 4).

Table 3. Total revenue from environmental tax and auctioning of emission permits by EU member states, first group, 2013–2021, EUR billion [71].

Country	2013	2014	2015	2016	2017	2018	2019	2020	2021
Germany	0.67	0.88	0.76	1.06	0.90	1.50	2.75	3.08	3.28
Poland	0.00	0.13	0.19	0.13	0.14	0.51	1.22	1.21	2.89
Italy	0.42	0.40	0.54	0.41	0.55	1.45	1.29	1.29	2.52
Spain	0.14	0.25	0.41	0.40	0.45	0.72	1.02	1.26	1.66
Romania	0.09	0.16	0.22	0.26	0.23	0.30	0.75	0.77	0.87
Czechia	0.00	0.09	0.06	0.12	0.12	0.20	0.57	0.62	0.73
France	0.05	0.22	0.22	0.31	0.24	0.31	0.83	0.73	0.73
Greece	0.09	0.15	0.13	0.19	0.15	0.24	0.56	0.51	0.55
Bulgaria	0.02	0.05	0.04	0.12	0.09	0.13	0.37	0.44	0.45
Netherlands	0.05	0.11	0.14	0.20	0.20	0.26	0.52	0.44	0.41
Belgium	0.04	0.16	0.10	0.14	0.11	0.19	0.41	0.35	0.39

Analysis shows that the amounts required for the development of eco-projects in the EU member states to achieve the neutrality targets by 2050 require significant funding. Under the current conditions of financial limitations for enterprises, especially small and medium-sized businesses, this is impossible to implement. Along with the few green financial instruments (GFIs) identified, other GFIs and financial management mechanisms are required to be involved. The sources of financing can be own (retained earnings,

depreciation), as well as funds raised (loans, issuance of shares, corporate bonds, bonded loans). In order to reduce the financial limitations of enterprises, especially SMEs, this paper proposes to form a regional ecological financial system, the organizer of which is an outsourcer for the provision of F&A and tax outsourcing (N&A) services. Clients of financial outsourcing services are both large and SMEs that demonstrate environmental or innovative activity.

Table 4. Total revenue from environmental tax and auctioning of emission permits by EU member states, second group, 2013–2021, EUR billion [71].

Country	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hungary	0.04	0.05	0.06	0.09	0.07	0.09	0.24	0.25	0.27
Portugal	0.03	0.05	0.08	0.08	0.10	0.22	0.24	0.22	0.26
Slovakia	0.01	0.05	0.05	0.06	0.06	0.09	0.23	0.24	0.24
Finland	0.00	0.10	0.06	0.09	0.08	0.11	0.26	0.22	0.24
Austria	0.03	0.04	0.07	0.05	0.06	0.08	0.21	0.18	0.18
Denmark	0.03	0.03	0.05	0.05	0.07	0.19	0.17	0.17	0.17
Estonia	0.00	0.02	0.01	0.02	0.02	0.04	0.14	0.14	0.14
Ireland	0.02	0.04	0.04	0.04	0.04	0.05	0.08	0.11	0.13
Sweden	0.00	0.02	0.04	0.04	0.03	0.05	0.15	0.17	0.12
Croatia	0.00	0.00	0.03	0.06	0.02	0.03	0.07	0.07	0.07
Slovenia	0.02	0.02	0.02	0.02	0.02	0.03	0.07	0.07	0.07
Lithuania	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Latvia	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01
Luxembourg	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01

The outsourcer offers its clients financial accounting and reporting services, as well as effectively attracting, distributing, using, and controlling financial instruments and financial mechanisms not only for the core business, but also for the implementation of environmental and innovative projects. It is also necessary to take into account that greening projects, in contrast to innovative projects, demonstrate mainly negative economic indicators during implementation.

There was a need to attract completely new financial instruments—green (environmental) financial instruments—green bonds, green investments, and green loans; and manage the received mixed capital using financial management mechanisms. At the same time, the state should also contribute to the greening of the production of goods and services through the formation of an effective fiscal (budgetary and tax) policy. Such an approach to organizing financing will make it possible to effectively carry out environmental and innovative activities both in the regions and at the state level. This requires additional development of the theory and practice of finance and financial management. This paper presents possible models for financing environmental and innovative projects developed and implemented by business entities—clients of F&A services. Significant funding is required to achieve neutrality goals by 2050. Under the current conditions of financial limitations of enterprises, especially SMEs, this is not possible. Identified financial instruments (FIs)—retained earnings, depreciation; raised funds—loans, issue of shares, corporate bonds, bonded loans; receipts of environmental taxes in the budgets of different levels; proceeds from trading in quotas (permits) for greenhouse gas emissions (cap-and-trade) and special environmental (green) financial instruments (GFIs); and others that need to be managed using financial management mechanisms (FMs).

4.3. Analysis of the Activities of Clients of Financial Outsourcing Services That Are Innovative and Environmentally Active

When calculating financing models, the following was used: the concept of the life cycle of innovations, which plays an important role in the organization of innovative and environmental processes. The outsourcer as an organizer of effective economic relations in the regional ecological financial system between clients, creditors, investors, municipalities, insurers, and others attracts GFIs (Figure 12).

