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DOES FINANCIAL PERFORMANCE AFFECTS ENVIRONMENTAL PERFORMANCE: THE CASE STUDY OF NIS A.D. NOVI SAD

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Abstract: Company performance includes a set of different indicators that quantitatively or qualitatively show the various performance achieved by a company. In addition to the performance through which the economic dimension of business is viewed, it is also necessary to manage the environmental or ecological performance. Effective management of environmental (ecological) performance is significant due to its interconnection with the financial performance of the company. The purpose of this research is to examine the impact of financial performance on environmental (ecological) performance on the example of large, joint-stock company NIS A.D. NOVI SAD for the period from 2013 to 2022. NIS Group is one of the largest vertically integrated companies in Southern Europe in the field of oil and natural gas production, petrochemistry, and energetics. Correlation and regression analysis were used for research purposes. In this paper, financial and ecological indicators were selected, with the aim to examine the impact of financial indicators (return on assets - ROA, return on equity - ROE, net profit margin, and EBITDA margin) on ecological indicators such as: SO2 emissions, CO2 emissions, energy natural productivity, waste disposal rate, productive use of water resources of affected water and indicator of waste water. The results of the regression analysis indicate that the EBITDA margin has a positive effect on the indicator of SO2 emissions, energy natural productivity, and indicator of productive use of water resources, and that there is a negative effect on the indicator of wastewater. Also, there is a negative impact of ROE, ROA and net profit margin on the environmental indicator of CO2 emissions and the waste disposal rate, as well as a negative impact of ROE and net profit margin on the indicator of wastewater.

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Introduction

The business world is rapidly changing and evolving. We are witnessing rapid changes, which force companies to adapt their operations in accordance with the new conditions. Technological advances have particularly influenced the fact that companies need to adapt faster in order to survive (Petrova et al., 2021). Globalization in modern conditions significantly affects the state of the business environment. Deforestation, destruction of habitats of animal and plant species, urbanization and industrialization with the passage of time expand their influence and negatively affect nature. The use of petroleum products is increasing, which contributes to the increase in greenhouse gas emissions and increases the temperature on Earth, thereby contributing to climate change (Marković et al., 2023). The consequences are also expanding in reducing the total water on Earth. Also, the growth of the global population, leads to an increase in the volume of total waste produced (Lafit et al., 2023). The transition from agricultural production to more sophisticated economic activities has had a bad impact on the environment. The use of artificial pesticides has increased. The use of natural resources has increased, which has influenced a higher level of exploitation of non-renewable energy sources (Lapatinas et al., 2021). Climate change is affecting the increase in economic losses due to the health consequences of environmental pollution. It is believed that environmental/ecological performance today will affect economic/financial, social and political opportunities in the future (Lestari et al., 2023).

The traditional view of the environment, where environmental management in an enterprise is seen as a cost, has been replaced by a view of noticing the importance of recycling, the use of renewable energy sources, waste management, etc. (Filbeck & Gorman, 2004). Modern environmental management has been gaining importance since the end of the last century, with the aim of reducing the negative impacts on Earth. Multidisciplinarity in environmental management is a necessity, since every person has an impact on the environment, with the difference in the existence of groups of people who have more direct and stronger influence, taking into account the activity they are engaged in (Živković & Veljković, 2020). The use of renewable energy sources and the replacement of non-renewable energy sources is crucial in modern environmental management. This management points out the circular economy principles and the product-waste-product relationship (Aleksić et al., 2023), as well as the goals of sustainable development (Marković et al, 2020).

Many researchers have analysed environmental (ecological) and economic (financial) performance of enterprises in a particular country or group of countries,

over a period of time. Most often, they choose companies from a clearly defined industry for their research. Certain studies focus on the influence of environmental performance on economic performance, others investigate the impact of economic on environmental performance, while some studies look at interdependence. Also, there is a difference in results in different studies, as well as in the methodology and sample size used (Murphy, 2002). It is precisely the sample size, the methodology used, the industrial context in which the research is conducted, the procedure of data collection and the method of analysis and interpretation, the time period in which the research is carried out as well as the branch covered by the research affect the results of the research, which justifies the fact that there are different results by different researchers. Of all the above factors, it is believed that the methodology has the most significant impact on the results of the research (Lu & Taylor, 2016).

Milenković et al. (2024) presented research by various authors examining the impact of environmental (ecological) on financial performance (a), financial on environmental (ecological) performance (b), and the interdependence between the financial and environmental (ecological) performance (c). It has been established that there is a positive correlation between environmental performance and financial performance in the majority of the examined research which is selected in Milenković et al. (2024), meaning that implementing environmental actions and programmes improves financial success. In the one segment of the study Milenković et al. (2024) that examines various studies of different authors in previous period, in the case of impact of financial on environmental performance, there are mixed research results with positive and negative impacts, and other studies whose results show the absence of statistical significance. Finally, in the largest percentage of the analysed research, there is a positive interdependence between financial and environmental performance.

1. The concept of business (financial) and environmental (ecological) performance

The performance of an enterprise, as a set of indicators that quantitatively or qualitatively describe the achieved performances (economic result, accounting results – revenues and earnings, inputs/cost/expenditures, efficiency rations such as profitability and labor productivity), are multifaceted for all market participants. Business performance (financial and non-financial) needs to be managed through defining (planning) performance goals, measurement and reporting on achieved performance, rewarding based on achieved performance, as well as through continuous improvement of achieved performance in comparison with different entities on the market (Krstić, 2022).

Financial and non-financial factors affect the value of a company. When it comes to the financial aspect of a business, we primarily think about the achieved financial

performance and the way in which the company makes an accounting profit (earnings) over a certain period of time. The non-financial aspect of business relates, among other things, to the environmental (ecologic) dimension in business functioning of the company. However, due to the increasing demand for environmentally responsible business and analyses that show the condition of financial success by non-financial factors, there is a trend of increased focus on non-financial dimension of business activity and environmental performance of an enterprise (Rinsman & Prasetyo, 2020).

Environmental (ecological) performance are usually non-financial in nature. Measuring environmental performance is an important task of a company's management. In order to successfully reduce the negative effects of the company's activities on the environment, in addition to measuring and managing financial performance, it is necessary to include environmental performance in this process. It is necessary for direct managerial activities which are related to environmental protection in the sense of formulation adequate strategy, operative plans, environmental performance measurement and reporting on environmental performance (Krstić et al., 2021).

