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Sergienko O.

D.Sc. in Economics, Associate Professor, Professor of Business, Trade and Logistics Department, National Technical University «Kharkiv Polytechnic Institute», Kharkiv, Ukraine;
 e-mail: Elena.Sergienko@khp.edu.ua;
 ORCID: [0000-0002-9796-9218](https://orcid.org/0000-0002-9796-9218)
 (Corresponding Author)

Volosnikova N.

PhD in Economics, Associate Professor of General Economic Theory Department, National Technical University «Kharkiv Polytechnic Institute», Kharkiv, Ukraine;
 ORCID: [0000-0001-9076-5231](https://orcid.org/0000-0001-9076-5231)

Reshetniak N.

PhD in Economics, Associate Professor, Head of General Economic Theory Department, National Technical University «Kharkiv Polytechnic Institute», Kharkiv, Ukraine;
 ORCID: [0000-0003-0070-5038](https://orcid.org/0000-0003-0070-5038)

Mashchenko M.

D.Sc. in Economics, Associate Professor, Head of Economic Theory and Economic Policy Department, Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine;
 ORCID: [0000-0002-8863-6040](https://orcid.org/0000-0002-8863-6040)

Baranova V.

D.Sc. in Economics, Associate Professor of Travel Business and Regional Studies Department, V.N. Karazin Kharkiv National University, Kharkiv, Ukraine;
 ORCID: [0000-0002-8163-881X](https://orcid.org/0000-0002-8163-881X)

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CONCEPT OF FINANCIAL FLOW MANAGEMENT OF ENTERPRISE CORPORATE SECURITY SYSTEM

ABSTRACT

The concept of financial flows management of enterprise corporate security system is developed and justified in the article. The approaches to the assessment and analysis of the financial flow are analyzed. It is determined that the financial flow of enterprises' corporate security system should be understood as financial resources purposeful movement, which is a dynamic set in time and space within the logistics of processes at enterprises.

The paper proves that the time factor is an important criterion for the industrial enterprise resource security management effectiveness because the duration of the time of any task depends on many interdependent cycles and parameters.

It is emphasized that the vector of strategic goals in the multi-purpose model of integrated logistics processes at enterprises in a particular time period is complexly determined on the basis of various coefficients which are formed by the internal and external institutional environment analysis.

It is confirmed that modeling of financial resources of integrated logistics processes makes it possible not only to form the optimal vector of strategic goals of the multi-purpose model of integrated logistics processes but also to identify the interconnection between the composition and volume of incoming and outgoing financial flows of all enterprise integrated processes. Material flow management optimization as a key aspect of logistics activities is considered, which is achieved by attracting and allocating financial resources and realized in the financial flows of integrated logistics processes at enterprises. The urgency of the requirements of coherence of material, financial, informational, and other types of resource flows of integrated logistics processes at enterprises is determined.

It is proved the topicality and relevance of algorithms implementation for finding and analyzing performance indicators and decision-making criteria, which form the basis of the decision-making system for effective management of industrial enterprises' resource potential, including financial, in conditions of factors instability and significant changes in the micro and macroeconomic environment.

Keywords: financial flow, financial resources, integrated logistics processes, institutional environment, enterprise, corporate security

JEL Classification: G38, G39

INTRODUCTION

In the conditions of adaptation of Ukraine's economy to modern conditions, the prospects of functioning of enterprises of various forms of ownership and their efficient financial resource usage become of paramount importance. This raises the problem of determining the set of internal and external factors that affect the final result.

In connection with the competition intensification between producers and Ukraine's integration into the world economic space, the problem of protecting the interests of individual enterprises is becoming increasingly important. Particular attention should be paid to the economic entities' financial security. As a result of inefficient economic management and imbalance of key macroeconomic indicators, which is especially noticeable

for businesses, there is a lack of financial resources, and a constant search for sources of funding, which involves identifying available forms and methods of limited resources rational usage.

The financial resources of the corporate security system at enterprises, in the narrow sense, cover the management of the financial flow, which is part of the overall logistics processes. In the broad sense, the financial resources management of the enterprises' corporate security system can be seen as the implementation of logistics concepts in the enterprise financial activities management.

LITERATURE REVIEW

A wide range of tasks and methods related to the study of general problems of financial flow management in a market transformation is reflected in the scientific papers of many scientists such as Repko M., Ramskyi A., Loiko V., Sobolieva-Tereshchenko O., Loiko D., Zharnikova V., Vassilikopoulou A., Lepetsos A., Siomkos G., Chatzipanagiotou K. and many others.