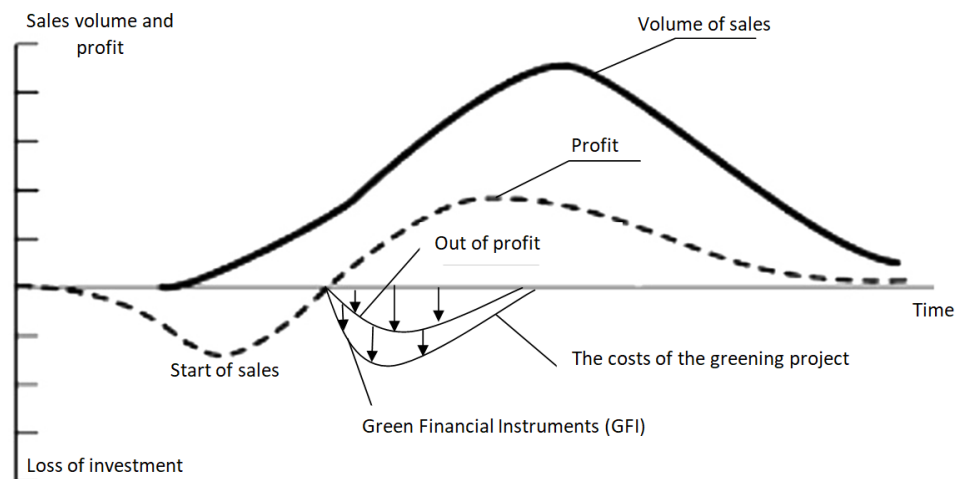


Figure 12. Model of financing environmental and innovative projects under the conditions of the regional ecological financial system, in the mode of financial outsourcing.

F&A clients’ profits from innovation activities, as well as environmental (green) financial instruments (GFIs), can be attracted as sources of financing for environmental activities. The dynamics of changes in environmental tax revenues to the EU budget is shown in Figure 13.

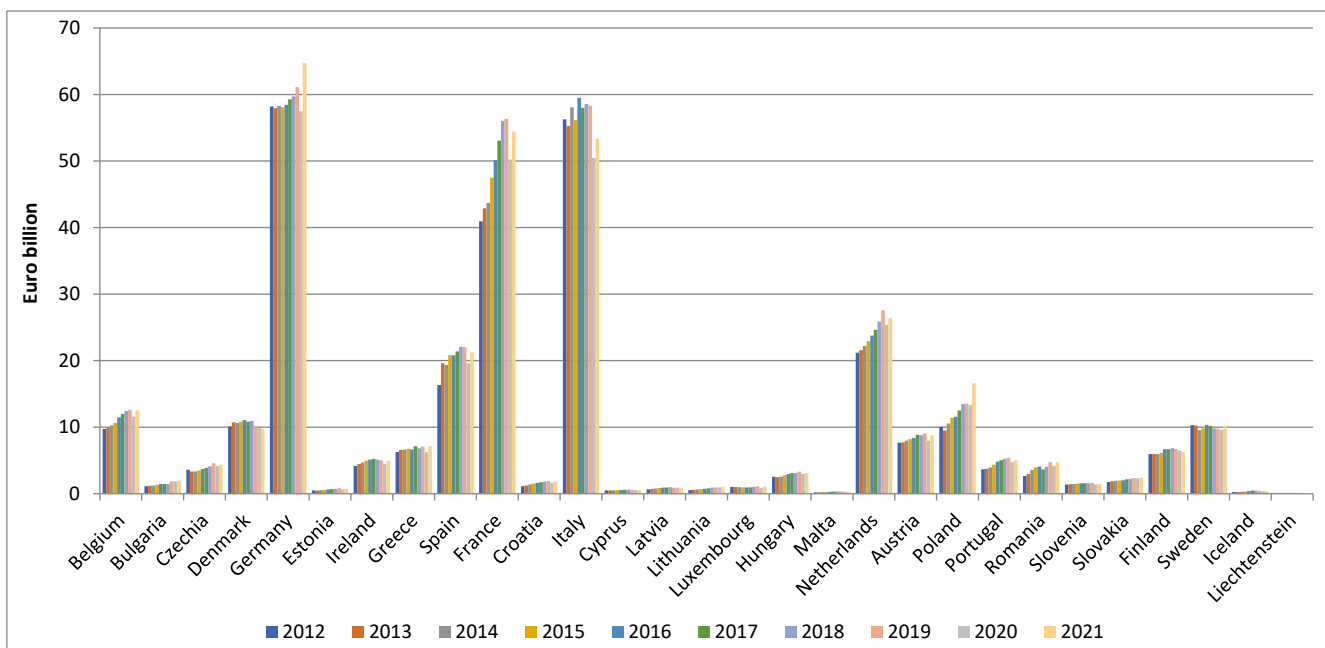


Figure 13. Dynamics of changes in environmental tax revenues to the EU budget, EUR million. Adapted with permission from [71].

The financing of projects of greening and the eco-modernization of the production of products and services are carried out at the expense of the following: the owned financial resources of business entities; receipts of environmental taxes to the local budget; subsidies; transfers; funds from the sale of “green shares”; public and private loans; swaps; fiscal investment; funds received as a result of optimization of local budgets; preferential taxation; preferential investment loans; granting the right to accelerated depreciation; and at the expense of other financial instruments (FIs) using financial management mechanisms (FMs) as a cash-flow-management system.