Companies have a primary responsibility in society when it comes to environmental pollution, given the fact that they produce most of the pollution. This is especially the case when it comes to large enterprises, where 100 large companies cause 71% of greenhouse gas emissions (Kalash, 2020). Society and governments of states are putting pressure on businesses to manage their environmental business. More and more companies are publishing environmental reports (Domanović et al, 2020). In addition to helping businesses manage and improve their business, they provide information to potential investors and report to society, thus gaining a good reputation (Indriastuti & Chariri, 2021). In addition to environmental reporting, financial statements are equally significant, which allow companies to plan and make decisions. It is very important that the financial statements are not distorted, in order, for example, to artificially increase the stock price of companies, but to be realistic. Only on the basis of such reporting can one operate effectively in the long term (Şeker & Şengür, 2021).

There is growing pressure on companies to shift their focus towards environmental performance for a number of reasons. The requirements for standardization (ISO 9000 and ISO 14000) provide an opportunity for a better position on the market and achieve competitiveness in relation to participants who do not have these standards. Also, the regulations of certain countries, especially countries belonging to the European Union, require reporting on the achieved environmental performance, which encourages companies to manage them in the best possible way. Satisfying the interests of stakeholders is another reason for managing environmental performance (Purnomo & Widianingsih, 2012).

Environmental issues are becoming more and more topical. In addition to the demands for improvement of social responsibility of company, the consumer's demand for the delivery of environmentally friendly products is also set. Also, a large number

of countries apply regulation measures when it comes to managing the environmental aspect of business as well as the obligation to report on achieved environmental performance. Companies face a dilemma about the impact of environmental performance on financial performance (Miladiasari et al., 2020), as well as the impact of financial on environmental performance over a period of time.

The importance of environmental performance management is also recognised when it comes to investment activity. In addition to considering financial performance as primary performance, investors often look at environmental practices and results, given their impact on financial performance. In this way, they come up with data that are significant when it comes to the possibility of development and progress, but also possible gaps in the company's business, on the basis of which they make a final decision on the outcome of starting the investment process (DyahPita Sari & Sutopo, 2022). Environmental management, as an intangible good, can bring multiple positive effects compared to companies that do not apply it (Singha et al., 2019).

Some companies still consider investing in an environmental management system only a cost, looking at the short-term aspect. In the long term, investing in an environmental management system should lead to profit in several aspects of the business, not only in financial terms. However, despite this understanding, there is an increasing trend of growing awareness of the importance of investing in the environmental management system and the application of it in its business (Evelyn et al., 2022).

In societies where there are strict environmental regulations, they show better environmental performance. They force them to implement stricter and more detailed procedures for managing the environmental aspects of the business, leading to better financial performance. Also, it is a chance to create innovations in this field (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013).

The environmental and financial performance interdependence is two-way and the analyses that will be observed in the paper aim to show whether financial indicators have a positive or negative impact on environmental indicators, as well as to show interdependence between the analyzed groups of indicators.

2. Theoretical background: the impact of financial on the environmental performance of the enterprise

The majority of studies tends to focus on analyzing how environmental performance affects financial performance and how environmental and financial performance are interdependent. Only few studies examine how a company's financial performance affects its environmental performance.

Lizal & Earnhart (2006), analyzed Czech companies in the five-year period 1993-1998. Using panel analysis, it was found that there is a positive impact of financial performance on environmental performance, primarily on pollution emissions.

Emissions are viewed in research as absolute and relative emissions. The research was conducted in a specific situation, after the 1990s, when a high degree of privatization was recorded, the state retained a significant part of assets in enterprises, which are predominantly in the field of heavy industry, which emits a significant degree of pollution.

Jalil & Feridun (2011) look at the impact of financial development on environmental pollution in China, 1953-2006. The method used in the research is to test the limits of autoregressive distributed delay. Research has shown that financial growth, or good financial performance, leads to a reduction in environmental pollution.

Aguilera-Caracuel et al. (2012), using regression analysis, on a sample of 135 multinational companies in three different industries in the USA, Mexico, Canada, France and Spain, with the help of regression analysis, found the existence of a positive impact of financial performance on environmental performance. In particular, the higher the financial performance, the more willing companies are to deal with environmental issues. There is also an increase in the level of standardization in matters related to environmental protection.

Omnamasivaya & Prasad (2017) studied the 50 largest Indian companies in the period 2011-2015. The impact of financial indicators on the disclosure of environmental data using regression analysis was examined. The study showed a positive relationship between the average environmental accounting data disclosure index and the average ROCE (Return on capital employed), average EPS (Earnings per share ratio), average ROA, average ROE, average P/E (Price to Earnings ratio). On the other hand, the study also showed the existence of a negative relationship between the average disclosure index in environmental accounting and the average ROS (Return on sales).

Laguir et al. (2018) looked at 68 banks in the period 2008-2011, analyzing the impact of financial on environmental performance, using regression analysis. They note the existence of a positive impact of financial on environmental performance. It is the first paper that involves French banks in the analysis and deals with this kind of research. The research was conducted taking into account that today's banks are looking to support environmental values and goals. Financially stronger and more stable banks will participate in the implementation of environmental activities in a greater percentage.

Aigbedo (2019) explores the impact of financial performance (ROA, ROE, ROS) on non-environmental performance. The survey consists of 50 companies in 2012. The method of analysis used in the study was regression analysis. The results show that there is no statistical significance.

Ardi & Yulianto (2020) examine the impact of profitability and leverage ratio as financial variables on the disclosure of environmental data. The survey was conducted in the period 2014-2018, on a sample of 9 companies, after a selection of the initial 45 companies. The focus of the research was the companies from the production and mining sectors operating in Indonesia. Regression analysis was used for research purposes. The

results of the research showed that profitability does not affect the disclosure of environmental data, while the impact of leverage is negative. In addition to financial variables, the positive impact of the size of the company on the disclosure of environmental data has been shown.

Aigbedo (2021) in his later study re-examines the impact of ROA on the environmental performance of 468 companies analyzed, from the 10 industrial sectors of the 32 countries that make up the sample. Using correlation and regression analysis, it confirms the results from his previous study in 2019, when it was noted that there is no statistically significant relationship, i.e. that the effect of ROA on environmental performance is not statistically significant. Without regard to the same results, the 2021 study included a significantly larger sample of businesses from multiple countries.