However, despite the increased interest in the problems, there is a serious lack of systematic descriptions of the composition, structure, and functioning of financial flows in real economic systems, including in the corporate security subsystems. There are practically no scientific developments in the impact of the financial flows on the formation and development of the integrated logistics processes mechanism at enterprises in the direction of ensuring the appropriate security level. The need to develop and apply these theoretical provisions explains the relevance of the chosen article topic.

METHODS

The theoretical and methodological bases are fundamental research and the provisions of modern economics, scientific papers and methodological developments of leading Ukrainian and foreign scholars in the finance field.

RESULTS

The presence of a large number of different approaches to the definition of "financial flows" leads to different interpretations and management systems. According to the linguistic interpreter, "flow" is defined as "moving mass" [1]. Dollan E. J. also bases traditional schemes of financial circulation on the concept of "flow", because "financial circulation is a constant and long process, and one of the main parameters of the flow is the movement speed". In this case, the financial resources movement is carried out in the conditions of "relatively constant changes in the flow rate and direction of its movement in individual units" [2]. If we focus on the physical component of the financial flow, scientists' group [3, p. 163] notes that "financial flow is characterized by the physical flow characteristics, i.e. laminarity and turbulence, and flow control is carried out by switching and regulating the speed, circulation, inertia and regularity of flow".

The fundamental distinction between the concepts of "financial flows" and "financial resources" which is presented in L. Harris paper [4; 5; 12], in addition, is supported by institutional theory representatives [6, p. 142-147].

It should be noted that such approaches to financial flows determining, in our opinion, incorrectly highlight the role of financial resources in the enterprise logistics system. However, each approach and method have certain advantages and disadvantages, the significance of which depends on use and purpose conditions.

According to the basic logistics terms interpretation, "flow" means a set of objects that are a single whole, exist as a process distributed over time [7, p. 3; 10, p. 31]. In addition, the concept of "financial logistics flow" is used in logistics [7, p. 4-5], which means the directed movement of financial resources that rotate both within the logistics system and between the system and external entities for the security of a particular material flow efficient movement. That is, financial flow is understood solely in conjunction with the inventories and finished products movement. However, this financial logistics flow interpretation is not correct given the multifaceted enterprise functioning as an active participant in the product, financial and other markets.

However, there is no consensus on the definition of "financial flows of the corporate security system at enterprises" in the economic literature. That is why the main task in methodological approaches and practical recommendations developing for financial flows managing of the corporate security system at enterprises is to research the economic content and to carry out the analysis.

Applying the above scientific and methodological approaches, the financial flow of enterprises' corporate security system should be understood as a purposeful financial resources movement, which is a dynamic set in time and space within the logistics processes at enterprises, in addition, they are dynamic and therefore in the process of functioning are formed, distributed and used by individual logistics centers.

An important criterion for the effectiveness of industrial enterprise resource management is the time factor. The duration of any task depends on many interdependent cycles and parameters. General minimization is achieved by performing the task of minimizing the implementation of individual subcycles:

$$\min \sum_{i=1}^n T_i = \min(t_1, t_2, \dots, t_n) \quad (1)$$

where T is the total duration of the implementation cycle of the i -th solution.

The total duration of effective management decisions is determined by the intervals of its sub-cycles, including the time intervals during which recorded, accumulated, processed information received by the system, and adopted and implemented management decisions until the final result [8, p. 914-918; 13].

The time characteristic of the cycle duration is expressed by the total implementation time of all subcycles:

$$T = t_1 + t_2 + t_3 + t_4 + t_5 \quad (2)$$

where t_1 is time for data detection and recording; t_2 is time for data formation; t_3 is time for processing incoming information; t_4 is time for making an effective management decision; t_5 is time for implementation of the adopted management decision.

The total cost of preparation of the i -th decision should be minimal at a predetermined time of its implementation, taking into account the total cycle duration of the i -th decision:

$$\min \sum_{i=1}^n Cost_i \text{ at } \sum_{i=1}^n T_i \leq \tau_\lambda, n \quad (3)$$

where $\min \sum_{i=1}^n Cost_i$ is total costs for the i -th decision preparation; $\sum_{i=1}^n T_i$ is the total cycle duration of the i -th decision making; τ_λ is allowable time for the decision implementation.

The time to prepare a decision should be minimal while minimizing the total cost of its implementation:

$$\min \sum_{i=1}^n T_i \text{ at } \sum_{i=1}^n Cost_i \leq \varsigma_\lambda, n \quad (4)$$

where ς_λ is the given amount of total costs.

