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Improvement of the Innovative Approaches to the Development of Environmental, Economic, Social, and Logistics Systems

COMMEMORATIVE MEDAL FOR YOUNG RESEARCHERS

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Abstract

The study presents original author's developments aimed at solving practical problems in various industries, such as the environmental sphere, waste removal and recycling (from technical, technological and economic positions). In this case, several practical developments are presented that allow solving various problems, in particular conducting an audit of an industrial enterprise along with the development of measures to eliminate environmental problems, developing technical innovations in the waste processing from pulp and paper and resource-supplying enterprises, solving the issue of reverse logistics by introducing a sorting point that allows the enterprise to get additional profit and reduce logistics costs.

Keywords: *reverse logistics, environmental problems, environmental audit, technological innovations, analytics in working with accounts receivable.*

The bulk of researches is aimed at the development of the environmental and eco-economic direction in the work of modern enterprises and companies, since the environmental matters are quite acute in the modern world and have already developed into global environmental problems in a number of activities. The developments relate to management and eco-economic aspects and

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allow to analytically approach the use of natural resources, and to economically assess the negative impact and encourage an organization to reduce it, improve logistics and management, implement digital approaches and offer the most efficient developments and measures to improve the environmental situation in the region.

The research topics include the following:

– determination of the negative impact of industrial facilities on the environment and its monetary assessment (calculation of economic damage);

– environmental audit and its features within an enterprise, as well as related activities;

– healthcare innovations and their practical application in hospitals;

– technical and technological innovations in recycling;

– digital and analytical approaches in the housing and public services;

– developments in the reverse and 'green' logistics.

Some of the research and developments listed above will be briefly presented.

Environmental Auditing and Development of Recommendations for Improving the Environment-Related Activities of Krasnaya Zarya. Digital Communication Systems JSC

Description of the Situation

Integrated organization of Plant Krasnaya Zarya. Digital Communication Systems JSC applied for an internal environmental audit in connection with the following problem: exceeding the limits of wastewater discharge into the city's sewerage, which have become significant for a number of pollutants (Treyman and Timofeyeva 2018).

What is the Novelty of the Development?

As a result of the analysis, the bottlenecks and aspects were identified and measures for wastewater treatment as well as several technological treatment schemes were proposed, and their economic assessment was carried out, in accordance to local building requirements (Treyman and Timofeyeva 2018).

During the audit, the main problems of the enterprise were identified, and there were proposed the measures and some process schemes for wastewater treatment, which included flotation and adsorption processes. The project of treatment facilities was developed and calculations were made that allowed calculating the estimated cost of work, evaluating a potential environmental load reduction and subsequent developing the management solutions to solve the problems of the enterprise.

Technological Innovations – Methods for Wastewater Sludge Treatment

Waste recycling is an important problem both of the regions and industrial enterprises, as industrial waste is quite specific and difficult to recycle. Russia needs to reconsider its position regarding waste and consider waste not as a negative factor, but as secondary material resources. The optimal 'waste management' mechanism has been developed in the research which allows to make a comprehensive analysis of the waste composition, to determine its value in terms of separation of the useful components, and based on this analysis, to design and implement waste reprocessing plants. Based on this mechanism, I have developed technical solutions for waste treatment for the pulp and paper industry and resource-supplying enterprises. These developments have been patented. The developed process plants make it possible not only to neutralize waste, but also to separate useful components, for example, obtain recycled ash, which can be further used as fertilizer for agricultural purposes. I have developed five process models of waste treatment plants of various types which can be considered as the environmental innovations.

Analytical Work with Accounts Receivable in the Housing and Public Services

The essence of the author's proposal is as follows: to create a methodology for working with accounts receivable, to form its structuring, to develop a new approach to its analysis, and eventually to model the process using the example of several apartment buildings with the possibility of further embedding this algorithm in the information system of an enterprise in the housing and public services industry. In this work, the data were tested on several apartment buildings with the reconstruction of their main parameters (Treyman and Timofeyeva 2018).

Analysis of Accounts Receivable

New approaches to accounts receivable analysis should be based on the assessment and division of receivables by type ('objective' and 'subjective'):

a) objective (a consumer does not pay for his/her own specific personal reasons that are not related to our internal processes);

b) subjective (or 'process') is directly related to work processes.