Wihandoko et al. (2022) conducted a survey of non-financial enterprises in Indonesia. The researchers formed a final sample of 13 companies, for which they collected data for the period 2017-2020. Regression analysis was used for the purpose of the research. The impact of profitability and leverage on environmental performance was examined. Regression analysis determined the negative and insignificant impact of profitability and leverage as independent variables, on environmental performance, as a dependent variable.

Fatmawati & Trisnawati (2022) through multiple linear regression explored the impact of profitability and leverage as financial performance on environmental performance reporting. The survey included 39 companies for which data were collected between 2018 and 2020. The results of the research showed that there is no statistically significant impact of these financial performance on environmental performance reporting.

Farhan et al. (2023) used secondary data from 75 companies from India in the period 2015-2021. The companies covered by the survey are from the manufacturing sector. ROA and leverage levels were used as financial indicators. The impact of financial indicators on the overall cost of sustainable business was explored. Correlation analysis concluded the existence of a weak positive relationship, while regression analysis confirmed the findings that were obtained through correlation analysis. A positive impact of the financial performance on environmental consumption has also been found.

2. Material and methods

The oil industry, due to its specific business and exploitation of natural resources, has a particular impact on environmental pollution. Such companies have a special responsibility regarding taking actions to reduce the negative impact of their business performance on the environment. For this reason, the research observed the company NIS A.D. NOVI SAD, in order to look at the actions, it is taking and analyze the results of their application. When analyzing secondary data, indicators have been created for research purposes. The indicators were created by combining data from

the Annual reports and the Sustainable development reports of the company for a ten-year period. As environmental performance reporting was given according to GRI (Global Reporting Initiatives) framework (www.globalreporting.org/ standards/), due to limitations in terms of research size, not all environmental indicators were taken, i.e. data related to energy consumption, materials and biodiversity were not included in the analysis.

Conditional production value (CP) of the company NIS A.D. NOVI SAD for the period from 2013 to 2022 is presented in Table 1. There is its constant decrease of it in the observed period.

Table 1 Conditional production of NIS A.D. NOVI SAD from 2013 to 2022 in thousand conditional tons

Ind.	Years										Average value
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
CP	1642	1596	1518	1411	1345	1302	1248	1214	1153	1119	1354.8

Source: Authors' presentation according to annual reports of NIS A.D. Novi Sad

Company NIS A.D. NOVI SAD provides a considerable amount of funding to support the realization of ecological projects. The largest investments in environmental projects in the observed period from 2013 to 2022 were realized in 2013 (2.1 billion dinars), and the lowest in 2016 (150 million dinars) (Table 2). The amount of investment in environmental projects in 2022 was 314.6 million dinars (Table 2). Some of the most significant environmental programs and actions, as well as the value of investments in environmental projects, are shown in Table 2.

Table 2 Part of the most significant Ecological actions/programs/investments of NIS A.D. NOVI SAD from 2013 to 2022

Year	Ecological actions/programs/investments
2013	- reduction of dependence on "Srbijagas" through reduction of natural gas deliveries; -wastewater treatment has been improved in the Novi Sad Oil Refinery through the reconstruction of the waste water treatment plant; - Pančevo Oil Refinery capital investments in ecological programs: mobile plant for the treatment of oil sludge, oil residue and oily soil, reduction of NO_2 emissions in flue gases from "Energana", project for the construction of a closed drainage system, reconstruction of the car filling station, reconstruction and modernization of the Pier, blending of diesel fuel with biodiesel; - total investments of 2.1 billion dinars in environmental projects (62% more than planned).
2014	- the construction of four small power plants with a total electric power of 3,650 kWe has been completed;

	- Pancevo Oil Refinery capital investments in ecological programs: project for the construction of a closed drainage system, construction of a closed sampling system in production, reconstruction of the car filling station, mixing of diesel fuel with biodiesel; - realized projects in the field of energetics: modernization of lighting, installation of modern energy-saving equipment, construction of small cogeneration plants - 11 plants with a total power of 12.5 MW, reconstruction of the electric power network in the Pančevo Oil Refinery, operational and technical measures to reduce steam and heat losses energy etc.; - total investments of 983 million dinars in environmental projects.
2015	- the projects for the construction of small power plants - Velebit 3 and Sirakovo 2 and the compressed natural gas supply station at the gas station "Novi Sad 10" have been completed; - a project to increase the energy efficiency of all organizational parts of NIS is being implemented; -Pancevo Oil Refinery capital investments in ecological programs: installation of a biocomponent with diesel fuel, construction of a closed drainage system, reduction of NO_2 emissions in flue gases from "Energana"; - total investments of 627 million dinars in environmental projects (The 36% drop in capital investment compared to 2014, is a consequence of the change in business conditions on the world oil market).
2016	- the construction of the Amin plant has been completed and all necessary permits from state authorities for the operation of the newly built plant have been obtained. The technology used in the Amin plant is one of the most environmentally safe and efficient among existing technologies, which now not used in the region. This is a project of importance for the reduction of CO2 emissions; -realised ecological programs: investments in projects aimed at reducing NO_2 and SO_2 emissions, installation of separators for the purification of oily stormwater, completion of the reconstruction and modernization of the Pancevo Oil Refinery wharf, installation of a wastewater treatment plant at the Novo Miloševo waste sludge landfill, as well as investment in green technology through the construction of cogeneration plants; - realized projects in the field of energetics: reconstruction project of electric power facilities, replacement of ESP pumps with submersible pumps, installation of Packinox heat exchangers at the catalytic reforming plant etc.; -total investments of 150 million dinars in environmental projects.
2017	-14 new separators for the treatment of oily waste water were installed at fueling stations, and five existing separators were replaced during construction of new fuel supply stations with previous demolition of the existing one; - Pancevo Oil Refinery became the first energy plant in Serbia with an IPPC permit on integrated prevention and control of environmental pollution, which confirms that the production process at the Refinery is fully compliant with the highest domestic and European standards in the field of environmental protection; - realized projects in the field of energetics: replacement of "ESP" pumps with submersible pumps, installation of frequency regulation on electric motors of air coolers, replacement of the existing economizer etc.; -total investments of 479 million dinars in environmental projects.