It should be noted that algorithms for finding and analyzing performance indicators and decision-making criteria are the basis of the security model of the decision-making system of industrial enterprises resource potential effective management in the factors instability and significant changes in the micro and macroeconomic environment.

The description of the model of industrial enterprise cumulative production technology is based on the sequence of cumulative technology formation, where the information system database sets cumulative norms of labor intensity for each equipment type [9, p. 115-118; 11].

Thus, the model of industrial enterprise cumulative production technology is based on the sequence of formation of the general technology using the cumulative rate of labor intensity for each equipment type. The duration of the sub-cycles for each stage of production of the j -th product are as follows:

$$Dur_i^t = \overline{P_i^t} - \underline{P_i^t} \quad (5)$$

where Dur_i^t is the duration of sub-cycles at each production stage of the j -th product; $\underline{P_i^t}$ is the beginning of the t -th production subcycle of the i -th product type. $\overline{P_i^t}$ is the end of the t -th production subcycle of the i -th product type.

When using this method, the norms of labor intensity for the j -th type of processing units of the i -th product in a certain time period must satisfy the following ratio:

$$\sum_{r=1}^r P_{ij}^r = P_{ij} \quad (6)$$

where P_{ij}^r is the rate of labor intensity for the j -th type of processing of the unit of the i -th product type in a certain time period; P_{ij} is a consolidated rate of the complexity of the i -th product type for the j -th operation.

Due to the fact that all processes of industrial enterprises' resource security subsystems will be carried out at certain intervals $\overline{P}_i^t, \overline{P}_i^t$, so the distribution of all consolidated norms of labor intensity P_{ij} it is necessary to predict at this stage. If the interval limits are not known, it is necessary to use an additional method of sub-cycles parameters calculating:

$$C = (\overline{P}_i^t + \sum_{i=1}^t Dur_i^t \overline{P}_i^t + \sum_{i=1}^t Dur_i^t) \quad (7)$$

Distribution of all consolidated norms of labor intensity on the forecasted interval $(\overline{P}_i^t, \overline{P}_i^t)$ described by a class of certain continuous functions:

$$P_{ij}(p) = \begin{cases} 0, & \text{if } p \in (\overline{P}_i^t, \overline{P}_i^t) \\ P_{i,j}, & \text{if } p \in (\overline{P}_i^t, \overline{P}_i^t) \end{cases} \quad (8)$$

Because the functions $P_{ij}(p)$ are random, their specific implementations in future periods will be predictable. When forecasting the uniform distribution of each consolidated norm in a particular subsystem of industrial enterprise resource security we can use the ratio:

$$P_{ij}^r = \frac{k((\overline{P}_i^t, \overline{P}_i^t) \cap (t-1, t))}{Dur_i^t} P_{ij} \quad (9)$$

provided $k((\overline{P}_i^t, \overline{P}_i^t) \cap (t-1, t)) = \min(\overline{P}_i^t, t) - \max(\overline{P}_i^t, t-1)$,

where $(t-1, t)$ is the beginning and end of the calendar period in the resource security subsystem; $k(\overline{P}_i^t, \overline{P}_i^t)$ is the length of the interval $(\overline{P}_i^t, \overline{P}_i^t)$.

The implementation of the distribution model makes it possible to reasonably determine the complexity of the production of specific products in the full technological process in order to effectively manage industrial enterprise resource potential.

The economic and mathematical apparatus and information support of such a system make it possible to make rational and effective decisions in the conditions of limited resources in the production process.

The financial resources of integrated enterprises' logistics processes in relation to the institutional environment can be in two states:

- "recipients of financial flows" (*Log F1*);
- "payers of financial flows" (*Log F2*).

Each state corresponds to a set of input (*IFLog*) and output (*OFLog*) logistics financial flows, which are formed under the influence of many internal (X^{in}) and external (Y^{ex}) factors that affect the composition and volume of input and output financial flows of integrated enterprises logistics processes.

Accordingly, the description of the state of integrated logistics processes at enterprises as recipients of financial flows (*Log F1*) takes the form:

$$Log F1 = f(IFLog(\{X^{in}\}; \{Y^{ex}\}), \mathcal{E}) \quad (10)$$

where \mathcal{E} is a random component that affects the financial flows of integrated enterprises logistics processes.