The following countries are active payers of environmental tax revenues to the EU budget (Table 5).

Table 5. Active payers of environmental taxes to the EU budget, EUR million [71].

	Germany	Spain	France	Italy	Netherlands	Austria	Poland	Sweden	Norway	Switzerland
2014	58,923	19,344	43,716	58,070	22,216	7974	10,562	9544	8732	7264
2015	58,073	20,821	47,493	56,144	22,925	8203	11,401	9801	8169	8474
2016	58,442	20,793	50,125	59,481	23,754	8384	11,556	10,341	8044	8557
2017	59,259	21,371	53,052	58,000	24,635	8844	12,512	10,150	8123	8527
2018	61,119	22,075	56,039	58,575	25,877	8784	13,474	9813	8109	8601
2019	62,133	22,018	56,327	58,299	27,570	9058	13,545	9779	7629	9038
2020	57,476	19,600	50,226	50,444	25,366	7974	13,330	9618	6447	9032
2021	64,714	21,265	54,421	53,383	26,419	8775	16,589	10,217	6983	9178
Σ	480,139	167,287	411,399	452,396	198,762	67,996	102,969	79,263	62,236	68,671

This will make it possible to reuse the capital formed from various sources of financing, i.e., mixed capital. In addition to environmental revenues, loans issued by EU countries can be sources of financing for eco-projects. Such active countries include Germany, which lent to EU countries in the amount of EUR 314 billion (Table 6). Spain issued loans to the amount of EUR 32.6 billion, the Netherlands to the amount of EUR 73.8 billion, and Switzerland to the amount of EUR 25.3 billion. In Germany, revenues from environmental taxes were the most significant at EUR -64.714 billion. Then, in descending order, revenues from environmental taxes amounted to France’s EUR 54.421 billion, Italy’s EUR 53.383 billion, and the Netherlands’ EUR 26.490 billion. In world practice, there is a tendency to increase the volume of direct investment and reduce portfolio investment.

In EU countries, significant direct investments were made by Germany (EUR 163 billion), Belgium (EUR 74 billion), and France (EUR 50.6 billion). The main components of the balance of financial accounts (loans, direct investment assets, portfolio investment assets, financial derivatives, and stock options) can act as sources of financing for eco-projects in EU countries. To achieve this, public fiscal support is needed in each EU country. As for the main components of the current account of the balance of payments (% of GDP), their insignificant values show that these payments cannot be sources of financing the environmental activities of the EU countries (Table 7).

Table 7 can be used to identify the largest polluters in the EU member states. The largest polluters of the EU countries are as follows: Germany, whose emissions are 615,621 thousand tons; France, with 307,281 thousand tons; Spain, with 227,177 thousand tons; and Poland, with 360,640 thousand tons (Table 8). Thus, the owned sources of the EU countries can be used to finance green technologies.

Table 6. Main components of the financial account balance, EUR billion [71].

	Financial Account, Net	Direct Investment Assets	Direct Investment Liabilities	Portfolio Investment Assets	Portfolio Investment Liabilities	Other Investment Assets	Other Investment Liabilities	Financial Derivatives and Employee Stock options Net	Reserve Assets	Total Environmental Taxes
EU	413	172	−103	654	331	179	592	60	168	325.837
Belgium	1	74	57	35	28	8.2	38	−0.6	8	12.536
Germany	314	163	61	221	−33	366	501	61	31.9	64.714
Spain	32.6	12.2	21.9	104.5	74.1	54.2	56.7	4.2	10.3	21.265
France	−47.5	50.6	65	76.2	99	142.6	193.5	17.8	22.8	54.421
Italy	26.3	14.7	12	123.9	0	19.7	140	0	20.7	53.383
Netherlands	73.8	−35	−127	−20	51.6	54.3	17.1	5.4	10.4	26.419
Austria	−4.3	12.5	6.6	16.4	6.0	3.6	29	0.6	4.2	8.775
Poland	1.2	7.1	27.9	4.1	−5.4	12.6	13.1	−2.9	−15.9	16.589
Sweden	9.2	43.7	49.3	26.7	−10.9	−7.5	12.2	−8.2	5.1	10.217
Switzerland	25.3	8.6	25.6	26.6	−5.1	33.9	64.8		41.4	9.178

Table 7. Main components of the current account balance (% of GDP), 2021 [71].

	Current Account	Products	Services	Primary Income	Secondary Income	Capital Account
Germany	7.4	5.4	0.0	3.5	−1.5	0.0
Sweden	5.5	4.5	−0.1	3.0	−1.9	0.2
Italy	2.5	2.9	−0.5	1.2	−1.1	−0.1
Lithuania	1.4	−5.2	9.4	−3.3	0.5	1.5
Spain	0.9	−1.7	3.2	0.5	−1.1	0.9
Finland	0.7	1.2	−0.9	1.7	−1.2	0.1
Belgium	−0.4	−0.3	0.4	0.9	−1.3	0.2
France	−0.6	−2.7	1.5	2.2	−1.6	0.5
Poland	−0.6	−0.1	4.6	−4.5	−0.7	1.6
Estonia	−1.1	−4.3	4.6	−1.5	0.0	9.2
Portugal	−1.1	−7.1	4.5	−1.2	2.7	1.8
Slovakia	−2.0	−0.1	0.8	−1.7	−1.0	1.4
Latvia	−2.9	−7.4	5.3	−1.9	1.2	1.4
Hungary	−3.0	−2.5	3.2	−3.0	−0.7	2.5
Greece	−5.9	−14.0	7.1	0.4	0.7	2.2
Romania	−7.0	−9.7	4.0	−1.8	0.4	2.2
Norway	15.3	12.5	0.0	4.6	−1.7	0.0
Switzerland	9.3	13.8	−0.9	−1.9	−1.7	−0.6

Table 8. Greenhouse gas emissions by sectors and EU countries, million tons [71].

