

# Organization of Business Processes of the Company on the Basis of the Systems Approach Tenets

Valentina Vaganova<sup>1</sup>, Lubov Vorona-Slivinskaya<sup>1</sup>, Anna Medvedeva<sup>1</sup> and Svetlana Kuzmina<sup>1,a</sup>

<sup>1</sup>*Saint-Petersburg University of State Fire Service of the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters, Moskovsky pr. 149, Saint-Petersburg, 196105, Russia*

**Abstract.** The article considers the management specificity on the basis of the systems approach tenets and description of business processes of the industrial enterprises. As the Company is a service-provider, its functional features are taken into consideration when modeling the business processes. The authors highlight challenges the Company faces in performance management because the existing system doesn't allow to predict the financial results at the stage of formation of orders portfolio, to evaluate adequacy of financial resources to objectives set and to operate cash flows. All these issues are considered in sufficient detail when analyzing a range of problems and are taken as a basis of the project on implementation of the budgeting system based on the process approach.

## 1 Introduction

The enterprise (further the Company), whose design of the systems approach to business-process management is taken as a basis of the study, renders the wide-ranging environmental impact assessment services [1].

Indispensable condition for work of any organization operating hazardous production facilities, generating waste, releasing contaminants into the atmosphere or water objects is compliance with requirements of the industrial ecology [2-4].

The concept of industrial ecology includes assessment and monitoring of chemical and biological pollution of the environment by the industrial enterprises, regulation of economic efficiency of actions on protection from pollutions and compliance of the industrial processes with the legal requirements. To identify, monitor and standardize harmful impacts on environment, the law provides a list of mandatory documents to be developed by legal entities and individuals, whose activity have direct or indirect impacts on environment (emission and/or dumping of the polluting substances, generation of production and consumption waste) [5-8].

Taking into account extensiveness of the environmental legislation, complication and diversity of the requirements in this field, one should have profound knowledge of laws, responsibility for legal and engineering decision-making, ability to predict the consequences. These demand the expert knowledge in the fields of ecology and industrial safety [9, 10].

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<sup>a</sup> Corresponding author : [kuzmina2003@bk.ru](mailto:kuzmina2003@bk.ru)

## 2 Problem statement

Today it is safe to say that even the large industrial enterprises and organizations mostly prefer to outsource solving of these problems to the specialized expert organizations, rather than to train and employ staff experts. This, in turn, is related to the concepts "environmental works and services", "market of environmental works and services", their development and application [12].

The environmental services provided by the Company are:

- inventory of pollution sources (air, water, waste);
- development of environmental projects for any type of industrial enterprises;
- consulting services in the fields of environmental security and environmental protection;
- environment-related information services;
- environmental audit, independent environmental assessment (including public assessment).

The Company is registered as a small business entity. Its core activity is research and development in the fields of natural and engineering sciences.

The income of the Company consists of two components:

- revenue from engineering/ technological projects in the fields of development and coordination of documentation in the sphere of industrial ecology and elimination of oil spills;
- revenue from expertise in the international and regional projects.

The core activity of the Company is development of the project documentation in the field of industrial ecology, approval and examination of projects. The list of the projects developed by the Company includes:

1. Plans on Prevention and Elimination of Oil Spills (PEOS);
2. Plans on Emergencies Elimination (PEE);
3. Plans on Localization and Elimination of Accident (PLA);
4. Material Safety Data Sheet of Dangerous Object (MSDSDO);
5. Draft Standards on Waste Formation and Limits on their Placement and Passports of Dangerous Waste (DSWFLP);
6. Draft Standards of Maximum-Permissible Emissions of the Polluting Substances in the Atmosphere (MPE);
7. Standards on Admissible Dumpings of the Polluting Substances in Environment (SAD);
8. Actions on Assessment of Impact on Environment (AAIE);
9. Projects of Justification of the Size of the Sanitary Protection Zone (SPZ).

The advancing activity of the Company is rendering environmental support to the enterprises (outsourcing).

The Company also renders expert services, participating in the international and regional environmental projects.