Similarly, a description of the state of integrated logistics processes in enterprises as payers of financial flows (*Log F2*) is formed:

$$Log F2 = f(OFLog(\{X^{in}\}; \{Y^{ex}\}), \mathcal{E}) \quad (11)$$

For the transition of integrated logistics processes from state $Log F1$ to $Log F2$ (i.e. $Log F1 \rightarrow Log F2$) there must be a decision (to be developed, adopted and implemented) on the distribution of incoming logistics financial flows in the relevant logistics areas. The decision on the distribution is also formed under the internal and external factors influence and depends on the initial system state:

$$Log F1 \rightarrow 2 = f(DFLog(\{X^{in}\}; \{Y^{ex}\}), \epsilon) \quad (12)$$

where $DFLog$ is distributed financial flows of integrated logistics processes at enterprises.

The indicator for integrated logistics processes financial resources management effectiveness assessment can be presented as:

$$\varphi_F^{Log} = \frac{\sum_{i=1}^n \omega_i \frac{LogF_i^{fact}}{LogF_i^t}}{\lambda} \rightarrow 1 \quad (13)$$

where φ_F^{Log} is the indicator for integrated logistics processes financial resources management effectiveness assessing; ω_i is the weight of the i -th sub-goal in the multi-purpose model of integrated logistics processes at enterprises; $LogF_i^{fact}$ is the factual quantitative characteristics of the i -th sub-goal in the multi-purpose model of integrated logistics processes at enterprises; $LogF_i^t$ is the target quantitative characteristics of the i -th sub-goal in the multi-purpose model of integrated logistics processes at enterprises; n is the number of sub-goals in the multi-purpose model of integrated logistics processes at enterprises ($0 < n < 1$); λ is the weighted average index of financial resources cot of integrated logistics processes at enterprises.

The limitations of the proposed model for integrated logistics processes financial resources management effectiveness assessment are:

$$\begin{cases} LogF_i^{fact} < LogF_i^t, \\ \sum_{i=1}^n \omega_i = 1 \\ \lambda \in (0; 1] \end{cases} \quad (14)$$

Thus, the effective financial resources management of integrated logistics processes at enterprises is provided when $LogF_i^{fact} = LogF_i^t$.

In a formalized form, the matrix of scores of internal and external institutional environment impacts (direct and indirect action) on the structure of the vector in the multi-purpose model of integrated logistics processes at enterprises is:

$$Log_{ij}^l = \begin{bmatrix} log_{11}^l, log_{12}^l, \dots, log_{1n}^l \\ log_{21}^l, log_{22}^l, \dots, log_{2n}^l \\ \dots \\ log_{m1}^l, log_{m2}^l, \dots, log_{mn}^l \end{bmatrix} = \begin{Bmatrix} 1 \\ 0 \\ -1 \end{Bmatrix} \quad (15)$$

The weight of the i -th sub-goal in the multi-purpose model of integrated logistics processes at enterprises is calculated as:

$$\omega_i = \frac{\sum_{m=1}^n log_{im}^l}{\sum_{i=1}^m \sum_{j=1}^n Log_{ij}^l} \quad (16)$$

The strategic goals vector in the multi-purpose model of integrated logistics processes at enterprises in a particular time period is determined complex on the basis of coefficients ω_i formed as a result of the internal and institutional environment analysis:

$$\overline{W_t^{log}} = \{\omega_1^{log}, \omega_2^{log}, \dots, \omega_{1t}^{log}\} \quad (17)$$

Modeling of financial resources of integrated logistics processes makes it possible not only to form the optimal strategic goals vector of the multi-purpose model but also to identify interrelations between the composition and volume of incoming and outgoing financial flows of integrated logistics processes at enterprises.

The material flow management optimization, as a key aspect of logistics activities, is achieved by attracting and allocating financial resources which are realized in the financial flows of integrated logistics processes at enterprises. Now when preparing, organizing and managing logistics processes, it is important to comply with a number of requirements for such parameters of financial flows as sufficiency, economy and reliability. The consistency requirement of material, financial, information and other resource flows types is especially relevant. Ensuring compliance with these items requires scientific research concerning the rational schemes movement of integrated logistics processes financial flows, the mechanism of operational corrective actions on flows, which have the flexibility and take into account dynamic changes in the environment.

