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Reorganization of the System of Intra-Holding Settlements: Methodological Tools, Efficiency Assessment

Yu.V. Nemtseva^a, A.V. Bekker^b^a Novosibirsk State University of Economics and Management, Novosibirsk, Russia;^b S7 Group, Novosibirsk, Russia

ABSTRACT

In the context of growth trends in the scale and diversification of business, the internal costs of companies with a complex holding structure are also increasing. Solutions that improve the efficiency of settlement systems are particularly relevant and significant. Therefore, the paper is devoted to the problems of building settlement systems that minimize the negative impact of certain factors reducing the economic efficiency of calculations. The **purpose** of the study is to develop methodological foundations for rationalization the holding's settlement system based on clearing obligations. The **tasks** of this paper are set as follows: to propose methodological tools for the reorganization of the system of intra-holding settlements; to test the proposed recommendations for the rationalization of the settlement system in holding structures. According to the **results** of the study, the authors systematized a set of factors that determine the effectiveness of the system of intra-group settlements. It is proposed to attribute the number of payment transactions and the volume of payment turnover to the quantitative factors of the settlement system efficiency. Qualitative factors of the settlement system efficiency are associated with the consolidation of financial information, the degree of automation of settlement processes, and the flexibility of the settlement system. The authors used the Ward **method** to build a cluster structure of the holding based on the analysis of payment turnover of pairs of companies, statistical methods of quantitative and qualitative assessment of the effectiveness of the holding's settlement system. The **scientific novelty** is expressed by the fact that the paper offers methodological tools for reorganization the system of intra-holding settlements. A methodology for rationalization the holding's settlement system based on clearing obligations, universal in use by holding-type companies, has been developed and its approbation has been carried out. The conclusions based on the **results** of the study form recommendations for changing some aspects of the holding's activities in accordance with the results of the modernization of the holding's settlement system. The method of rationalization of the system of intra-holding settlements proposed by the authors has versatility in application and can be used in solving management tasks within any holding.

Keywords: holding; intra-group settlement system; efficiency of the settlement system; effect; two-way clearing; multilateral clearing

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INTRODUCTION

It is common knowledge that intra-group operations are involved in the economic activities of holding companies. The need to establish intra-group economic relations of a financial nature in holding structures with legal entities generates the value of transaction costs, which include the reduction of solvency of individual group companies, labour and financial costs of intra-group payments.

Scale and diversification of business in the context of pandemics and turbulence of economic processes, solutions that ensure the efficiency of settlement systems should be recognized as particularly relevant and significant. In this case, the efficiency of the settlement system of holding will be understood as the ratio of the benefits and functions it performs to the amount of direct and indirect losses associated with the device of such system. In the scientific literature, the main focus in the consideration of efficiency is shifted to costs (negative effect) of inter-group settlements in the form of transaction costs [1–8].

LITERATURE REVIEW AND RESEARCH METHODS

Many works of domestic and foreign experts in the field of corporate financial flows management are devoted to the search for ways to reduce transaction costs: K. Asai [9], A. P. Kirsanov [1], A. N. Kulemin [10], A. Z. Piramatov [11], A. Sinkevich [12], D. O. Chukhlantsev [6], A. A. Shishakin [7], K. Spremann [13] etc. Dynamics of intra-group payments and maintenance of liquidity paid attention in the works of D. A. Endovitskii, I. V. Polukhina [14], S. A. Mkhitarian [15], D. E. Okladnikov [16], V. A. Makarova [17], P. Atrill [18], N. Petit [19]. Efficiency tools for calculation in the domestic market of the group of companies are considered in the works of V. A. Buzanov [3], A. S. Volkov [4], A. S. Pleshchinskii [8].

Despite sufficient theoretical material accumulated by experts and available for study on the subject, the review of the literature revealed a lack of a harmonized approach to addressing the economic losses from internal operations.

To obtain the result, the paper uses general scientific research methods, such as theoretical analysis and synthesis, abstraction and concretization, deduction and induction. The authors apply methods of cluster analysis for building cluster structure of holding on the basis of analysis of payment turnover of pairs of companies, statistical methods of quantitative and qualitative assessment of efficiency of holding's settlements system, method of expert estimation.