	Agriculture, Forestry, and Fishing	Mining and Quarrying	Manufacturing	Electricity, Gas, Steam, and Air Conditioning Supply	Transportation and Storage	Water Supply and Construction	Total Production Activities
EU	478.114	49.33	799.649	719.788	359.44	459.295	2865.616
Belgium	12.403	0.466	34.579	14.035	6.381	15.013	82.877
Bulgaria	6.718	1.218	9.832	22.265	7.467	4.234	51.734
Czechia	9.321	5.235	20.3	39.656	8.848	11.346	94.706
Denmark	12.806	0.987	5.469	5.519	34.216	6.44	65.438
Germany	61.188	4.576	196.833	211.417	70.072	71.534	615.621
Estonia	1.656	0.086	2.032	5.822	1.408	1.082	12.087
Ireland	22.098	0.121	7.671	9.106	9.854	5.511	54.362
Greece	8.906	0.36	16.741	21.308	21.663	8.393	77.371
Spain	51.08	1.289	74.878	32.182	37.075	30.674	227.177
France	83.681	0.578	87.037	25.645	32.123	78.216	307.281
Croatia	3.584	0.557	4.6	3.416	1.316	4.085	17.559
Italy	41.891	3.02	87.782	78.208	40.059	60.788	311.747
Cyprus	0.648	0.042	1.587	3.046	0.253	1.26	6.837
Latvia	2.946	0.059	1.317	1.565	2.208	1.511	9.606
Lithuania	4.916	0.021	5.915	1.738	8.44	1.85	22.88
Luxembourg	0.769	0.006	1.352	0.313	5.192	0.929	8.562
Hungary	9.977	0.863	11.49	11.171	5.432	11.36	50.292
Malta	0.108	0.017	0.086	0.792	0.363	0.626	1.991
Netherlands	28.108	2.089	45.808	32.73	22.608	20.841	152.185
Austria	7.876	0.781	27.711	6.102	6.991	7.598	57.058
Poland	56.696	19.26	67.141	141.198	9.608	66.736	360.64
Portugal	8.872	0.296	14.647	6.413	6.492	11.416	48.135
Romania	21.066	5.607	29.604	20.434	6.35	16.05	99.111
Slovenia	1.99	0.27	2.715	4.282	0.968	2.441	12.665
Slovakia	2.181	0.227	17.452	4.774	2.109	7.103	33.847
Finland	7.923	0.457	11.459	11.076	7.019	5.731	43.665
Sweden	8.706	0.843	13.612	5.573	4.926	6.523	40.182

However, they are insufficient, and funding is limited, especially for participants, namely small and medium-sized businesses from EU countries. There is a need to involve the services of a financial outsourcer to organize and monitor the financial flows of the emerging ecological system and for the effective organization of participants (creditors, investors, insurers, municipalities). Financial outsourcing services will include not only the effective formation of the structure of environmental capital, but also the involvement of financial management mechanisms, accelerating the turnover of capital. It was revealed that the owned sources of EU countries are not enough to finance the development of green technologies. Clients of financial outsourcing services—small and medium-sized businesses that are environmentally active—have financial limitations.

Therefore, there is a need to engage the services of a financial outsourcer to organize and monitor the financial flows of the emerging ecological financial system. The outsourcer,

as the organizer of the regional system, contributes to the formation of effective economic relations among all participants (creditors, investors, insurers, and municipalities). Financial outsourcing services will include not only the effective formation of the structure of environmental capital, but also the involvement of financial management mechanisms, accelerating the turnover of capital. When calculating financing models, the following was used: the concept of the life cycle of innovations, which plays an important role in the organization of innovative and environmental processes. In order to reduce the financial constraints of enterprises, especially SMEs, the article proposes to form a regional ecological financial system, organized by an outsourcer for the provision of F&A services and tax outsourcing, which offers its clients services for the effective attraction, distribution, use, and control of financial instruments and financial mechanisms not only for core activities, but also for the implementation of environmental and innovative projects.

An outsourcer is the organizer of effective economic relations in the regional ecological financial system between clients, creditors, investors, municipalities, and insurers; they attract GFIs and manages it using mechanisms. At the same time, the state should also contribute to the greening of the production of goods and services through the formation of an effective fiscal (budget and tax) policy. Such an approach to organizing financing will make it possible to effectively carry out environmental and innovative activities both in the regions and at the state level. This requires additional development of the theory and practice of finance and financial management.