In substantiating the sequence of management of financial flows of the corporate security system of the enterprise, in addition to the volume of financial flows and sources of their formation, the basic characteristics we have included the following (Fig. 1):

1. financial flow direction of the corporate security system;
2. financial flow speed of the corporate security system ($t_{0 \rightarrow 1}$);
3. financial flow strength of the corporate security system (v_t^{LogF});
4. financial flow rate ratio of the corporate security system ($K_{t_{0 \rightarrow 1}}^{LogF}$);
5. theoretical level of the financial flow liquidity of the corporate security system;
6. index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF});
7. volume of the total financial flow of the corporate security system, taking into account the index of financial flows operational optimization ($LogF^{sum}$);
8. real total financial flow of the corporate security system ($LogF\{I_{opt}^{LogF}\}$).

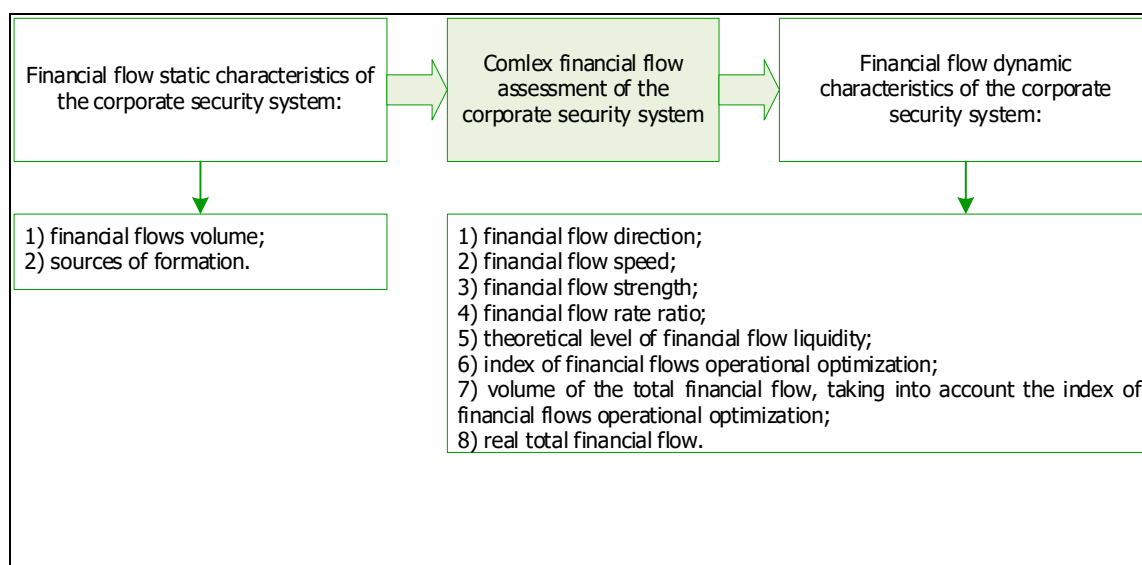


Figure 1. The structure of complex financial flow assessment of the enterprise corporate security system. (Source: developed by the authors on the basis of the material [10; 14])

Thus, the financial flows direction of the corporate security system reflects the ability to change the number of financial resources. Each financial flow of the corporate security system is in the system for a certain period and is characterized by the category of "direction of movement" and "sphere of circulation":

9. for incoming financial flows of the corporate security system at enterprises, the direction is set from the moment of legal grounds for the incoming financial flow formation to the moment when the flow becomes a resource and loses its dynamic properties;

10. for outgoing financial flows of the corporate security system at enterprises, the direction is set from the moment of legal grounds for the outgoing financial flow formation to the moment when the counterparties recognize the obligations fulfilled;
11. internal financial flows of the corporate security system are flows that do not go beyond the enterprise system;
12. external financial flows of the corporate security system are flows that go beyond the system or come from outside it.

The application of a scientific approach makes it possible to standardize the movement direction of incoming and outgoing financial flows of the corporate security system at enterprises. The enterprise financial flows are characterized by a set of objective relations that arise at the enterprise with the institutional environment and counterparties during the formation, distribution and usage of financial resources. Institutional relations mediate the financial resources movement and therefore financial resources need logistics, subordination of their movement to the corporate security system's general objectives (Fig. 2).