Modeling of Accounts Receivable Management

The model of accounts receivable management in this case is generation of processed statistical data on debt, payments and activities carried out by the enterprise for debt collection with their maximum automation.

The modeling process includes:

1) Balance sheet, which is divided into several types of operations: 'accrued', 'debt', 'payment', 'arrears', 'debt for the period'.

2) Accounts receivable ranked by 'collection indicator': 'well collected', 'collected during n-term', 'average collected', 'hard to collect', 'bad', as well as the term for collection and implementation of measures that encourage customers to pay the debt (deadlines and amounts of debt).

3) Automatic debt collection measures: mass text messaging, sending newsletters, sending claims to consumers, *etc*.

4) Further, the debt is divided and thereafter classified into arrears of one month, two months, and three months. As a result, it falls into the following categories: 'paid on time', 'paid in full', and 'bad debt'.

5) In case of normal operation of the model, the work will be carried out in semi-automatic mode through newsletters, SMS notifications. An accounts receivable specialist will only have to monitor the current situation and control the information flows, provide advice to consumers, and this will significantly reduce labor costs, use of hard copies, speed up the processes of receiving funds from consumers, and strengthen analytical efforts in terms of receiving and preventing debts.

Planning

1) In the workspace it is necessary to provide the possibility of combining model algorithms, and certain templates for further actions can also be laid here.

2) Further, as a result of the analysis, the data array is divided into separate samples, which are grouped on the basis of planning (depending on the appropriate planning method), then the planning period and parameters are set (sections of forms and templates for this planning should be incorporated in the system with information variability). The system performs processing according to the statistics, settings, and selected methods of planning and generates a plan. Specialists are engaged in monitoring the result obtained, and an additional minimum manual adjustment is also provided for (for exceptional cases by individual consumers), after which the final forms of plans are generated.

One should note that it is necessary to plan cash inflow by dates and periods, which can be updated by creating a payment calendar model which would allow specifying periods and dates of cash inflow and take them into account in the planning model.

Developments in the Field of Reverse Logistics

Description of the Situation

Currently, the problem of solid waste management has not been solved in the city. Most waste is removed to landfills without proper treatment and sorting, which affects the overall environmental situation in the city, public health and other factors. The study considers the provisions that allow developing the

reverse logistics by creating flowcharts and algorithms for inclusion of schemes for waste sorting and treatment in addition to waste disposal (Treyman 2019).

The Novelty of the Development and Author Contribution

I have developed the waste management scheme, taking into account the creation of the sorting station on the basis of the enterprise for removal of municipal solid waste. An economic evaluation of the feasibility of this scheme was also carried out: the calculations of economic efficiency of the implementation of these measures, in particular, the income from the delivery of secondary raw materials by the enterprise and impact of the economic effects on the company were estimated (Treyman 2019).

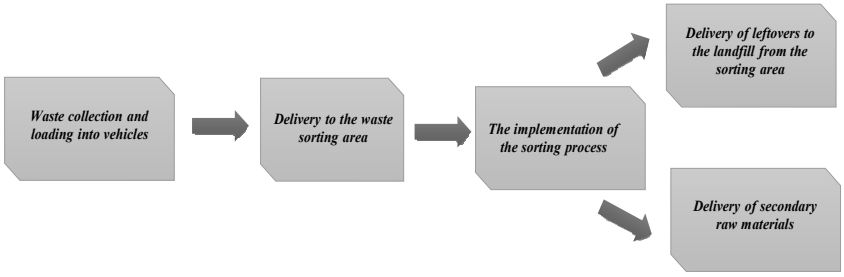

Fig. The principle of operation using the sorting station for the treatment of exported municipal solid waste by Sozvezdie Ltd

The introduction of the sorting complex has the following positive effects:

– reduction of logistics costs and transport routes;

– additional profit due to separation of useful components from the waste using sorting methods;

– significant economic effect from introduction of a sorting plant.

To summarize, I would like to note that the developments presented here are relevant, significant, practice-oriented and will allow enterprises and organizations to significantly optimize their activities.

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