However the existing performance management system doesn't allow the Company to predict the financial results at the stage of order portfolio building, assess adequacy of financial resources to the targeted objectives and operate cash flows.

This range of problems was has been taken as a basis for the project on implementation of the budgeting system based on the process approach [12, 13].

### *2.1 Stage of the Company's life cycle and setting objectives in course of implementation of the budgeting system*

For today the Company has passed the stage of formation and search for its market niche and mastering the survival skills. The long-lasting formation stage is characterized by a simple and informal organizational structure without clear division of functions and financial responsibility centers, and also by concentration of powers in hands of owners. There was no budgeting system, the managerial decisions were generally made by the Company's owners on the intuition basis. From time to time there were disagreements among founders concerning the accepted managerial decisions.

Nevertheless, the Company managed to occupy its market position, achieve competitive edge and create positive reputation.

Now the challenge for the Company is to stabilize its position, fully realizing its available advantages. Today it is necessary to model its business processes, form the organizational-and-financial structure, using a linearly-functional principle, namely to establish the financial responsibility centers, bring powers down to managers, formalize procedures, focus on sales growth. It is also necessary to form a reserve fund and establish tight control over expenses [15].

The model of budgeting system being developed on the basis of the process approach consists of the following stages:

1. Task definition and collection of information, necessary for budgeting.
2. Examination and analysis of the available information, generalization and analysis of the past achievements, calculation of performance indicators, draft budgeting.
3. Expert examination and evaluation of the draft budget.
4. Adoption of the budget.

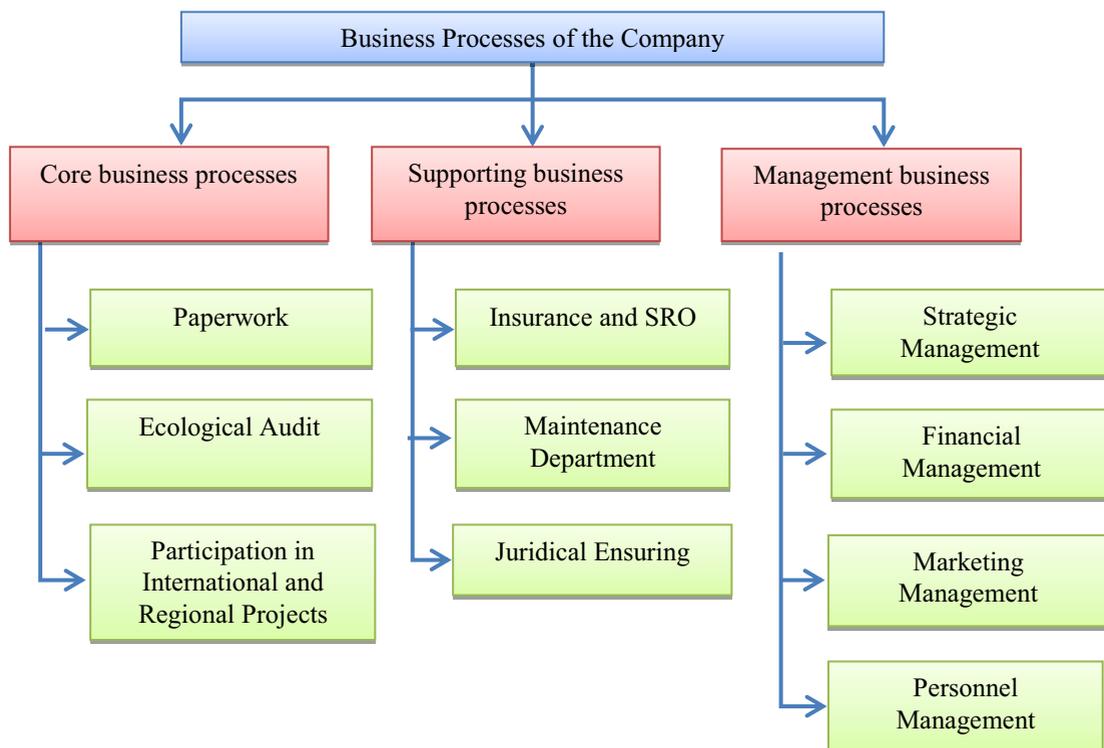
## 2.2 Results

The business processes of the Company are relatively simple due to its specificity and operation in the services sector.