5. Discussion

Environmental protection, which is positioned in economic activity, is in demand all over the world, within the country, and not only in the public sector, but also in the private sector. As the EU demonstrates an international environmental initiative, the fact that it draws comparisons with the EU is also commendable. To reduce the financial constraints of enterprises, especially SMEs, active in the field of environmental protection, the study proposes for the first time to form a regional ecological financial system, the organizer of which is an outsourcer for the provision of financial (F&A) and tax (N&A) outsourcing services. Clients of financial outsourcing services are small, medium, and sometimes large enterprises that demonstrate environmental or innovative activity. The outsourcer offers its clients financial accounting and reporting services, as well as the effective attraction, distribution, use, and control of financial instruments and financial mechanisms, not only for core activities, but also for the implementation of environmental and innovative projects. It should also be taken into account that greening projects, in contrast to innovative projects, demonstrate mainly negative economic indicators during implementation. Thus, to accelerate the implementation of environmental measures, it is required not only to increase sources and innovative financial instruments, but also to use financial management mechanisms to accelerate the turnover of mixed capital.

Therefore, it became necessary to attract completely new financial instruments—green (environmental) financial instruments—green bonds, green investments, and green loans; and manage the received mixed capital using financial management mechanisms. At the same time, the state should also contribute to the greening of the production of goods and services through the formation of an effective fiscal (budget and tax) policy. Such an approach to organizing financing will make it possible to effectively carry out environmental and innovative activities both in the regions and at the state level. This requires additional development of the theory and practice of finance and financial management. Substantial funding is required to achieve the climate neutrality goals by 2050, which can be provided by using the services of a financial outsourcer as the organizer of a regional environmental financial system.

Outsourcing services are aimed at increasing the efficiency of economic relations among participants in the financial system and contributing to the attraction, distribution, redistribution, and control of financial resources in the regional ecological financial system.

6. Conclusions

This study contributes to the creation of models of economic interaction between participants in the regional financial system in the development and implementation of environmental projects. It is shown that significant funding is required to achieve the goals of neutrality by 2050. In the current conditions of financial limitations for enterprises, especially SMEs, this is not possible. There is a need to involve financial instruments—retained earnings, depreciation; raised funds—loans, issue of shares, corporate bonds, bonded loans; receipts of environmental taxes in the budgets of different levels; proceeds from trading in quotas (permits) for greenhouse gas emissions; and special environmental (green) financial instruments (GFIs), which must be managed using financial management mechanisms (FMs). Total environmental tax revenues and auctioning of emission permits according to EU member states for 2021 are as follows: Germany, EUR 3.28 billion; Poland, EUR 2.29 billion; and Italy, EUR 2.52 billion.

When calculating financing models, the following were used: the concept of the life cycle of innovations, which plays an important role in the organization of innovative and environmental processes. This study shows that in order to reduce the financial constraints on the development of clean technologies and the participation of entities in them, including small and medium-sized businesses (SMEs) and clients showing increased environmental and innovation activity, it is proposed to form a regional environmental financial system organized by an outsourcer, which forms effective economic relations between service customers and other participants in the system, including investors, creditors, insurers, and municipalities. This is especially useful for countries that are “pollutants” in the EU. It was revealed that the largest polluters of the EU countries are as follows: Germany, whose emissions amount to 615,621 thousand tons; France, with 307,281 thousand tons; Spain, with 227,177 thousand tons; and Poland, 360,640 with thousand tons, only for 2021. To study the relationship between variables “revenues from environmental taxation by country” and “the sum of all environmental tax revenues in the budget” (UE-27) for the period 2012–2021, correlation analysis was carried out, and the following Pearson coefficients were obtained according to the degree of decrease in the strength of the connection: Belgium (0.952); France (0.961); Croatia (0.960); Portugal (0.938); Hungary (0.909); Spain (0.901); Estonia (0.875); the Netherlands (0.869); Germany (0.787); Czech Republic (0.771); Greece (0.743); Latvia (0.716); Luxembourg (0.736); Poland (0.717); Slovakia (0.748); Finland (0.695); and Ireland (0.626). The following countries had negative Pearson coefficients: Denmark: “−0.195”; Norway: “−0.240”. The Pearson coefficient shows how proportional the changes in the Pearson coefficients of these countries are to the sum of all environmental revenues in the UE-27 budget. The proposed methodology requires clarification, but it can be useful in managing financial flows attracted to the regional ecological financial system by an outsourcer.

Financial outsourcing services will include not only the effective formation of the structure of environmental capital, but also the involvement of financial management mechanisms that accelerate the turnover of capital in the regional ecological financial system. The state should also contribute to the greening of the production of goods and services through the formation of an effective fiscal (budget and tax) policy. Such an approach to organizing financing will make it possible to effectively carry out environmental and innovative activities both in the regions and at the state level. This requires additional development of the theory and practice of finance and financial management.