PROBLEM STATEMENT

In their papers, the authors consider ways to construct settlement systems that minimize the negative impact of individual factors reducing the economic efficiency of settlements. Some researchers suggest specific methodologies for performance management, the scope of which is limited to a separate branch of economic activity or to the regulation of a particular State; other work is limited to a theoretical review of practices in the construction of intra-group settlement systems; the third results have mathematical models of settlement and payment operations in order to reduce the negative influence of one of the factors of transaction costs.

It is obvious that the lack of theoretical and methodical support on the issue is compensated by the efforts of top management and staff "on the ground" in the process of studying the causes and solutions of affordable ways to curb the growth of transaction costs. This issue is resolved in private, taking into account the specifics of the business, and as a rule, the results of the decision are closed from the study of commercial secrets by third parties.

The purpose of the study — development of methodical bases of rationalization of settlement system of holding on the basis of clearing obligations. The goal is achieved by solving the following tasks:

- to propose methodical tools of reorganization of the system of intra-holding settlements;
- to carry out approbation of the proposed recommendations on rationalization of the settlements system in holding structures.

RESULTS AND DISCUSSION OF THE STUDY

Clearing of liabilities is a tool to improve the group's settlement system. Different types of clearing are distinguish depending on the features of intra-group settlement system, and improving by clearing.

Popular belief that multilateral clearing has a more beneficial effect than two-way clearing, but has a more complex implementation procedure and more risks generated by clearing activities (*Fig. 1*) [17, 20, 21].

The use of netting allows not only to reduce the risk of a shortage of funds, but also to accumulate funds that can be used to finance capital-intensive projects of the holding company. Money is not taken out of circulation for a long time, which allows to use it not only for operational but also for investment purposes.

The reduction in the number of payments, the degree of process automation will lead to the release of labor, which will also improve the efficiency of the holding.

The amount of savings will be achieved by reducing the number of payment orders — the cost of the bank's commission on settlement servicing will be reduced.

Under multilateral clearing, financial information on a group of companies is also centralized in a single center, which facilitates its collection for the parent company. However, it has to be noted the possibility of reducing the document

management between the settlement participants.

Thus, the positive effect of clearing for large systems of companies bound by mutual monetary obligations is significant. At the same time, it is necessary to calculate the economic feasibility of creating and maintaining a clearing system. The authors proposed an algorithm for increasing the efficiency of intra-group settlements, including a number of steps or stages (*Fig. 2*). Each phase consists of a group of methods to achieve the objectives. Clearing of intra-group liabilities is a tool for increasing the efficiency of intra-holding settlements.

The authors consider the stage of primary analysis and collect information in the form of two blocks:

1) initial state — constant factors determining the structure of the settlement system of holding;

2) efficiency factors — quantitative and qualitative characteristics of the system, the values of which can be changed by modification of the settlement system, thereby increasing or reducing its overall efficiency (*Fig. 3*).

As a result of the initial analysis of the system of intra-group settlements the researcher gets a number of quantitative and qualitative indicators, the values of which can be changed in favor of a group of companies by adopting appropriate adjustments in the system. Limitations and influence of conditions needs to be taken into account.

As quantitative indicators of the need to improve the system of payments, the authors propose to use indicators of the potential of system improvement — the potential to reduce the number and volume of intra-group payments transactions.

The main positive effect is the possibility of releasing financial resources from the payment chain, so the value of the potential is determined by the ratio of the aggregate value of intra-group payment operations

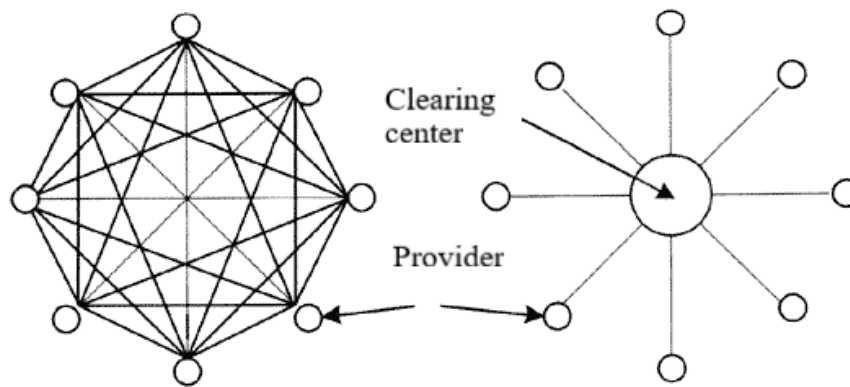


Fig. 1. The Scheme of Interaction of Participants of Multilateral Clearing

Source: Compiled by the authors.