When modeling, all the business processes of the Company were divided into 3 groups (Fig. 1):

1. Core business processes.
2. Supporting business processes.
3. Management business processes.

This modeling has resulted in formation of the financial responsibility centers, including: profit centers, revenue center, cost centers and investment center.



**Figure 1.** Business processes (BP) of the Company

Development of the budgeting model is based on the following assumptions. As the financial status of the Company is displayed in a format of three main statements (balance sheet, profit-and-loss statement, cash flow statement) forming the system of economic assessment of the Company's performance, the most effective financial management is possible when the budgeting of the Company's economic activity allows to link all these statements [12, 23-25].

It is expedient to organize the financial planning according to the following scheme:

REVENUE-AND-EXPENDITURE BUDGET =>; CASH FLOW BUDGET  
(DIRECT METHOD) =>; BALANCE SHEET BUDGET

Suggested is the following budgeting procedure:

The Financial responsibility centers of the enterprise draw up revenue-and-expenditure budgets and BCF. The costs centers draw up budgets of labour remuneration, overheads, purchases, business and managerial expenses.

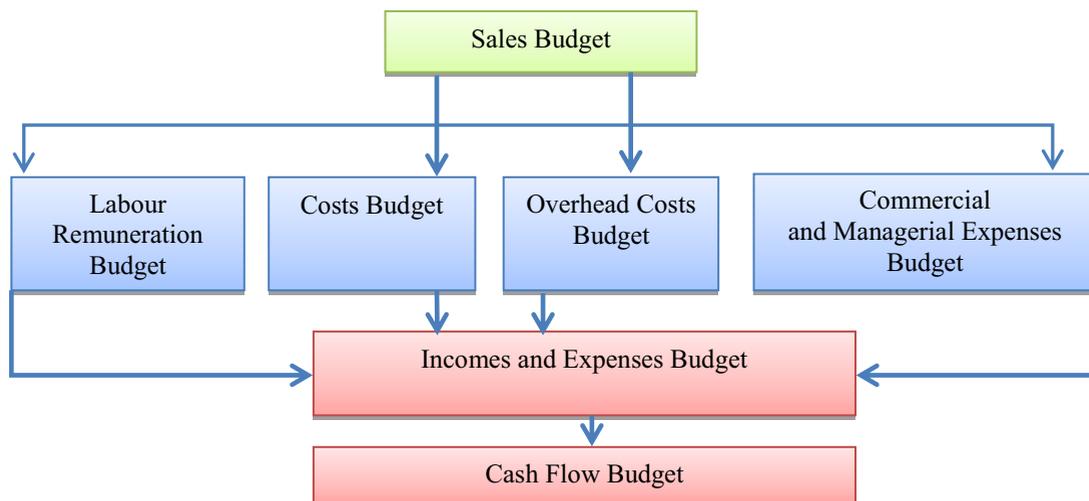
Allocation of the Company's services among the profit centers is presented in Table 1 [17].

Table 1. Allocation of the Company's services among the profit centers

No	Profit center	Services	Customers	Financial responsibility
1	Department	Development of PEOS, AAIE, PLA, MSDSDO	Enterprises of the oil and gas industry, Large and medium-sized industrial enterprises, environment-related public organizations	Director – 1 Experts – 2
2	Department of environmental design	Development and coordination of the DSWFLP, MPE, SAD projects, and so forth. Environmental maintenance of activity of the enterprises (outsourcing) Environmental audit	All enterprises and the organizations having the status of nature users	Director – 1 Experts – 2
3	Department of international projects	Expert, organizational, coordination services with participation in the international and regional projects in the environmental field	The interested commercial, semi-state, public organizations, funds, state bodies of Russia, Norway, Finland	Director – 1 Manager – 1

These budgets being consolidated within the framework of the whole enterprise enable to draw up the revenue-and-expenditure budget and the cash flow budget (Fig. 2).