Author Contributions: Conceptualization, V.K. and O.L.; methodology, O.L.; software, M.B.; validation, P.O. and D.K.; formal analysis, D.K.; investigation, V.K.; resources, M.H.; data curation, P.O.; writing—original draft preparation, O.L.; writing—review and editing, V.K.; visualization, P.O.; supervision, M.B.; project administration, D.K. and P.O.; funding acquisition, M.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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

References

1. Reza-Gharehbagh, R. Financing green technology development of and the role of digital platforms: Insourcing or outsourcing. *Technol. Soc.* **2022**, *69*, 101967. [[CrossRef](#)]
2. Reza-Gharehbagh, R.; Asian, S.; Hafezalkotob, A. Reframing supply chain finance in an era of reglobalization: On the value of multi-sided crowdfunding platforms. *Transp. Res. Part E Logist. Transp. Rev.* **2021**, *149*, 102298. [[CrossRef](#)]
3. Miller, J. Outsourcing review: Contract manufacturing through the years. *Pharm. Technol. Eur.* **2017**, *41*, 76–78.
4. Dekker, H.C.; Mooi, E.; Visser, A. Firm Enablement through Outsourcing: A Longitudinal Analysis of How Outsourcing Enables Process Improvement under Financial and Competence Constraints. *Ind. Mark. Manag.* **2020**, *90*, 124–132. [[CrossRef](#)]
5. AbdulRafiu, A.; Sovacool, B.K.; Daniels, C. The Dynamics of Global Public Research Funding on Climate Change, Energy, Transport, and Industrial Decarbonisation. *Renew. Sustain. Energy Rev.* **2022**, *162*, 112420. [[CrossRef](#)]
6. Aleluia, J.; Tharakan, P.; Chikkatur, A.P.; Shrimali, G.; Chen, X. Accelerating a Clean Energy Transition in Southeast Asia: Role of Governments and Public Policy. *Renew. Sustain. Energy Rev.* **2022**, *159*, 112226. [[CrossRef](#)]
7. An, J.; Jung, D.; Jeong, K.; Ji, C.; Hong, T.; Lee, J.; Kapp, S.; Choi, J. Energy-Environmental-Economic Assessment of Green Retrofit Policy to Achieve 2050 Carbon-Neutrality in South Korea: Focused on Residential Buildings. *Energy Build.* **2023**, *289*, 113059. [[CrossRef](#)]
8. Andone, I.I. Outsourcing the Business Services. *Inform. Econ.* **2010**, *14*, 165–170.
9. Aragão, J.P.S.; Fontana, M.E. Guidelines for Public Sector Managers on Assessing the Impact of Outsourcing on Business Continuity Strategies: A Brazilian Case. *J. Glob. Oper. Strateg. Sourc.* **2023**, *16*, 118–141. [[CrossRef](#)]
10. Bai, Y.; Song, S.; Jiao, J.; Yang, R. The Impacts of Government R&D Subsidies on Green Innovation: Evidence from Chinese Energy-Intensive Firms. *J. Clean. Prod.* **2019**, *233*, 819–829. [[CrossRef](#)]
11. Bhuiyan, K.H.; Jahan, I.; Zayed, N.M.; Islam, K.M.A.; Suyaiya, S.; Tkachenko, O.; Nitsenko, V. Smart Tourism Ecosystem: A New Dimension toward Sustainable Value Co-Creation. *Sustainability* **2022**, *14*, 15043. [[CrossRef](#)]
12. Gbani, E. *Diaspora and Outsourcing: Evidence from Desk and India*; Policy Research Working Paper; The World Bank: Washington, DC, USA, 2013.
13. Prokopenko, O.; Miśkiewicz, R. Perception of „Green Shipping” in the contemporary conditions. *Entrep. Sustain. Issues* **2020**, *8*, 269–284. [[CrossRef](#)]
14. Ghisellini, P.; Cialani, C.; Ulgiati, S. A Review on Circular Economy: The Expected Transition to a Balanced Interplay of Environmental and Economic Systems. *J. Clean. Prod.* **2016**, *114*, 11–32. [[CrossRef](#)]
15. Coase, R.H.; Buchanan, J.B.; Thirlby, G.F. *Business Organization and the Accountant*; Weidenfeld and Nicolson: New York, NY, USA, 1938.
16. Coase, R.H. The Nature of the Firm. *Economica* **1937**, *4*, 386–405. [[CrossRef](#)]
17. Rumelt, R.P. Towards a Strategic Theory of the Firm. *Compet. Strateg. Manag.* **1984**, *26*, 556–570.
18. Krell, E. *Outsourcing the Finance and Accounting Functions*; CIMA, AICPA and CMA: Toronto, ON, Canada, 2007.
19. Kondzielnik, O. Ethical and Economic Implications for an Accounting Office That Offers Bundled Services with a Bank Account. *Zesz. Teoretyczne Rachun.* **2021**, *45*, 77–90. [[CrossRef](#)]
20. Zhang, D.; Kong, Q. Credit Policy, Uncertainty, and Firm R&D Investment: A Quasi-Natural Experiment Based on the Green Credit Guidelines. *Pac.-Basin Financ. J.* **2022**, *73*, 101751. [[CrossRef](#)]
21. Horbach, J.; Rammer, C. Circular Economy Innovations, Growth and Employment at the Firm Level: Empirical Evidence from Germany. *J. Ind. Ecol.* **2020**, *24*, 615–625. [[CrossRef](#)]
22. Markowitz, H. Portfolio Selection. *J. Financ.* **1952**, *7*, 77. [[CrossRef](#)]
23. Morcillo García, J. Analysis and discussion of financial outsourcing case studies in the pharmaceutical industry. *Dir. Organ.* **2022**, *76*, 13–24. [[CrossRef](#)]
24. Mubako, G. Internal audit outsourcing: A literature synthesis and future directions. *Aust. Account. Rev.* **2019**, *29*, 532–545. [[CrossRef](#)]
25. Li, E.-L. Economic influence analysis of offshore outsourcing based on host country’s view. *Int. J. U- E- Serv. Sci. Technol.* **2014**, *8*, 63–72. [[CrossRef](#)]
26. Singh, P. *Investment Management*; Himalaya Publishing House: Mumbai, India, 2012.
27. Li, X.; Yang, Y. Does Green Finance Contribute to Corporate Technological Innovation? The Moderating Role of Corporate Social Responsibility. *Sustainability* **2022**, *14*, 5648. [[CrossRef](#)]
28. Fu, K.; Li, Y.; Mao, H.; Miao, Z. Firms’ Production and Green Technology Strategies: The Role of Emission Asymmetry and Carbon Taxes. *Eur. J. Oper. Res.* **2023**, *305*, 1100–1112. [[CrossRef](#)]
29. Li, Y.; Zhou, M.; Sun, H.; Liu, J. Assessment of Environmental Tax and Green Bonds Impacts on Energy Efficiency in the European Union. *Econ. Change Restruct.* **2022**, *26*, 1063–1081. [[CrossRef](#)]
30. Liang, Y. Impact of financial development on outsourcing and aggregate productivity. *J. Dev. Econ.* **2021**, *154*, 102770. [[CrossRef](#)]