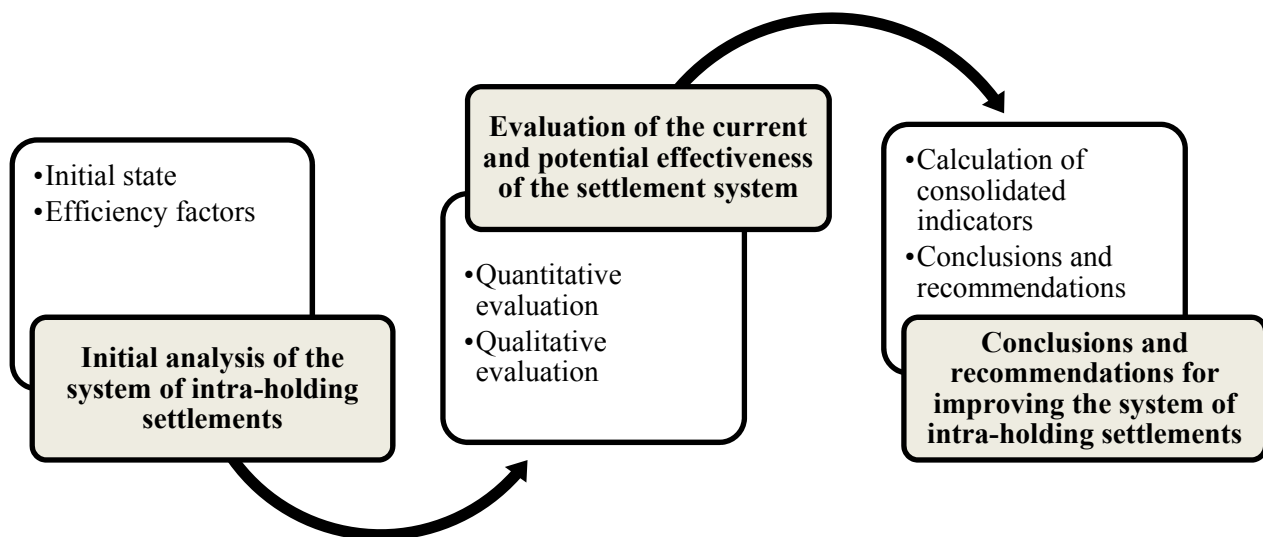


Fig. 2. Methodology for Improving the Efficiency of the System of Intra-Holding Settlements

Source: Compiled by the authors.

(internal turnover) to the total value of payment operations (turnover) of group companies. The higher the value of the indicator, the more theoretically possible clearing effect can be obtained for the holding. Savings of the holding on payment operations and turnover due to transition from gross settlements between companies to multilateral clearing [22].

According to the authors, the method of expert estimation should be used to evaluate the quality indicators of the system of intra-group settlements (level of information support for management, the presence of

levers of influence on the settlement system, the degree of process automation, etc.) (Fig. 4).

In this way, the settlement system efficiency factors that need management impact can be evaluated in their current and potential state in a digitized form, allowing for a comparison of alternative options for this system.

The third phase of the rationalization of the intra-holding settlement system is related to the integrated evaluation of the system reform project. The net present NPV effect should be used to assess the