2018	-NIS was carrying out a project to build a thermal power plant-heating plant (TE-TO) at the site of the Pancevo Oil Refinery in collaboration with Gazprom Energoholding; -the "Electoral gas washing" project was implemented, which led to a significant reduction of SO_2 emissions, to a level below emission limit values; - injection of CO_2 extracted from gas at the Amin plant in the oil and gas preparation plant in Elemir into the Rusanda deposit continued; - realized projects in the field of energetics: installation of a reactive energy compensation system, modernization of lighting, Balancing of deep pumps in oil fields, Installation of energy-efficient transformers with reduced losses etc.; -total investments of 320 million dinars in environmental projects.
2019	- installation of new and replacement of existing separators continued, in order to check the quality of wastewater, as well as the efficiency of the purification process, regular monitoring of all emitters is carried out, as well as groundwater monitoring, which controls the impact of NIS work activities on groundwater and soil; - at the end of 2019, the preparation of a study to define the measures and activities required for quantitative determination and calculation, as well as the preparation of the annual report on greenhouse gas emissions in the Company, was started; - realized projects in the field of energetics: stopping wells with low production, replacing asynchronous motors with valve ones, regular adjustment of the operation of technological furnaces in accordance with the changes in the operating mode of the plant etc.; - total investments of 534 million dinars in environmental projects.
2020	- the waste and groundwater monitoring plan was fully implemented in order to check the quality of waste water, as well as the efficiency of the purification process and the quality of underground water and soil; - the "Deep Processing" project also brought significant benefits in terms of environmental protection, above all when it comes to stopping the production of fuel oil with a high sulphur content. Thus, emissions of sulphur compounds were reduced by as much as 98.8%, while emissions of powdery substances and nitrogen compounds were reduced by 58.2% and 9.8%, respectively; - realized projects in the field of energetics: modernization of pumping units, optimization of the number of diesel-electric units in operation, installation of more energy-efficient transformers etc.; - total investments of more than 200 million dinars in environmental projects.
2021	- the Strategy for Environmental Protection until 2030 was drawn up; - construction of the Projection Study of Greenhouse Gas Emissions until 2030 has begun; - realized projects in the field of energetics: change in the way of exploitation in oil and gas production, implementation of repair and isolation works in oil and gas production fields, reducing gas consumption on compressors, reducing own gas consumption on boiler rooms etc.; - total investments of 355.6 million dinars in environmental projects.
2022	- the implementation of a pilot project started - installation of solar panels for the production of electricity at fuel supply stations. In the first phase of the project,

	solar panels were installed at eight NIS Petrol and Gazprom retail outlets throughout Serbia. - the process of updating the Environmental Impact Assessment Study for the Plandište 1 wind farm was started; - realized projects in the field of energetics: the operation of a backup compressor for instrument and drive air in order to prevent the operation of the electric motor in a relieved mode in sleep mode, Reduction of electricity consumption on GB5001, Installation of a line of minimum flow rate of the reflux pump at DA502, Reconstruction of the steam production system on the S2200 - total investments of 314.6 million dinars in environmental projects.

Source: Authors' presentation according to Sustainability reports of NIS A.D. Novi Sad

Review of values of environmental indicators of the company NIS A.D. Novi Sad for the period from 2013 to 2022 is given in Table 3. The values of the following ecological indicators are shown: Ecological indicator of SO2 emissions (EISE), Ecological indicator of CO2 emissions (EICE), Energy natural productivity (ENP), Waste disposal rate (WDR), Productive use of water resources (PUWR), Waste water indicator (WWI).

Table 3 Environmental (ecological) indicators of NIS A.D. NOVI SAD from 2013 to 2022

Years	Indicators					
	EISE	EICE	ENP	WDR	PUWR	WWI
2013	1.07	0.46	0.51	82.98	0.00042	1721.27
2014	0.92	0.38	0.43	75.17	0.00043	1244.12
2015	2.28	0.70	0.47	111.8	0.00035	1462.4
2016	2.59	0.64	0.44	99.75	0.00036	1573.52
2017	3.51	0.71	0.41	101.77	0.00034	1566.65
2018	2.65	0.76	0.39	98.89	0.00033	1850.78
2019	0.99	0.87	0.38	99.39	0.00034	1761.87
2020	0.53	0.73	0.35	99.95	0.00035	1733.31
2021	0.23	0.76	0.33	100.01	0.00027	2022.74
2022	0.16	0.89	0.28	101.64	0.00023	2226.18
Average value	1.49	0.67	0.4	97.14	0.00034	1716.29

Source: Authors' calculation according to Sustainability reports of NIS A.D. Novi Sad

After the decrease in the value of EISE in 2014 compared to 2013, there is a growing trend until 2017. Then, in the rest of the observed period, there is a trend of decreasing value of EISE. When it comes to the EICE indicator, there is an

alternating decrease and increase in its value in the period from 2013 to 2016. In addition, its value increases in the next three years 2017-2019. In 2020, its value is lower compared to 2019, then it grew in 2021 and 2022. After the alternating decrease and increase in the value of ENP in the period from 2013 to 2016, there is a downward trend in its value until the end of the observed period. The value of WDR alternately falls and rises in the period from 2013 to 2019. After that, it continues to rise until the end of the observed period. The PUWR value alternately increases and decreases throughout the observed period. A slightly greater decrease of this indicator is observed in the last two years when its value is the lowest. The value of EIWW alternately decreases and increases during the observed period. The highest values of this indicator were recorded in the last two years.

The values of the financial indicators - Return on assets (ROA), Return on equity (ROE), Net profit margin (NIM) and EBITDA margin (EBITDAM) are shown in Table 4 for the period from 2013 to 2022. It can be noticed that the values of ROA and ROE are twice as small in 2014 compared to 2013, as well as in 2015 compared to 2014, after which they are maintained at the same level in 2016. After that follows a slight increase in their value in 2017, followed by a decline until 2020. In 2020, the company did not make net profit. The growth of their value in 2021 continued and quadrupled in 2022. When it comes to the value of NIM, a significant decline can be observed in 2014 and 2015, followed by growth until 2017. After that, the value of NIM falls until 2020, after which a significant increase in the value of NIM follows. Also, there is a trend of decreasing EBITDAM value in the period from 2013 to 2020, followed by an increase of its value.