The profit centers draw up sales budgets, direct costs budgets, labour remuneration budget and overheads budget. The costs centers draw up a labour remuneration budget, overheads and marketing budgets. Consolidation of the above-mentioned budgets enable to draw up the enterprise-wide master budget.



**Figure 2.** Model of the Company's budget

It is usual for the budget period to be a year, broken down into a month or a quarter control periods.

The general financial plan is formed by consolidation and coordination of the financial plans for business lines and includes the revenue-and-expenditure budget and expected balance, and simplified taxation plans:

- sales budget;
- cost budget;
- overheads budget;
- commercial and managerial expenses budget;
- revenue-and-expenditure budget, cash flow budget and break-even point.

The new budgeting model was used for drawing up the master budget of the Company: the revenue-and-expenditure budget, the cash flow budget and calculating of the break-even point.

### 3 Conclusions

Calculation of the break-even point is one of the major tasks when planning sales of products and services.

The break-even point is a point at which total cost and total revenue are equal. There is no loss or profit. It represents the sales amount that is required to cover total costs. Sometimes it is also called the critical volume: the minimum output that must be exceeded in order to make profit.

To calculate the break-even point, total costs are disaggregated into fixed and variable costs. In theory, variable costs are increasing in proportion to increase in production (sales) of products. Fixed costs are not dependent on volume of the produced (sold) products and services and business activity.

$$\text{Break-even point} = \text{Revenue} \times \text{Fixed costs} / (\text{Revenue} - \text{Variable costs})$$

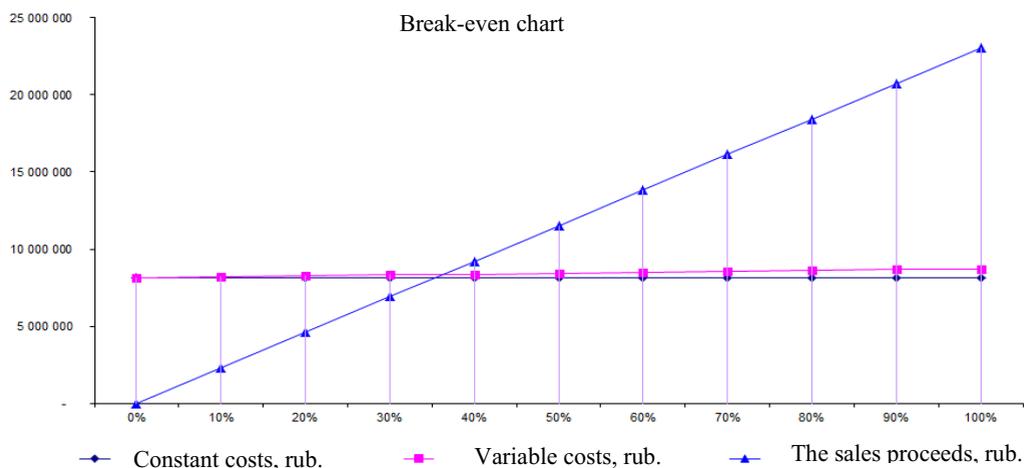
Thus, to cover the Company's total costs in 2015, its annual revenue shall be at least 13 117 069 rubles

Table 2 –Data for the break-even chart

% of services provided	Fixed costs, ruble	Variable costs, ruble	Revenue, ruble
0%	8 149 975	8 149 975	-
10%	8 149 975	8 207 821	2 305 000
20%	8 149 975	8 265 668	4 610 000

30%	8 149 975	8 323 514	6 915 000
40%	8 149 975	8 381 360	9 220 000
50%	8 149 975	8 439 206	11 525 000
60%	8 149 975	8 497 053	13 830 000
70%	8 149 975	8 554 899	16 135 000
80%	8 149 975	8 612 745	18 440 000
90%	8 149 975	8 670 591	20 745 000
100%	8 149 975	8 728 438	23 050 000

The cash-flow forecast for 2015 (Table 2) has shown annual cash revenue of 25 164 400 rubles, that gives reason to believe that, in case of successful implementation of all the projects, the revenues will allow not only to avoid losses, but also to get profit (Fig. 3).