31. Lok, K.L.; Opoku, A.; Baldry, D. Design of Sustainable Outsourcing Services for Facilities Management: Critical Success Factors. *Sustainability* **2018**, *10*, 2292. [CrossRef]
32. Rezazade, F.; Minutillo, S.; Patel, N. Accounting Outsourcing and Its Relationship with Financial Performance of SMEs: Manager and Employee Perspectives. *S. Afr. J. Acc. Res.* **2023**, *37*, 106–121. [CrossRef]
33. Konovalova, N.; Rozgina, L. Accounting Outsourcing: Increasing the Possibility of Its Use in Latvia. In *Lecture Notes in Networks and Systems*; Springer: Cham, Switzerland, 2023; pp. 384–393. ISBN 9783031266546.
34. Al Mamun, M.; Boubaker, S.; Nguyen, D.K. Green Finance and Decarbonization: Evidence from around the World. *Fin. Res. Lett.* **2022**, *46*, 102807. [CrossRef]
35. Laktionova, O.; Harbar, Z.; Melikhov, A.; Slobodianiuk, O.; Gevko, V.; Desiatskyi, S. Financing the greening of enterprises in industrial regions of Ukraine in the context of sustainable development. *Manag. Theory Stud. Rural. Bus. Infrastruct. Dev.* **2021**, *43*, 574–584. [CrossRef]
36. Koval, V.; Laktionova, O.; Atstāja, D.; Grasis, J.; Lomachynska, I.; Shchur, R. Green Financial Instruments of Cleaner Production Technologies. *Sustainability* **2022**, *14*, 10536. [CrossRef]
37. Prieto-Sandoval, V.; Jaca, C.; Santos, J.; Baumgartner, R.J.; Ormazabal, M. Key Strategies, Resources, and Capabilities for Implementing Circular Economy in Industrial Small and Medium Enterprises. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 1473–1484. [CrossRef]
38. Prieto-Sandoval, V.; Jaca, C.; Ormazabal, M. Towards a Consensus on the Circular Economy. *J. Clean. Prod.* **2018**, *179*, 605–615. [CrossRef]
39. Rausch, S.; Yonezawa, H. Green technology policies versus carbon pricing: An intergenerational perspective. *Eur. Econ. Rev.* **2023**, *154*, 104435. [CrossRef]
40. Shanmugam, V.; Mensah, R.A.; Försth, M.; Sas, G.; Restás, Á.; Addy, C.; Xu, Q.; Jiang, L.; Neisiany, R.E.; Singha, S.; et al. Circular Economy in Biocomposite Development: State-of-the-Art, Challenges and Emerging Trends. *Compos. Part C Open Access* **2021**, *5*, 100138. [CrossRef]
41. Nie, P.-Y.; Wen, H.-X.; Wang, C. Cooperative Green Innovation. *Environ. Sci. Pollut. Res. Int.* **2022**, *29*, 30150–30158. [CrossRef] [PubMed]
42. Zhao, Y.; Zhou, H.; Wang, Y. Outsourcing Remanufacturing and Collecting Strategies Analysis with Information Asymmetry. *Comput. Ind. Eng.* **2021**, *160*, 107561. [CrossRef]
43. Niang, A.; Bourdin, S.; Torre, A. L'économie Circulaire, Quels Enjeux de Développement Pour Les Territoires? *Dévo. Durable Territ.* **2020**, *11*, 16902. [CrossRef]
44. Benkhodja, M.T.; Fromentin, V.; Ma, X. Macroeconomic Effects of Green Subsidies. *J. Clean. Prod.* **2023**, *410*, 137166. [CrossRef]
45. Tian, Q.; Guo, W. Reconfiguration of Manufacturing Supply Chains Considering Outsourcing Decisions and Supply Chain Risks. *J. Manuf. Syst.* **2019**, *52*, 217–226. [CrossRef]
46. Böhlinger, C.; Schneider, J.; Springmann, M. Economic and Environmental Impacts of Raising Revenues for Climate Finance from Public Sources. *Clim. Policy* **2021**, *21*, 546–562. [CrossRef]
47. Bocken, N.; Boons, F.; Baldassarre, B. Sustainable Business Model Experimentation by Understanding Ecologies of Business Models. *J. Clean. Prod.* **2019**, *208*, 1498–1512. [CrossRef]
48. Helm, D. The Environmental Impacts of the Coronavirus. *Environ. Resour. Econ.* **2020**, *76*, 21–38. [CrossRef] [PubMed]
49. Tomašević, I.; Đurović, S.; Abramović, N.; Weis, L.; Koval, V. Factors Influencing Accounting Outsourcing Using the Transaction Cost Economics Model. *Int. J. Financ. Stud.* **2023**, *11*, 61. [CrossRef]
50. Hussain, M.; Ye, C.; Ye, C.; Wang, Y. Impact of Financial Inclusion and Infrastructure on Ecological Footprint in OECD Economies. *Environ. Sci. Pollut. Res. Int.* **2022**, *29*, 21891–21898. [CrossRef]
51. Jordan, J.B. *Financial Management for Episcopal Parishes: Revised Edition*; Morehouse Publishing: Harrisburg, PA, USA, 2017.
52. Huang, R.H.; Wang, C.M. FinTech-Bank Partnership in China's Credit Market: Models, Risks and Regulatory Responses. *Eur. Bus. Organ. Law Rev.* **2023**, 1–35. [CrossRef]
53. Zhao, H.; Yang, Y.; Li, N.; Liu, D.; Li, H. How Does Digital Finance Affect Carbon Emissions? Evidence from an Emerging Market. *Sustainability* **2021**, *13*, 12303. [CrossRef]
54. International Financial Development Club. Green Finance. Available online: <https://www.idfc.org> (accessed on 25 May 2013).
55. Trypolska, G.; Riabchyn, O. Experience and Prospects of Financing Renewable Energy Projects in Ukraine. *Int. J. Energy Econ. Policy* **2022**, *12*, 134–143. [CrossRef]
56. Bilan, Y.; Zos-Kior, M.; Nitsenko, V.; Sinelnikau, U.; Ilin, V. Social Component in Sustainable Management of Land Resources. *J. Secur. Sustain. Issu.* **2017**, *7*, 107–120. [CrossRef]
57. Ghani, E.; Kerr, W.R.; Stanton, C. Diaspora and Outsourcing: Evidence from oDesk and India. *Manag. Sci.* **2014**, *60*, 1677–1697. [CrossRef]
58. Kaplan, R.S.; Bruns, W. *Accounting and Management: A Field Study Perspective*; Harvard Business School Press: Brighton, MA, USA, 1987.
59. Magnani, M.; Sanfelici, D. The Financial Industry Sets Sights on Institutional Investors: A Relational Approach to Property Investment Outsourcing. *Econ. Geogr.* **2023**, *99*, 285–311. [CrossRef]
60. Ma, N.; Li, H.; Zhang, J.; Han, X.; Feng, S.; Arif, A. The Short-Term Price Effects and Transmission Mechanism of CO₂ Cost Pass-through in China: A Partial Transmission Model. *Resour. Policy* **2021**, *70*, 101972. [CrossRef]
61. Williams, P.; Sion, R.; Shasha, D.E. *The Blind Stone Tablet: Outsourcing Durability to Untrusted Parties*; NDSS: San Diego, CA, USA, 2009.