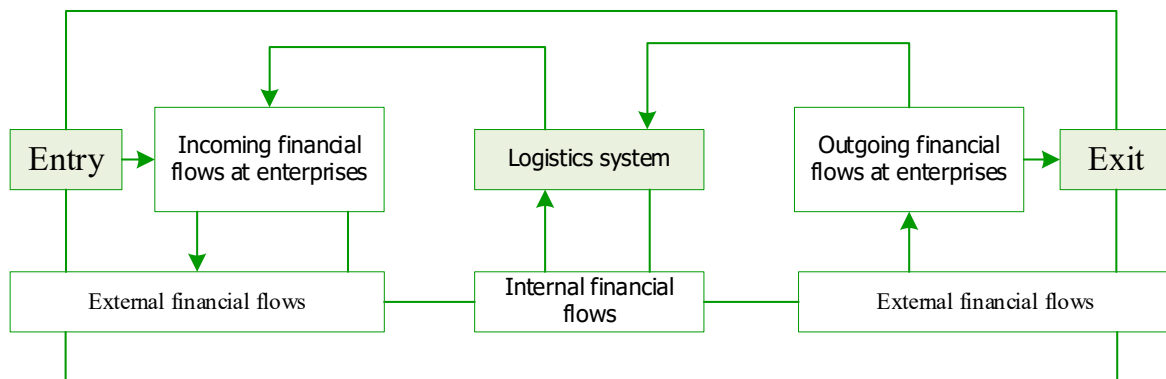


Figure 2. The direction of the enterprises corporate security system inflows and outflows. (Source: developed by the authors on the basis of the material [11])

The enterprise financial flow speed reflects the number of days during which the financial flow will be able to move from the initial t_0 state to the final t_1 , which will indicate the parties' fulfillment of their financial obligations under the corporate security system.

Accordingly, the financial flow strength reflects the cash flow amount that passes from the initial to the final state per unit time:

$$\overline{v}_i^{LogF} = \frac{LogF_i}{t_{0 \rightarrow 1}} \quad (18)$$

where \overline{v}_i^{LogF} is the financial flow strength; $LogF$ is financial flow nominal volume at enterprises; $t_{0 \rightarrow 1}$ is the financial flow speed at enterprises or the number of days for which the financial flow can move from the initial to the final state.

The application of the indicator "The financial flow strength of the corporate security system" shows the ability of the enterprise system to generate a certain amount of financial resources for the relevant period of time $t_{0 \rightarrow 1}$ for incoming financial flows and the ability to meet a certain amount of liabilities over a period of time $t_{0 \rightarrow 1}$ for the outgoing financial flows of the corporate security system [15; 16].

The financial flow rate ratio of the corporate security system at enterprises ($K_{t_{0 \rightarrow 1}}^{LogF}$) is used in estimating the financial flow liquidity level, which is determined as the ratio of the number of days required to obtain funds for the proper functioning of the system from the current enterprise account (t') and the financial flows speed:

$$K_{t_{0 \rightarrow 1}}^{LogF} = \frac{t'}{t_{0 \rightarrow 1}} \quad (19)$$

According to the results of calculating, the financial flow rate ratio of the corporate security system ($K_{t_{0 \rightarrow 1}}^{LogF}$) determines the theoretical level of financial flow liquidity, which varies from conditionally absolutely liquid to conditionally illiquid. In order to ensure the practical application of the indicator "the financial flow liquidity of the corporate security system" we

used index of financial flows operational optimization of the corporate security system which depending on the financial flow liquidity level varies from 1.0 (conditionally absolutely liquid) to 0.5 (illiquid) (Tab. 1).

The volume of the total financial flow of the corporate security system, taking into account the index of financial flows operational optimization (or focusing on the financial flow liquidity level) for a certain period is determined as [17, p.752; 18, p. 892]:

$$LogF\{I_{opt}^{LogF}\} = \sum_{i=1}^n LogF_i \cdot I_{opt}^{LogF} \quad (20)$$

where $LogF\{I_{opt}^{LogF}\}$ is the volume of the total financial flow of the corporate security system, taking into account the index of financial flows operational optimization.

Table 1. Index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF}) on the bases of the financial flow rate ratio ($K_{t_{0-1}}^{LogF}$).

Financial flow speed (t_{0-1})	Financial flow rate ratio ($K_{t_{0-1}}^{LogF}$)	Theoretical level of financial flow liquidity	Index of financial flows operational optimization (I_{opt}^{LogF})
1-2	1.0000-0.5000	Conditionally absolutely liquid	1.00
3-10	0.4900-0.1000	Conditionally highly liquid	0.98
11-30	0.0999-0.0330	Conditionally limited liquid	0.95
31-60	0.0329-0.0167	Conditionally average liquid	0.90
61-120	0.0166-0.0083	Conditionally low liquid	0.80
121-270	0.0082-0.0037	Conditionally poorly liquid	0.70
> 271	<0,0037	Conditionally illiquid	0.50

Thus, taking into account the index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF}) and taking into account changes in financial flow over time, we can determine real total financial flow of the corporate security system as [19, p. 507; 20, p.714-716]:

$$LogF^{sum} = \sum_{t=1}^T \frac{\sum_{i=1}^n LogF_i \cdot I_{opt}^{LogF} \cdot p_{it}}{(1+\eta_i)^t} \quad (21)$$

where $LogF^{sum}$ is the real total financial flow of the corporate security system, taking into account the index of financial flows operational optimization and changes in financial flow over time; p_{it} is the probability of the i -th financial flow occurrence of the corporate security system at enterprises; η_i is coefficient that takes into account the change in the money value.