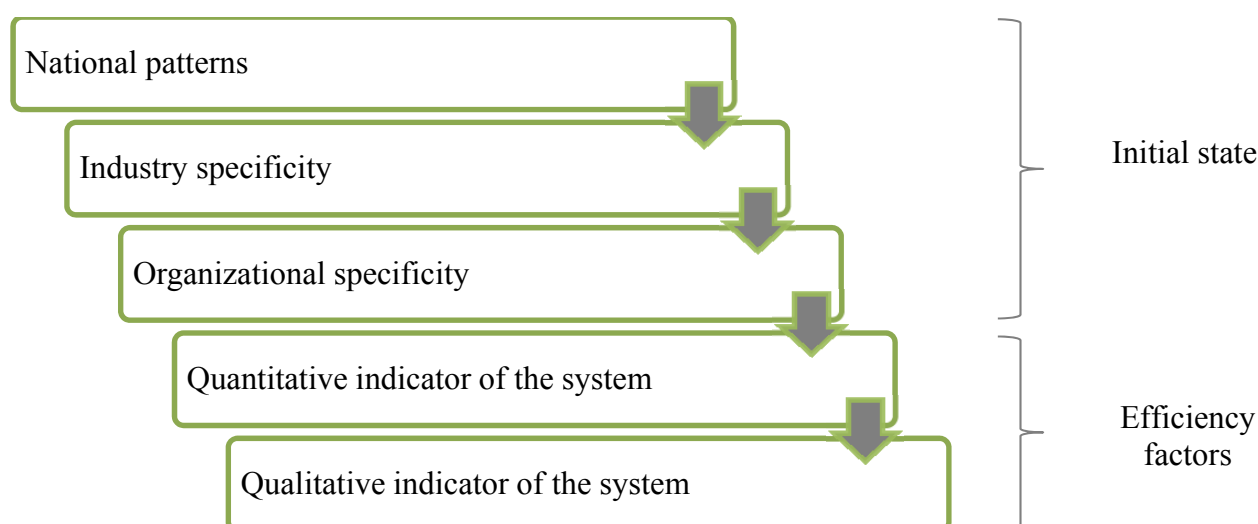


Fig. 3. Elements of the Primary Analysis of the System of Intra-Holding Settlements

Source: Compiled by the authors.

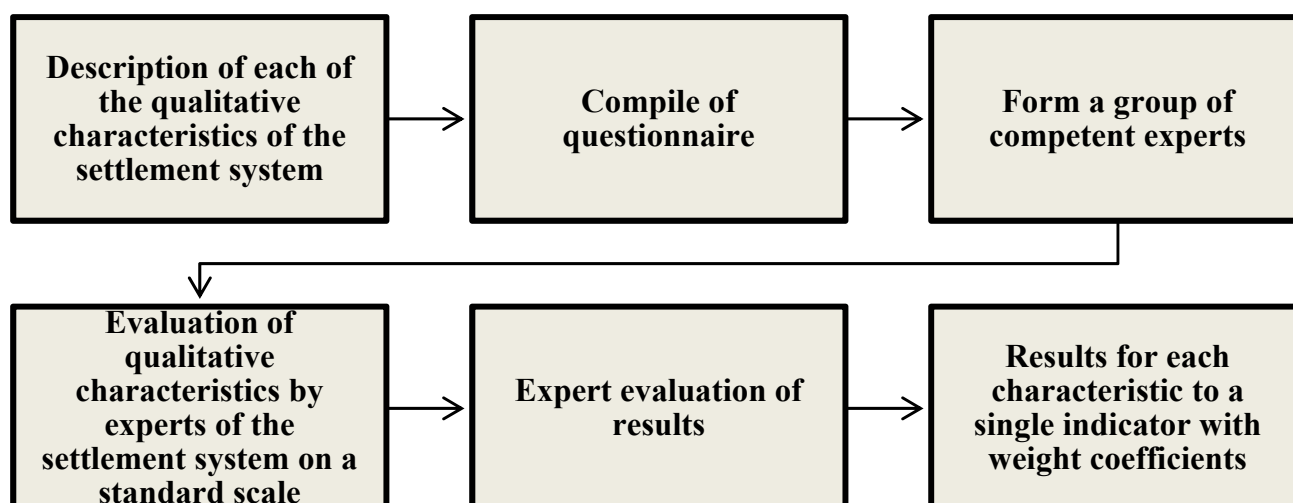


Fig. 4. Algorithm to Evaluate the Qualitative Factors of the Settlement System Efficiency

Source: Compiled by the authors.

effectiveness of the project. The positive value of the net present value will allow us to speak about the effectiveness of the introduction of clearing in the practice of intra-holding settlements, while the negative value will show the impracticality of such a project.

When assessing the NPV, the project costs should be included:

- cost of work on collection, systematization and analysis of primary information on settlement system in the holding;

- cost of work on the project development clearing system;

- cost of work on reconciliation of obligations, calculation of net positions, processing of accounting documents, recording of transactions in the accounting system;

- value of other overhead costs (management, transaction, security, reserve formation, etc.).