Table 4 Financial indicators of NIS A.D. NOVI SAD from 2013 to 2022

Years	Indicators			
	ROA	ROE	NIM	EBITDAM
2013	0.15	0.32	0.19	0.00000027
2014	0.08	0.16	0.11	0.00000025
2015	0.04	0.08	0.07	0.00000022
2016	0.04	0.08	0.08	0.00000021
2017	0.07	0.13	0.11	0.0000002
2018	0.06	0.11	0.09	0.00000019
2019	0.04	0.07	0.06	0.00000016
2020	n/a	n/a	n/a	0.00000008
2021	0.05	0.08	0.07	0.00000017
2022	0.2	0.3	0.17	0.00000025
Average value	0.08	0.13	0.11	0.0000002

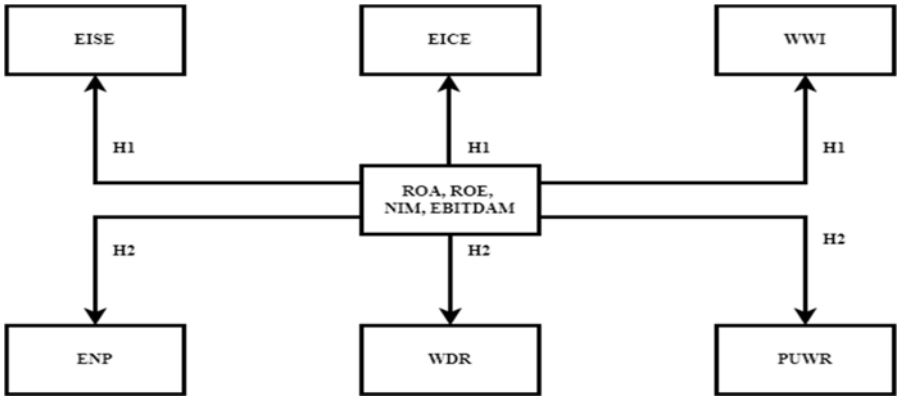
Source: Authors' calculation using data from annual reports of NIS A.D. Novi Sad

Research aim and conceptual framework

This research has a major goal to examine the impact of financial indicators (Return on assets - ROA, Return on equity - ROE, Net profit margin - NIM, EBITDAM margin - EBITDAM) on environmental or ecological indicators (SO2 emission - EISE, CO2 emission - EICE, Energy natural productivity – ENP), Waste disposal rate - WDR, Productive use of water resources - PUWR, Waste water indicator - WWI).

Figure 1 shows the conceptual framework of the research which is defined in order to realize the stated goal of the research.

Figure 1. Conceptual research framework



Source: Authors

Hypothesis

To accomplish the research's stated goal, the following hypothesis will be examined:

H1: *There is a negative impact of financial indicators in previous year (ROA, ROE, NIM and EBITDAM) on the selected environmental (ecological) indicators (EISE, EICE, WWI) in current year.*

H2: *There is a positive impact of financial indicators in previous year (ROA, ROE, NIM and EBITDAM) on the selected environmental (ecological) indicators (ENP, WDR, PUWR) in current year.*

Sample

Secondary data from the NIS A.D. NOVI SAD business were used to test the defined hypotheses. The data were collected from the reports (balance sheets, income statements, annual business report and data covering key business indicators) and the Sustainable Development Report (based on GRI reporting, section GRI 301-306) of the company for the period 2013-2022. Based on secondary data, a set of financial and environmental indicators has been created. For the purpose of calculating

financial indicators (Table 5), data on net profit, operating revenue, EBITDA, average value of business assets and average capital value were used. In creating environmental indicators (Table 6), data related to SO2 and CO2 emissions were used, then the volume of domestic oil and gas production, electricity consumption, the amount of total waste disposed of and generated, the consumption of affected water and the amount of waste water discharged. The analysis also includes data related to the crisis period caused by the Covid-19 pandemic, due to the specific effects of the crisis on the activities of the analyzed company.

Variable

The following independent variables are included in the empirical part of the study (Table 5):

1. *ROA* is a financial indicator that shows the rate of return on total assets.
2. *ROE* is a financial indicator that shows the rate of return on equity.
3. *Net profit margin* as a measure of profitability.
4. *EBITDA margin*, i.e. earnings before interest, tax, depreciation and depreciation margin as a measure of profitability.

The following table presents previously mentioned financial indicators and formulas for their calculation.

Table 5. Financial indicators

Indicator	Formula
ROA	Net profit : Average value of total business assets
ROE	Net profit : Average value of equity
Net profit margin	Net profit : Operating revenue
EBITDA margin	EBITDA : Operating revenue

Source: Authors

In addition to independent variables, the following dependent variables representing the ecological performance of the company were also used for the purpose of the research (Table 6):

1. *The ecological indicator of SO2 emissions*, which is calculated as the ratio of SO2 emissions in tons and the volume of production of oil and gas, in thousands of conditioned tons.
2. *Ecological indicator of CO2 emissions* in tons, which is calculated as a ratio of CO2 emissions and the volume of domestic oil and gas production in thousands of conditional tons.
3. *Energy natural productivity*, which is quantified by dividing the volume of domestic oil and gas production into thousands of conditional tons with the consumption of electricity in Mwh.

4. *The waste disposal rate* shows how much waste is disposed of as a percentage and it is calculated by dividing the amount of total waste disposed of with the amount of total generated waste in tonnes and then multiplying it by 100%, to get the rate.
5. *Productive use of water resources* – affected water is calculated as the ratio of the volume of production of domestic oil and gas in thousands of conditioned tons and consumption of affected water in m^3. Affected water is a collective category that includes water from river water intake, city water supply and ground water.
6. *Waste water indicator* was obtained as a quotient of the amount of wastewater discharged in m^3 and the volume of domestic oil and gas production in thousands of conditioned tons.

Table 6 contains an overview of environmental indicators with formulas of their calculation.

