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Economic Performance Analytical Platform for Environmental Health in an Organization

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Abstract. The article shows the results of company environmental health assessment research. The role of the environmental management today has been described, and it was established that successful management depends greatly on measurement and evaluation tools. It has been demonstrated that existing statistics research only provide a limited number of indicators, including pollution measurement and current and capital expenditures on environment protection. What is more, all the information is given for all the companies at once (by types of economic activities) and by regions. The problem of measuring environmental health in an organization was outlined. The term "environmental health" of a company was defined. The analysis of scientific publications on assessing the environmental status of a company was conducted, it was established that all the explored research was based on the known statistics indicators. The developed environmental and economic performance indicator was presented that was based on the classic return-on-assets indicator. The economic performance analytical platform for company environmental health was developed with 17 indicators that demonstrated economic and environmental dimensions. It was proved that the analytical platform would allow to more objectively assess the company environmental health, identify the causes of deviations and use a more evidence-based approach to the environmental development of a company.

1. Introduction

Sustainable development as a concept and a new way of life implies the implementation of the basic principle that any activity should have a balanced impact on the environment, the balance must achieved between economic performance and company environmental health [1-2]. Today nature-intensive development type is still the main trend in environmental and economic development. Its main characteristic is the use of technologies and equipment that have been developed without taking into account environmental limits and concerns, its impact on the environment. The result of this development types is the exhaustion of natural resources and the level of pollution that is higher than can be mitigated [3-5].

Industrial companies make their own "significant" contribution into the environmental losses. Environmental protection statistics include a representative set of indicators [6-10], however, they show more the past actions and not their efficiency and cannot "stimulate" companies to conduct more environmentally efficiency activities. There is a need for a new performance indicator system, including indicators for the environmental activities of a company. So, there is no information and environmental performance indicators for environmental activities of a company.

2. Relevance, scientific value, goal description

The assessment of environmental and economic performance of a company is demand because: the whole world is implementing the sustainable development concept (with efficient environmental management as its foundation), the whole world is making a transition to new environmental management standards; in the production sector, green technologies and equipment becomes the criteria for efficiency and success [11-13]. However, production processes are still not oriented toward environmental limits (old standards), there are still unconcerned businessmen who believe that pollution taxes (damage to the environment) is more "profitable" than purchase and operation of environmentally friendly facilities (unfortunately, this is really true). So, companies that take green measures (requiring significant capital and current expenditures in comparison to environmentally unconscious) sustain losses in terms of effectiveness and cost-efficiency.

There are scientific innovations concerning the assessment of the environmental state of a company. Let us consider some of them. A comparison has been made, including that of environmental performance of companies in two countries (Russia and Kazakhstan), that used indicators, in particular economic ones (profit, per unit of time or per employee) [14]. In other words, the usual statistic indicators have been used. Other authors propose to use the system of known statistics indicators for the assessment of environmental and economic performance (evaluation and monitoring of emissions and assessment of environmental investments into the capital stock) [15-16].

In order to evaluate the implementation efficiency of the environmental safety of companies, they propose to establish whether a company creates added value as a result of the introduction of such systems; economic performance can also be measured by the market value of the company [17]. The research of company environmental condition based on green company ranking and statistic indicators has been conducted [18]. Other publications consider environmentally-oriented business without providing environmental assessments [19].

Finally, we can say that scientific research mainly uses known statistically observable and measurable indicators, which do not allow to demonstrate environmental health of an individual company with the information only by types of economic activities and regions.

3. Theory

3.1. Assessment of the environmental health of a company

Traditionally analysis and assessment of the environmental health of a company is the responsibility of the company itself. Pollution measurement must be conducted by the company itself, and the assessment of possible damages can also be made in-house, the business also establishes the pollution fees and pays it. Evaluations and assessments of the environmental factor (pollution, current and capital expenditures on environmental protection) are usually not conducted. The general rate of return of the company is assessed (manufactured products and assets). The existing rate of return indicators actually put environmentally friendly companies on par with not environmentally friendly ones, as the rate of return for environmentally friendly ones is, of course, lower, as the associated costs are always quite high.

We propose to evaluate the environmental performance of a company's environmental health. We define it as the condition, when all the systems within a company (production, innovation, financial, economic, investment, social ones) can fulfil their functions and cooperate efficiently, which allows them to strike a dynamic balance with the environment. Economic and environmental functions should be the major fundamental functions for the purposes of environmental health evaluation. The environmental health criteria are shown in Table 1. Three new ones are added to the existing list of criteria. Micro-biological treatment methods and commercial biomass production can increase financial output with the help of treatment facilities. The quantitative measurement of environmental health implies an evaluation of reserve capacities for emergencies. The assessment of environmental and economic performance of a company is one of the new criteria. Traditional performance indicators (rate of return, first of all) cannot be used, as they do not "see" the economic efficiency of

environmental activities.

The authors propose to evaluate the performance of an individual company taking into account the economic factor (environmental and economic performance) on the basis of rate of return on assets as a ratio of the outcome to the resources. The outcome is the profit from economic activities, profit from the operation of treatment facilities, and the damage (pollution fees, or since1.01.2020 it is an environmental tax) is deducted from it (given lack of proper treatment) [20-22]; the resources are represented by the amount of capital assets and working capital of the core operations and treatment facilities. In Russia the environmental damage assessment implies the damage evaluation through the population's health (healthcare costs, GRP losses from diseases and low life expectancy). However, the evaluation of damage from negative environmental impact in every case is very difficult; it is almost impossible to account for the damage in real time; special methods that are employed do not take into account the real economic damage. On the basis of the environmental and economic performance indicator proposed by the authors, we can identify, clarify and drmatically change the assessment of possible damage: the economic performance of an environmentally friendly company should be(under any conditions) similar or higher than the economic performance of an environmentally unfriendly company; the environmental tax can be calculated (as damage compensation) using a number of chain substitutions.