The economic impact of the introduction of clearing in the calculation practice in value terms can be defined as:

Table 1

Format of Comparison of Alternatives of the Settlement System Device

	Initial state	Option 1	Option 2	...	Option n
NPV project, where n – number of considered alternatives for settlement system; i – value of the indicator that characterizes the effectiveness of the settlement system	–	i_{12}	i_{13}	...	i_{1n+1}
Qualitative indicator	i_{21}	i_{22}	i_{23}	...	i_{2n+1}

Source: Compiled by the authors.

- cost of bank payment services, which were reduced as a result of clearing;
- cost of employees' work on formation and support of payment operations, the number of which was reduced as a result of clearing;
- amount of savings on the withdrawal of short-term credit funds from clearing;
- income from accommodation in financial instruments released as a result of clearing.

It should be noted that the key issue in assessing the effectiveness of the formation or modification of the clearing system is the value of its revenue – clearing effect for the holding. Effect of reduction of payment operations and payment turnover in the holding can be called the main positive factor of introduction of clearing in the system of settlements. Most of other indicators that form savings for the holding are derived from the above indicators. For example, information on the quantitative reduction in the volume of payments transactions, together with data on the cost of bank services and the value of other costs of companies for the formation and maintenance of transactions, will allow evaluate the savings in the conduct of counterclaims. Using rate of return on potentially released financial resources from clearing will reveal the amount of additional income from project implementation.

Previously noted that the impact on the aggregate result of changes in settlement system are qualitative, difficult to quantify. In this case, we propose to aggregate qualitative characteristics with the application of weight coefficients to a single indicator of the level of qualitative factors. Weight coefficients range from 0 to 1 and are detected by the expert assessment method based on a questionnaire. To assess the significance of qualitative factors (degree of consolidation of financial information, degree of process automation, possibilities for adjustment of settlement system of holding) key specialists of holding (experts), those with competence in the various stages of the payment chain in companies use a score of 10. Individual expert assessments averaged.

The final consolidation of results and management decisions remain with the manager. The recommended form for comparing the results on the various options of settlement system is presented in the Table 1.

The method of rationalization of settlement system of holding on the basis of clearing of liabilities is demonstrated in practice for holding, using historical data of group activity (reporting data). 28 Russian companies of the holding, the main type of economic activity of which is the provision of passenger air transport services (the article uses the names in the form of sequence

Table 2

Results of the Initial Analysis Stage of the Intra-Holding Settlement System

Initial analysis of the system of intra-holding settlements	Conditions	Factors of efficiency	
		Quantitative factors of settlement system efficiency	Qualitative factors of settlement system efficiency
Actual cluster structure of holding on the basis of analysis of payment turnover of pairs of companies (Ward method)		– number of payment transactions (more than 772 thous. payment transactions, including more than 55 thous. transactions – on intra-group settlement); – amount of payment turnover (819.5 bln rubles of payment turnover on ruble bank accounts, of which 324.5 bln rubles are intra-group payment turnover)	– degree of consolidation of financial information; – flexibility of the settlement system and possibilities for its adjustment; – degree of process automation
	Solvency problem companies: 1 725		
Clearing frequency: 1 month			

Source: Compiled by the authors.

numbers from 1 to 28). The holding has a single center for the consolidation and processing of payment information (Shared Services Centre – SSC).

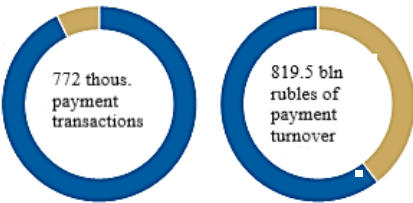
Initial analysis of the system of intra-holding settlements showed the following results. One of the main negative aspects of intra-group payments may be the shortage of liquidity for settlement with counterparties. Analysis of daily dynamics of financial flows and cash balances on the accounts of the holding showed that the problems of short-term loss of solvency of companies are not excluded from operational activities. More than 10 companies of the holding receive from 70 to 100% of revenues from provision of intra-group services from year to year. However, for at least three of these companies, there has been a systematic significant decline in liquidity balances in sub-average accounts unrelated

to their investment or financial activities. Accordingly, the method of reducing the negative effects of conducting payment operations within the holding can be a periodic clearing of mutual obligations. Given the frequency of intra-holding payments, it is reasonable, in the authors' view, to perform monthly clearance of obligations prior to the next payment cycle in each month. This will further improve the solvency of some companies and release excess financial resources from others (Table 2).