Table 6. Ecological indicators

Indicator	Formula
SO2 emissions	SO2 emission : Volume of domestic oil and gas production
CO2 emissions	CO2 emission : Volume of domestic oil and gas production
Energy natural productivity	Volume of domestic oil and gas production : Electricity consumption
Waste disposal rate	(Amount of total disposed waste : Amount of total generated waste) * 100
Productive use of water resources	Volume of domestic oil and gas production : Consumption of impounded water
Waste water	Discharged amount of wastewater : Volume of domestic oil and gas production

Source: Authors

Research methods

In order to analyze data in empirical research, two methods were used. Firstly, correlation analysis was used to examine the interdependence between environmental and financial performance. Correlation analysis shows whether there is an interdependence between the analyzed variables. Correlation coefficient values can range from -1 to +1. The sign indicates whether it is a positive or negative correlation (Pallant, 2011). The strength of the relationship can be weak when the value of the correlation coefficient is from 0.10 to 0.29, medium when it is from 0.30 to 0.49 and strong when its value is from 0.5 to 1 (Cohen, 1988). Secondly, the regression analysis was used to examine the effect of financial on environmental performance. Through the regression model that is most closely approached to quantitative agreement of variations of observed phenomena, the influence of independent variables on dependant variables is examined (Regression and correlation analysis, n.d.).

Environmental (ecological) indicators (EISE, EICE, ENP, WDR, PUWR, WWI) and financial indicators (ROA, ROE, NIM, EBITDA) were used to investigate the impact of environmental performance on financial performance of NIS A.D. NOVI SAD with the time lag of 1 year.

3. Research results and discussions

In order to apply correlation and regression analysis in the statistical program STATA, the values of all variables were logarithmized (lROA, lROE, lNIM, lEBITDA, lEISE, lEICE, lENP, lWDR, lPUWR, lWWI). Then commands were given for the creation of financial variables in previous year (l1ROA, l1ROE, l1NIM, l1EBITDA). Using correlation analysis, the interdependence of financial indicators in previous year (l1ROA, l1ROE, l1NIM, l1EBITDA) and environmental indicators in current year (lEISE, lEICE, lENP, lWDR, lPUWR, lWWI) was examined. The influence of financial indicators in previous year (l1ROA, l1ROE, l1NIM, l1EBITDA) on the environmental indicators (lEISE, lEICE, lENP, lWDR, lPUWR, lWWI) in current year was investigated by applying regression analysis.

Based on the Shapiro-Wilk test, the requirements of normality of the data distribution were examined in order to establish the proper correlation coefficient that needs to be applied (Table 7). The results of the applied tests indicate that the data are normally distributed ($p > 0.05$), except in the case of l1EBITDAM, lEICE and lWDR ($p < 0.05$). This means that Pearson's correlation coefficient should be applied where data is normally distributed and Spearman's correlation coefficient should be applied where it is not.

Table 7. Results of normality tests

Variable	*Shapiro-Wilk*	
	W	*p-value*
l1ROA	0.87183	0.15706
l1ROE	0.87183	0.15706
l1NIM	0.91457	0.38737
l1EBITDAM	0.82366	0.03790
lEISE	0.91309	0.30293
lEICE	0.84082	0.04513
lENP	0.98620	0.98971
lWDR	0.77474	0.00714
lPUWR	0.90384	0.24127
lWWI	0.98296	0.97901

Source: Authors

Tables 8 and 9 display the correlation analysis's findings. Using Pearson's correlation coefficient (Table 8), it was determined that there is a statistically significant negative strong relationship between l1ROE and l WWI. The same was established between l1NIM and l WWI. Other variables do not have a statistically significant relationship.

Table 8. Results of correlation analysis

Pearson	*lEISE*	*lENP*	*lPUWR*	*l WWI*
l1ROA	-0.0312 (0.9416)	0.2997 (0.4707)	0.4538 (0.2588)	-0.5289 (0.1777)
	lEISE	*lENP*	*lPUWR*	*l WWI*
l1ROE	0.1041 (0.8061)	0.4426 (0.2721)	0.5500 (0.1579)	-0.6488 (0.0818)
	lEISE	*lENP*	*lPUWR*	*l WWI*
l1NIM	0.2474 (0.5548)	0.4868 (0.2212)	0.5858 (0.1270)	-0.6427 (0.0856)

Source: Authors

Based on the use of Spearman's correlation coefficient (Table 9), a statistically significant negative strong relationship was found between l1EBITDAM, on the one hand, and lEICE and lEIWW, on the other hand. When it comes to the interdependence between l1EBITDAM, on the one hand, and lENP and lPUWR, on the other hand, a statistically significant strong positive relationship is present. No other statistically significant relationship between variables was established.

Table 9. Results of correlation analysis

Spearman	*lEICE*	*lWDR*				
l1ROA	-0.1190 (0.7789)	-0.3333 (0.4198)				
	lEICE	*lWDR*				
l1ROE	-0.2619 (0.5309)	-0.3810 (0.3518)				
	lEICE	*lWDR*				
l1NIM	-0.03810 (0.3518)	-0.4762 (0.2329)				
	lEISE	*lEICE*	*lENP*	*lWDR*	*lPUWR*	*l WWI*
l1EBITDAM	0.4048 (0.3199)	-0.8333 (0.0102)	0.9048 (0.0020)	-0.1190 (0.7789)	0.6667 (0.0710)	-0.8095 (0.0149)

Source: Authors

Regression analysis was used following correlation analysis. The regression analysis's findings are displayed in Tables 10, 11, 12, and 13. First, the analysis of

the influence l1ROA on the ecological indicators (lEISE, lEICE, lENP, lWDR, lPUWR, l WWI) is shown in Table 10.

It can be noted that l1ROA had a negative and statistically significant impact on lEICE. An increase in the l1ROA by 1% contributes to a decrease in the lEICE by 0.3910775%. The results of the model confirm that the model is statistically significant at the 10% significance level. This model explained 0.1% of changes in the value of lEICE.

There was also a negative and statistically significant impact of l1ROA on lWDR at the 10% significance level. An increase in the l1ROA by 1% contributes to a decrease in the lWDR by 0.1678431%. This model explained 44.35% of changes in the value of lWDR.

The model showed no statistically significant impact of l1ROA on lEISE, lENP, lPUWR and l WWI.