62. Mikhno, I.; Koval, V.; Sedikova, I.; Kotlubai, V. Digital Globalization in the International Development of Strategic Alliances. *Econ. Ecol. Socium* **2022**, *6*, 11–21. [[CrossRef](#)]
63. Abi Jaber, E.; Miller, E.; Pham, H. Markowitz Portfolio Selection for Multivariate Affine and Quadratic Volterra Models. *SIAM J. Financ. Math.* **2021**, *12*, 369–409. [[CrossRef](#)]
64. May, M. *Business Process Management: Integration in a Web-Enabled Environment*; Pearson FT Executive Briefing; Prentice Hall: Upper Saddle River, NJ, USA, 2008.
65. May, M. *Transforming the Finance Function. Adding Company-Wide Value in a Tech-Tax-Driven Environment*, 2nd ed.; Financial Times Prentice Hall: Edinburgh, UK, 2005.
66. Sribna, Y.; Skakovska, S.; Paniuk, T.; Hrytsiuk, I. The Economics of Technology Transfer in the Environmental Safety of Enterprises for the Energy Transition. *Econ. Ecol. Socium* **2023**, *7*, 84–96. [[CrossRef](#)]
67. Gillan, S.L.; Koch, A.; Starks, L.T. Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance. *J. Corp. Fin.* **2021**, *66*, 101889. [[CrossRef](#)]
68. Modigliani, F.; Miller, M.H. The Cost of Capital, Corporation Finance and the Theory of Investment. *Am. Econ. Rev.* **1958**, *48*, 261–297.
69. Li, D.; Gou, C.; Han, M. Research on the Influence Mechanism of Green Finance on the Quality of Green Innovation of Private Enterprises: Evidence from China. *Environ. Sci. Pollut. Res. Int.* **2023**, *30*, 30905–30918. [[CrossRef](#)]
70. Elsevier. Scopus. Available online: <https://www.elsevier.com/solutions/scopus> (accessed on 20 May 2023).
71. European Commission. Eurostat Database. Available online: <https://ec.europa.eu/eurostat/data/database> (accessed on 3 May 2023).

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.