**Figure 3.** Break-even chart

## References

1. *Scientific and practical portal "Production Ecology". Power and environmental contradictions in national security system* <http://www.ecoindustry.ru> (23.11.2015)
2. J. Četković, S. Rutešić, M. Zarković, M. Knežević, N. Vatin, *Procedia Engineering*, **117 (1)**, 780-790 (2015)
3. V. Urbanavičienė, A. Kaklauskas, E.K. Zavadskas, J. Šliogerienė, J. Naimavičienė, N. Vatin, *International Journal of Strategic Property Management*, **18 (3)**, 213-224 (2014)
4. B. Melović, S. Mitrović, A. Djokaj, N. Vatin, *Procedia Engineering*, **117 (1)**, 807-812 (2015)
5. D. Arseniev, A. Rechinskiy, K. Shvetsov, N. Vatin, O. Gamayunova, *Applied Mechanics and Materials*, **635-637**, 2076-2080 (2014)
6. S. Isaev, P. Baranov, N. Vatin, Y. Zhukova, A. Sudakov, *Technical Physics Letters*, **40 (8)**, 653-656 (2014)
7. K. Strelets, N. Vatin, (2015) *Rocznik Ochrona Srodowiska*, **17 (1)**, 104-112 (2015)
8. S. Rutešić, J. Četković, M. Knežević, M. Žarković, N. Vatin, *Procedia Engineering*, **117 (1)**, 642-650 (2015)
9. S. Rutešić, J. Četković, M. Žarković, M. Knežević, N. Vatin, *Procedia Engineering*, **117 (1)**, 905-915 (2015)
10. V. Chechevichkin, N. Vatin, *Applied Mechanics and Materials*, **641-642**, 409-415 (2014)

11. V. Korsun, N. Vatin, A. Franchi, A. Korsun, P. Crespi, Mashtaler S. *Procedia Engineering*, **117 (1)**, 975-984 (2015)
12. A. G. Konstantinov, A.V. Berestenko, V. Ya Ushakov, *Collected papers of the International Youth Conference "Energy Saving Technologies"*, **I**, 6-7 (2011).
13. S.N. Kuzmina, *Journal of Economic Regulation*, **3**, 3 (2012)
14. V. V. Okrepilov, *Innovations*, **12**, 88-91 (2008).
15. N.I. Babkina, A.V. Babkin, Approaches and methods of an innovative potential assessment of an industrial cluster. Innovative economy and industrial policy of the region (EKOPROM-2014) (St. Petersburg: Publishing House of Peter the Great St. Petersburg Polytechnic University 2014).
16. V. A. Vaganova, *Management system improvement of capital repairs projects in the power generation companies* (St. Petersburg: Publishing House of Peter the Great St. Petersburg Polytechnic University 2012).
17. V. A. Plotnikov, *The Belgorod State University Scientific Bulletin*, "History. Political science. Information science" series, **vol. 23, no 13-1**, 5-10 (2012).
18. S. N. Kuzmina, *Naukovedenie* (electronic journal), **4 (7)**, 1-9 (2012).
19. L. G. Vorona-Slivinskaya, *Strategic planning of industrial production development: features of implementation in the conditions of unstable macro-microenvironments* (FINEC), St Petersburg, 2007)
20. S. V. Kuznecov, S. S. Neustroev, *Program and target approach in management of innovative development of economics* (Saint Petersburg: IPRE RAN, 140, 2012).
21. V. L. Kvint, V. V. Okrepilov, *Innovations*, **9 (191)**, 41-51 (2014).
22. V.L. Kvint, V.V Okrepilov, *Herald of the Russian Academy of Sciences*, **84 (3)**, 188-200 (2014)
23. V. V. Okrepilov, *Problemy prognozirovaniya*, **1**, 52-62 (2013)
24. V.V Okrepilov, M.V. Leonidovich, *Asian Social Science*, **11 (7)**, 312-325 (2015)
25. V.V Okrepilov, V.L. Makarov, A.R. Bakhtizin, S.N Kuzmina, *Economy of Region*, **2**, 301-313 (2015)