3.2. Economic performance analytical platform for company environmental health

We propose to complement "symptomatic" representation of information on environmental protection with "causal" one. The proposed indicator should be used as company economic performance indicators. In our opinion, the transition from symptomatic indicators to causal ones in the economic performance assessment of regional environmental health requires the creation of a special analytical indicator platform, which would support the transition to the digital analytical platform for statistics representation [23]. However, it is important what the content of the digital analytical platform would be. We propose an economic performance analytical platform for company environmental health (Table 1).

Table 1. Economic performance analytical platform for company environmental health (list of analytical indicators).

Criteria	Exponent
Environmental protection costs (sufficiency, fluctuations)	1. Current costs of environment protection activities (annually), in current and comparable prices; statistics over 5 years
Increasing the financial outcome (possibly at the expense of the operation of environment protection facilities)	2. Comparison of current expenditures and pollution level (sufficiency assessment)
	3. Assessment of the possible outcome (profit) from the treatment facility by-product (annually) in current and comparable prices; statistics over 5 years
Experts in environmental and economic management	4. Number of experts in environmental and economic management (annually; statistics over 5 years)
Environment protection R&D	5. Environment protection R&D (development, introduction and implementation of green technologies and innovations), (annually; statistics over 5 years)
Feasibility of green environmentally friendly products	6. Sales of environmentally friendly products (annually), in current and comparable prices; statistics over 5 years
Green technologies and green equipment, environment protection investments into capital assets (treatment facilities)	7. Green technologies in production (%)(annually); statistics over 5 years
	8. Green equipment in production (%)(annually); statistics over 5 years
	9. Environment protection investment into capital assets (annually), in current and comparable prices; statistics over 5 years

Environment and economic performance measurement and assessment	10. Environment and economic performance assessment in regional companies, %, (annually); statistics over 5 years
	11. Regional environment and economic performance integrated index' assessment, %, (annually); statistics over 5 years
Damage measurement and assessment, pollution fees, tax planning	12. Pollution-associated damage (above the limit and standard values) by companies and regions, (annually) in current and comparable prices; statistics over 5 years
	13.1. Pollution fees (according to the existing methods) by companies and regions, (annually) in current and comparable prices; statistics over 5 years
	13.2. Environmental tax, (annually), in current and comparable prices; statistics over 5 years
Waste, emission, wastewater measurement; recycling and usage percentage and fluctuations	14. Amount of waste, air emissions, wastewater (annually); statistics over 5 years, including refinery waste (annually); statistics over 5 years
Measurement and assessment of environmental parameters, monitoring opportunities (monitoring and evaluation equipment)	15. Monitoring stations, number, (annually); statistics over 5 years
	16. Transparent waste, air pollution, wastewater accounting system (annually); statistics over 5 years
Measuring the "amount" of environmental health	17. Reserve capacity of treatment facilities

Collection, treatment, environmental health indicator calculation on the analytical platform would certainly cause certain difficulties: much primary data (companies' latest updates) have to be taken on faith, hence the issue of trust; some indicators are simply not taken into account, or have not been introduced at all (environmental and economic efficiency), experts and relevant methods are needed to assess them, hence the problem of development, measurement and indicator evaluation. However, in our opinion, these problems can be addressed. The main analytical purpose of the platform is accomplished. An analytical platform user can both "read" the digital materials and see what has been going on (emissions, costs), "symptoms" and analyse and see the root causes, namely the environmental level of a company, sufficient/insufficient current and capital costs, "value" of pollution fees and assess the possibility and necessity of environmental tax planning. It is possible that the developed Economic performance analytical platform for company environmental health somehow will embody the principles of the platform economy [24-25] and promote the development of and solutions to standard and unique comprehensive problems.

4. Conclusion

The conducted research allows us to come to the following conclusions.

1. Assessment of economic performance of environmental activities is in high demand in business. Existing statistics and analytical indicators assess and show the past, emissions, pollution and costs. It is impossible to assess the effectiveness of the environmental activities.

2. We have defined the concept of environmental health as the condition, when all the systems within a company (production, innovation, financial, economic, investment, social ones) can fulfil their functions and cooperate efficiently, which allows them to strike a dynamic balance with the environment. Economic and environmental functions are the most important ones for the environmental health.

3. The criteria for company environmental health are identified and some new ones were added: possibilities for additional revenues (profit) from treatment facilities; changing amount of environmental health (reserve capacity in case of emergency); company environmental and economic performance assessment.

4. The indicator for company environmental and economic performance assessment was developed

on the basis of the classic indicator for rate of return on assets. The numerator of the indicator must account for the damage (pollution fees, environmental tax) and possible revenues from treatment facilities. The denominator must include the cost of capital assets and working capital of the core operations and treatment facilities.

5. Economic performance analytical platform for company environmental health is developed and proposed, which is based on the evaluation of two main functions, economic and environmental ones, of a company and includes 17 specific indicators; when measured, monitored and compared, they can help to quickly and objectively evaluate the environmental health of a company and justify necessary management decisions.

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