Table 10. Results of regression analysis

Independent variable	Dependent variable					
	lEISE	lEICE	lENP	lWDR	lPUWR	l WWI
constant	-0.0181305 [-0.01] (0.995)	-1.46407 [-2.86] (0.029)	-0.6502853 [-1.71] (0.138)	4.1155 [18.94] (0.000)	-7.502859 [-18.84] (0.000)	6.848255 [13.34] (0.000)
l1ROA	-0.0716134 [-0.08] (0.942)	-0.3910775 [-2.16] (0.074)	0.1032226 [0.77] (0.471)	-0.1678431 [-2.19] (0.071)	0.175507 [1.25] (0.259)	-0.2014335 [-1.53] (0.178)
R^2	0.0010	0.4376	0.0898	0.4435	0.2059	0.2798
$\overline{R^2}$	-0.1655	0.3439	-0.0618	-0.3507	0.0736	0.1597
F	0.01 (0.9416)	4.67 (0.0740)	0.59 (0.4707)	4.78 (0.0714)	1.56 (0.2588)	2.33 (0.1777)
Note: *t* statistic in [ ] *p-value* in ( )						

Source: Authors

Table 11 shows the analysis of the influence l1ROE on the ecological indicators (lEISE, lEICE, lENP, lWDR, lPUWR, l WWI). It can be noted that l1ROE had a negative and statistically significant impact on lEICE. An increase in the l1ROE by 1% contributes to a decrease in the lEICE by 0.3847361%. The results of the model confirm that the model is statistically significant at the 5% significance level. This model explained 55.02% of changes in the value of lEICE.

Then, a negative and statistically significant impact of l1ROE on lWDR was established at the 10% significance level. An increase in the l1ROE by 1%

contributes to a decrease in the lWDR by 0.1468853%. This model explained 44.12% of changes in the value of lWDR.

Also, the impact of l1ROE on l WWI was negative and statistically significant at the 10% significance level. An increase in the l1ROE by 1% contributes to a decrease in the l WWI by 0.2167775%. This model explained 44.09% of changes in the value of l WWI.

l1ROE's effect on lEISE, lENP, and lPUWR is not statistically significant according to the model used in the analysis.

Table 11. Results of regression analysis

Independent variable	Dependent variable					
	lEISE	lEICE	lENP	lWDR	lPUWR	l WWI
constant	0.6443844 [0.35] (0.739)	-1.216225 [-3.80] (0.009)	-0.6449161 [-2.59] (0.041)	4.261991 [28.04] (0.000)	-7.58338 [-29.10] (0.000)	6.93497 [29.66] (0.000)
l1ROE	0.2100565 [0.26] (0.806)	-0.3847361 [-2.71] (0.035)	0.1337239 [1.21] (0.272)	-0.1468853 [-2.18] (0.072)	0.1866184 [1.61] (0.158)	-0.2167775 [-2.09] (0.082)
R^2	0.0108	0.5502	0.1959	0.4412	0.3024	0.4209
$\overline{R^2}$	-0.1540	0.4753	0.0619	0.3481	0.1862	0.3244
F	0.07 (0.8061)	7.34 (0.0351)	1.46 (0.2721)	4.74 (0.0724)	2.60 (0.1579)	4.36 (0.0818)
Note: *t* statistic in [ ] *p-value* in ( )						

Source: Authors

The analysis of the influence l1NIM on the ecological indicators (lEISE, lEICE, lENP, lWDR, lPUWR, l WWI) are presented in Table 12. It can be noted that l1NIM had a negative and statistically significant impact on lEICE. An increase in the l1NIM by 1% contributes to a decrease in the lEICE by 0.5250524%. The results of the model confirm that the model is statistically significant at the 5% significance level. This model explained 51.62% of changes in the value of lEICE.

Then, a negative and statistically significant impact of l1NIM on lWDR was established at the 10% significance level. An increase in the l1NIM by 1% contributes to a decrease in the lWDR by 0.207308%. This model explained 44.27% of changes in the value of lWDR.

Also, the impact of l1NIM on l WWI was negative and statistically significant at the 10% significance level. An increase in the l1NIM by 1% contributes to a

decrease in the l WWI by 0.3025868%. This model explained 41.31% of changes in the value of l WWI.

However, the impact of l1NIM on lEISE, lENP and lPUWR, is not statistically significant according to the model.

Table 12. Results of regression analysis

Independent variable	Dependent variable					
	lEISE	lEICE	lENP	lWDR	lPUWR	l WWI
constant	1.869113 [0.69] (0.518)	-1.629719 [-3.24] (0.018)	-0.4418694 [-1.20] (0.275)	4.087683 [17.76] (0.000)	-7.321798 [-19.09] (0.000)	6.685794 [18.73] (0.000)
l1NIM	0.7029687 [0.63] (0.555)	-0.5250524 [-2.53] (0.045)	0.2072176 [1.36] (0.221)	-0.207308 [-2.18] (0.072)	0.280106 [1.77] (0.127)	-0.3025868 [-2.06] (0.086)
R^2	0.0612	0.5162	0.2369	0.4427	0.3432	0.4131
$\overline{R^2}$	-0.0953	0.4356	0.1098	0.3498	0.2338	0.3153
F	0.39 (0.5548)	6.40 (0.0447)	1.86 (0.2212)	4.77 (0.0717)	3.14 (0.1270)	4.22 (0.0856)
Note: *t* statistic in [ ] *p-value* in ( )						

Source: Authors

The analysis of the influence l1EBITDAM on the ecological indicators (lEISE, lEICE, lENP, lWDR, lPUWR, l WWI) are presented in Table 13. It can be noted that l1EBITDAM had a positive and statistically significant impact on lEISE. An increase in the l1EBITDAM by 1% contributes to an increase in the lEISE by 2.154627%. The results of the model confirm that the model is statistically significant at the 5% significance level. This model explained 42.80% of changes in the value of lEISE.

It can be also noted that l1EBITDAM had a positive and statistically significant impact on lENP. An increase in the l1EBITDAM by 1% contributes to an increase in the lENP by 0.306078%. The results of the model confirm that the model is statistically significant at the 5% significance level. This model explained 44.39% of changes in the value of lENP.

Also, the impact of l1EBITDAM on lPUWR was positive and statistically significant at the 10% significance level. An increase in the l1EBITDA by 1% contributes to an increase in the lPUWR by 0.3300281%. This model explained 39.76% of changes in the value of lPUWR.

Then, the impact of l1EBITDAM on l WWI was negative and statistically significant at the 5% significance level. An increase in the l1EBITDA by 1% contributes to a decrease in the l WWI by 0.357941%. This model explained 48.65% of changes in the value of l WWI.

The applied model shows no statistically significant impact of l1EBITDAM on lEICE and lWDR.