The second stage of the algorithm for increasing the efficiency of intra-group settlements involves an assessment of the current and potential efficiency of the settlement system. Based on the results of the initial analysis of the system of settlements in the holding, the indicators of the potential of system improvement were evaluated. The potential for improving

Table 3

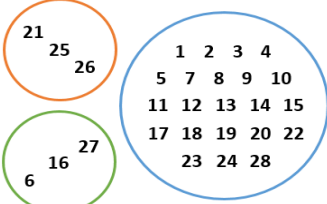
The Evaluation Results of the Current State of Factors of Efficiency the Settlement System of the Holding

Step of algorithm of improve of efficiency of intra-group settlements	Evaluation of current and potential settlement system efficiency
Evaluation of current and potential settlement system efficiency	<p>7,1% intra-group</p>  <p>772 thous. payment transactions</p> <p>819.5 bln rubles of payment turnover</p> <p>39,6% intra-group</p>
Quantitative evaluation	
Qualitative evaluation (score)	<ul style="list-style-type: none"> – degree of consolidation of financial information – 6.2; – flexibility of the settlement system, possibilities for its adjustment – 8.1; – degree of process automation – 6.3

Source: Compiled by the authors.

Table 4

Results of the Implementation of The Two-Way Clearing Scheme

Evaluation of current and potential settlement system efficiency	Quantitative evaluation	Qualitative evaluation (score)
Option 1 (introduction of a two-way clearing scheme)	<ul style="list-style-type: none"> – reduction in the number of payment transactions by 50 thous. pcs. (6.6%); – reduction of payment turnover by 19.1 bln rubles (2.3%) 	degree of consolidation of financial information – 5.8; flexibility of the settlement system, possibilities for its adjustment – 6.5; degree of process automation – 7.6
The greatest potential clearing effect for pairs of companies		25 and 26–6.7 bln rubles; 21 and 26–4.4 bln rubles; 12 and 26–1.3 bln rubles; 6 and 16–1.2 bln rubles; 16 and 27–1.1 bln rubles
Optimal cluster structure for clearing holding (Ward method)		

Source: Compiled by the authors.

Table 5

Results of the Implementation of the Multilateral Clearing Scheme

Evaluation of current and potential settlement system efficiency	Quantitative evaluation	Qualitative evaluation (score)
Option 2 (introduction of the multilateral clearing scheme)	<ul style="list-style-type: none"> – reduction in the number of payment operations by 53 thous. pcs. (7.0%); – reduction of payment turnover by 143.5 bln rubles (17.5%) 	<ul style="list-style-type: none"> – degree of consolidation of financial information – 8.7; – flexibility of the settlement system, possibilities for its adjustment – 8.2; – degree of process automation – 7.9
Key donor-companies	25, 12, 18, 5, 6	
Key recipient- companies	3, 26, 4, 16, 27	

Source: Compiled by the authors.

the efficiency of the settlement system through transaction netting is 7.1%. In terms of turnover, 39.6% of resources could be released (*Table 3*).

Such potential is considered essential for the group of companies, then it is necessary to consider options for increasing the efficiency of the intra-group settlements system.

As alternative options for rationalization of intra-group settlements system is the formation of two-way or multilateral clearing of obligations.

Two-way clearing in the holding companies involves calculation of a net payment position of each holding company in relation to another company, which is a potential domestic recipient or payer of funds on a month basis and shows the following results (*Table 4*).

Corporate structures that have a single center for management of financial flows, predisposed to the implementation of multilateral clearing in economic activities. This option implies the calculation of a net payment position of each holding company

in relation to all holding companies considered as a whole. When implementing a multilateral clearing with a central payment counterparty, the potential volume of funds transferred within the holding (at monthly clearance of obligations) is reduced by 143.5 bln rubles. Payment savings will amount to 17.5% of total actual money transfers for 2018–2020. Useful effect of multilateral clearing of obligations above the effect of bilateral clearing both on reduction of number of payment operations and on reduction of volume of transfers (*Table 5*).

In order to decide in favor of an option of a settlement and payment system, a net present value is calculated in the third step of the intra-group calculation algorithm. Taking into account the need for preparatory measures, as a start of the project of transformation of the settlement system through the introduction of clearing the beginning of 2021. The forecast period of the project implementation is defined in 5 years, which is due to the economic cycles of the company, strategic vision of the management regarding the future development of the

Table 6

Discount Rates Used to Calculate the Net Present Value of Project Implementation

Year	2021	2022	2023	2024	2025
r	8.17%	11.24%	13.62%	16.28%	19.31%

Source: Compiled by the authors.