The calculation results of the index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF}) and the financial flow speed of the corporate security system ($K_{t_{0-1}}^{LogF}$) for machine-building industry enterprises are presented in Tab. 2 and Fig. 3 and 4. The results of the calculation are very important for assessment of the cash flows effectiveness associated with the corporate security system, their purpose is determination the effectiveness of their formation and usage of enterprises' sustainable economic growth security.

Table 2. Results of the index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF}) and the financial flow rate ratio of the corporate security system ($K_{t_{0-1}}^{LogF}$) by enterprises of the machine-building industry.

№	Enterprises	Financial flow rate ratio ($K_{t_{0-1}}^{LogF}$)			Index of financial flows operational optimization (I_{opt}^{LogF})		
		2018	2019	2020	2018	2019	2020
1	PJSC «Turboatom»	0.0088	0.0092	0.0094	0.825	0.826	0.827
2	SE «Design Bureau «Southern» named after MK Yangel	0.7248	0.7456	0.7681	0.999	0.999	0.999
3	SE «Production Association «Southern Machine-Building Plant named after O.M. Makarova»	0.4425	0.4542	0.4588	0.975	0.976	0.976

(continued on next page)

Table 2. (continued)

№	Enterprises	Financial flow rate ratio ($K_{t_0-t_1}^{LogF}$)			Index of financial flows operational optimization (I_{opt}^{LogF})		
		2018	2019	2020	2018	2019	2020
4	SE «Electrovazhmash Plant»	0.0029	0.0031	0.0032	0.695	0.696	0.696
5	PJSC «Hartron»	0.0058	0.0062	0.0063	0.716	0.717	0.717
6	KP of special instrument making «Arsenal»	0.0068	0.0069	0.0072	0.725	0.725	0.726
7	State Scientific Production Enterprise «Kommunar Corporation»	0.0074	0.0082	0.0083	0.814	0.815	0.815
8	SE «Dnieper Electric Locomotive Plant»	0.0452	0.0468	0.0472	0.945	0.946	0.947
9	SE «Zorya» - «Mashproekt»	0.7569	0.7678	0.7689	0.999	0.999	0.999
10	PJSC «Pivdenkabel»	0.7688	0.7892	0.7844	0.999	0.998	0.996
11	PJSC Krukiv Carriage Building Plant	0.0524	0.0562	0.0546	0.948	0.949	0.948
12	PJSC Kremenchug Wheel Plant	0.03855	0.0368	0.0374	0.942	0.941	0.942
13	SE «Kharkiv Machine-Building Plant «FED»	0.7254	0.7386	0.7358	0.999	0.996	0.997
14	PJSC «Electric Motor»	0.0458	0.0486	0.0474	0.945	0.947	0.946
15	PJSC «Sumy plant «Nasosenergomash»	0.0564	0.0568	0.0549	0.949	0.949	0.948
16	PJSC «Kharkiv Bearing Plant»	0.7246	0.7485	0.7698	0.999	0.997	0.999
17	SE «Malyshev Plant»	0.0365	0.0366	0.0374	0.942	0.942	0.943
18	SE «Lviv Armored Plant»	0.0644	0.0685	0.0692	0.950	0.951	0.951
19	SE «Kyiv BTZ» SE «KBTZ»	0.0528	0.0586	0.0546	0.947	0.949	0.948
20	SE «HKBM» named after O.O. Morozova	0.7845	0.7954	0.7922	0.999	0.999	0.999
4	SE «Electrovazhmash Plant»	0.0029	0.0031	0.0032	0.695	0.696	0.696
5	PJSC «Hartron»	0.0058	0.0062	0.0063	0.716	0.717	0.717
6	KP of special instrument making «Arsenal»	0.0068	0.0069	0.0072	0.725	0.725	0.726
7	State Scientific Production Enterprise «Kommunar Corporation»	0.0074	0.0082	0.0083	0.814	0.815	0.815
8	SE «Dnieper Electric Locomotive Plant»	0.0452	0.0468	0.0472	0.945	0.946	0.947
9	SE «Zorya» - «Mashproekt»	0.7569	0.7678	0.7689	0.999	0.999	0.999
10	PJSC «Pivdenkabel»	0.7688	0.7892	0.7844	0.999	0.998	0.996
11	PJSC Krukiv Carriage Building Plant	0.0524	0.0562	0.0546	0.948	0.949	0.948
12	PJSC Kremenchug Wheel Plant	0.03855	0.0368	0.0374	0.942	0.941	0.942
13	SE «Kharkiv Machine-Building Plant «FED»	0.7254	0.7386	0.7358	0.999	0.996	0.997
14	PJSC «Electric Motor»	0.0458	0.0486	0.0474	0.945	0.947	0.946
15	PJSC «Sumy plant «Nasosenergomash»	0.0564	0.0568	0.0549	0.949	0.949	0.948
16	PJSC «Kharkiv Bearing Plant»	0.7246	0.7485	0.7698	0.999	0.997	0.999
17	SE «Malyshev Plant»	0.0365	0.0366	0.0374	0.942	0.942	0.943
18	SE «Lviv Armored Plant»	0.0644	0.0685	0.0692	0.950	0.951	0.951
19	SE «Kyiv BTZ» SE «KBTZ»	0.0528	0.0586	0.0546	0.947	0.949	0.948
20	SE «HKBM» named after O.O. Morozova	0.7845	0.7954	0.7922	0.999	0.999	0.999