Table 13. Results of regression analysis

Independent variable	Dependent variable					
	lEISE	lEICE	lENP	lWDR	lPUWR	l WWI
constant	33.39102 [2.29] (0.056)	-5.586006 [-1.44] (0.193)	3.785954 [1.89] (0.101)	-3.397083 [1.90] (0.099)	-2.902233 [-1.22] (0.262)	1.88657 [0.88] (0.410)
l1EBITDAM	2.154627 [2.29] (0.056)	-0.3372585 [-1.35] (0.219)	0.306078 [2.36] (0.050)	-0.0768004 [-0.67] (0.099)	0.3300281 [2.15] (0.069)	-0.357941 [-2.58] (0.037)
R^2	0.4280	0.2064	0.4439	0.0596	0.3976	0.4865
$\overline{R^2}$	0.3463	0.0931	0.3645	-0.0747	0.3116	0.4132
F	5.24 (0.0559)	1.82 (0.2192)	5.59 (0.0501)	0.44 (0.5266)	4.62 (0.0686)	6.63 (0.0367)
Note: *t* statistic in [ ] *p-value* in ( )						

Source: Authors

It is evident from the results that have been provided that both hypothesis (H1 and H2) have been partially confirmed.

4. Conclusion

This research examined the impact of financial performance on environmental performance of the company NIS A.D. NOVI SAD for the period 2013-2022 by using the regression analysis. The results of the research indicated that both hypothesis (H1, H2) have been partially confirmed. Regarding hypothesis (H1) that assumes that there is a negative impact of financial indicators (ROA, ROE, NIM and EBITDAM) on the selected environmental indicators (EISE, EICE, WWI) in the next year, the negative impact of: ROA on EICE; ROE on EICE and WWI; NIM on EICE and WWI; EBITDAM on WWI has been confirmed. However, the results showed that the impact of EBITDAM on EISE is positive. Other results regarding hypothesis 1 (H1) are not statistically significant. When it comes to hypothesis 2 (H2) that assumes that there is a positive impact of financial indicators (ROA, ROE, NIM and EBITDAM) on the selected environmental indicators (ENP, WDR, PUWR) in the next year, the only

statistically significant result that supports the hypothesis 2 is the positive impact of EBITDAM on ENP and PUWR. When it comes to the influence of ROA, ROE and NIM on WDR, the results indicate that it is negative. No other result regarding hypothesis 2 is statistically significant.

The results of this research cannot be compared with previous research (Lizal & Earnhart, 2006; Jalil & Feridun, 2011; Aguilera-Caracuel et al., 2012; Omnamasivaya & Prasad, 2017; Laguir et al., 2018; Aigbedo, 2019; Ardi & Yulianto, 2021; Wihandoko et al., 2022; Farhan et al., 2023) because this research focuses on a set of 6 indicators that were not included in previous research in terms of examining the impact of financial performance on environmental indicators.

Looking at financial and environmental performance, the largest number of papers investigated the impact of environmental performance on financial performance as well as the interdependence that exists between them. The least number of studies analyzed the impact of financial performance on environmental performance. The results of the research that examined the impact of financial performance on environmental performance are different. The largest number of studies that examined the impact of financial performance on environmental performance recorded a positive impact. Also, there are studies in which there is no statistically significant relationship and certain studies (in a small percentage), note the negative impact of financial on environmental performance. The most widely used methods of analysis in the research were correlation and regression analysis.

Compared to previous research, it can be concluded that partial confirmation of hypotheses leads to the conclusion of the existence of both positive and negative connections and influences, putting in the relationship different indicators. In certain cases, there is no statistically significant impact, as it is also the case with the studies of other writers.

The limitation of this research is the relatively small number of environmental indicators (6 in total) that were taken into analysis, considering the large number of other environmental indicators in theory and practice.

This research is based on analysis of one company, and therefore the recommendation for future research is to include a larger number of companies. Also, there is a possibility of comparing the analyzed companies, as representatives of business in the Republic of Serbia and other companies from the same industry in Europe or other parts of the world. Also, the extension of the indicators that can be used in the analysis is possible, which would give the analysis a higher degree of multidimensionality.

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DA LI FINANSIJSKE PERFORMANSE UTIČU NA EKOLOŠKE PERFORMANSE: STUDIJA SLUČAJA NIS A.D. NOVI SAD

Abstrakt: Performanse preduzeća obuhvataju set različitih pokazatelja preko kojih se kvantitativno ili kvalitatativno prikazuju performanse koje jedno preduzeće ostvaruje. Pored performansi kroz koje se sagledava ekonomska dimenzija poslovanja, potrebno je upravljati i ekološkim performansama. Efikasno upravljanje ekološkim performansama značajno je zbog povezanosti sa ekonomskim performansama preduzeća. Cilj ovog istraživanja je da se na primeru preduzeća NIS A.D. NOVI SAD za period 2013-2022. godine ispita uticaj ekonomskih na ekološke performanse. NIS Grupa je jedna od najvećih vertikalno integrisanih kompanija u Južnoj Evropi u području proizvodnje nafte i gasa, petrohemije i energetike. Za potrebe istraživanja korišćena je korelaciona i regresiona analiza. U radu su selektovani određeni finansijski indikatori i formirani određeni ekološki, sa ciljem ispitivanja uticaja finansijskih indikatora (rentabilnosti ukupnih sredstava, rentabilnosti sopstvenih sredstava, marža neto dobiti i marža dobiti pre odbitka kamata, poreza, depresijacije i amortizacije) na ekološke indikatore (emisija SO2, emisija CO2, energetska naturalna produktivnost, stopa zbrinjavanja otpada, produktivno korišćenje vodnih resursa zahvaćene vode i otpadna voda). Rezultati regresione analize ukazuju da marža dobiti pre odbitka kamata, poreza, depresijacije i amortizacije pozitivno utiče na ekološki indikator emisije SO2, energetsku naturalnu produktivnost i indikator produktivnog korišćenja vodnih resursa, kao i da postoji negativan uticaj na ekološki indikator - otpadna voda. Takođe, prisutan je negativan uticaj rentabilnosti sopstvenih sredstava, rentabilnosti ukupnih sredstava i marže neto dobiti na ekološki indikator emisije CO2 i stopu zbrinjavanja otpada, kao i negativan uticaj stope renatiblnosti sopstvenih sredstava i marže neto dobiti na ekološki indikator otpadnih voda.

Ključne reči: ekološke performanse, finansijske performanse, održivost, životna sredina

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