Table 7

Forecast Cash Flow from Savings on the Payment Transactions Volume, mln rub.

Год / Year	2021	2022	2023	2024	2025
Option 1	1.38	1.41	1.47	1.47	1.50
Option 2	1.41	1.41	1.50	1.53	1.59

Source: Compiled by the authors.

Table 8

Forecast Cash Flow from Savings on the Payment Turnover Volume, mln rub.

Год / Year	2020	2021	2022	2023	2024
Option 1	18.54	29.66	37.08	44.49	48.20
Option 2	139.47	223.15	278.94	334.73	362.62

Source: Compiled by the authors.

Table 9

Comparison of Alternatives to the Design of the Settlement System

Conclusions and recommendations to improve the system of intra-holding settlements	Initial state	Option 1	Option 2
NPV project, mln rubles	–	51.55	834.53
Qualitative indicator	7.00	6.71	8.22

Source: Compiled by the authors.

holding and market conditions. To estimate the discount rate, a cumulative method was used, according to which the risk-free rate is adjusted for country, industry, management risks and inflation (Table 6).

In calculating the efficiency of the project, the initial investment costs for its launch

were estimated in the form of work on the collection, systematization and analysis of primary information on the system of settlements in the holding, work on the development of the clearing system, purchase of equipment, training of staff and other direct and overhead costs (management,

transaction, security, reserve formation). To predict the amount of cash flows generated by the project, a cost estimate of savings from changes in the values of quantitative efficiency factors was used.

To assess the effect of reducing the number of payment transactions, the cost of sending a payment order in accordance with the average tariff of the banks servicing operations of the holding is used (the forecast of clearing effect on the reduction of the volume of payment operations in 2021–2025 is obtained by extrapolation of the results of 2018–2020 evaluation, with adjustment for the strategic plans of the group of companies (Table 7).

To estimate the volume effect of the payment turnover, the estimated cost of placement of funds in low-risk financial instruments (bank deposits) was used. The calculation schedule of cash flows in the form of savings on the volume of payment turnover is presented in the Table 8.

The results of the calculations of the indicators of economic efficiency of the projects justify the choice of the second option and indicate the feasibility of introducing a monthly multilateral clearing of intra-holding obligations with a central counterpart (Table 9).

CONCLUSION

The article systematizes a complex of factors that determine the efficiency of the system of intra-group settlements, develops a method of rationalization of the settlement system of holding on the basis of clearing obligations, universal in the application of holding

companies. The research results generate a number of conclusions.

Firstly, the existing fragmentation of the holding into separate legal entities creates transaction costs. On individual companies of the holding there is a small payment turnover. The group of companies should consider merging individual companies to benefit the holding economy and without seriously harming business managers and owners.

Secondly, maximizing the benefits of the clearing system requires changes in the current structure of the holding organization. The results of cluster analysis based on the volume of payment turnover and the effect of two-way clearing differ from the actual structural device in the holding.

Thirdly, the presence of the SSC, which has already centralized the functions of formation and maintenance of payment operations of all participants of the holding, is the basis for building a single clearing center and transfer of authority of the central counterparty to multilateral clearing.

Fourthly, based on the analysis of options to improve the quality of the settlement system, it can be concluded that the clearing of mutual requirements will have a significant positive effect on the settlement system in the holding, will reduce the economic costs of the companies involved in the settlement, increase their financial reliability to external parties.

In general, it should be noted that the proposed method of rationalization of the system of intra-holding settlements has universality in application and can be used in solving managerial tasks within any holding.

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ABOUT THE AUTHORS



Yulia V. Nemtseva — Cand. Sci. (Econ.), Assist. Prof. of the Corporate Management and Finance Department, Novosibirsk State University of Economics and Management, Novosibirsk, Russia

<https://orcid.org/0009-0003-6676-6308>

Corresponding author:

nemtseva_july@mail.ru



Artur V. Bekker — economist, S7 Group, Novosibirsk, Russia

<https://orcid.org/0000-0003-4883-8331>

artur8bekker@mail.ru

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