The obtained results show that the enterprises referred to the high level of corporate security, namely SE «Design Bureau «Southern» named after MK Yangel, SE «Production Association «Southern Machine-Building Plant named after O.M. Makarova», SE «Zorya» - «Mashproekt», PJSC «Pivdenkabel», SE «Kharkiv Machine-Building Plant «FED», PJSC «Kharkiv Bearing Plant», SE «HKBM» named after O.O. Morozova have conditionally absolutely liquid and conditionally highly liquid theoretical level of financial flow liquidity. This means a significant excess of positive payments over negative, i.e. revenues over payments and corporate security sustainable development.

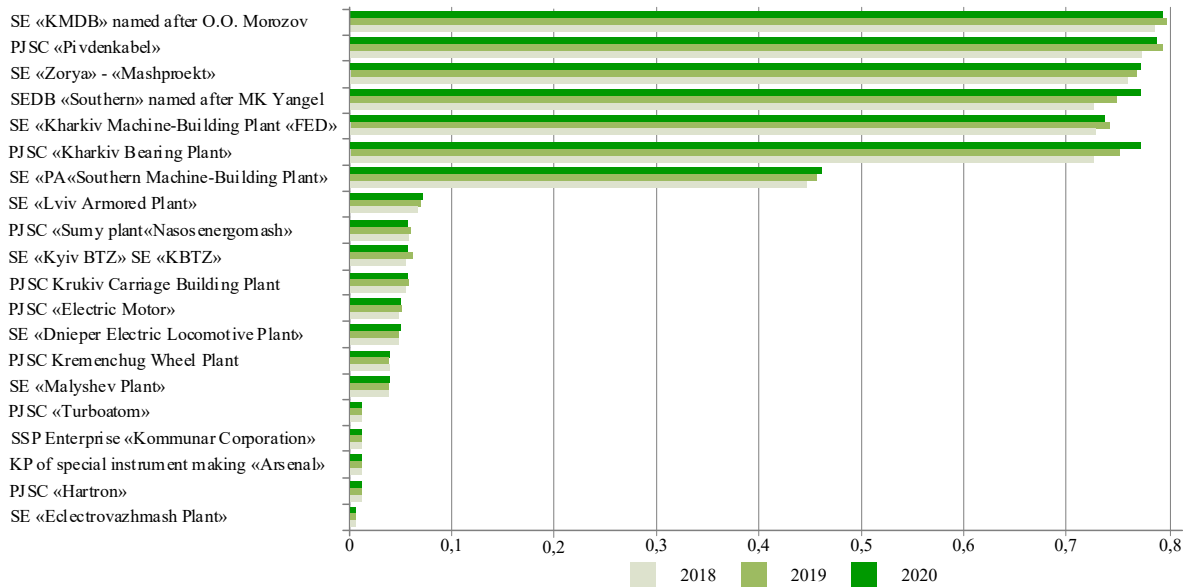


Figure 3. Dynamics of the financial flow rate ratio.

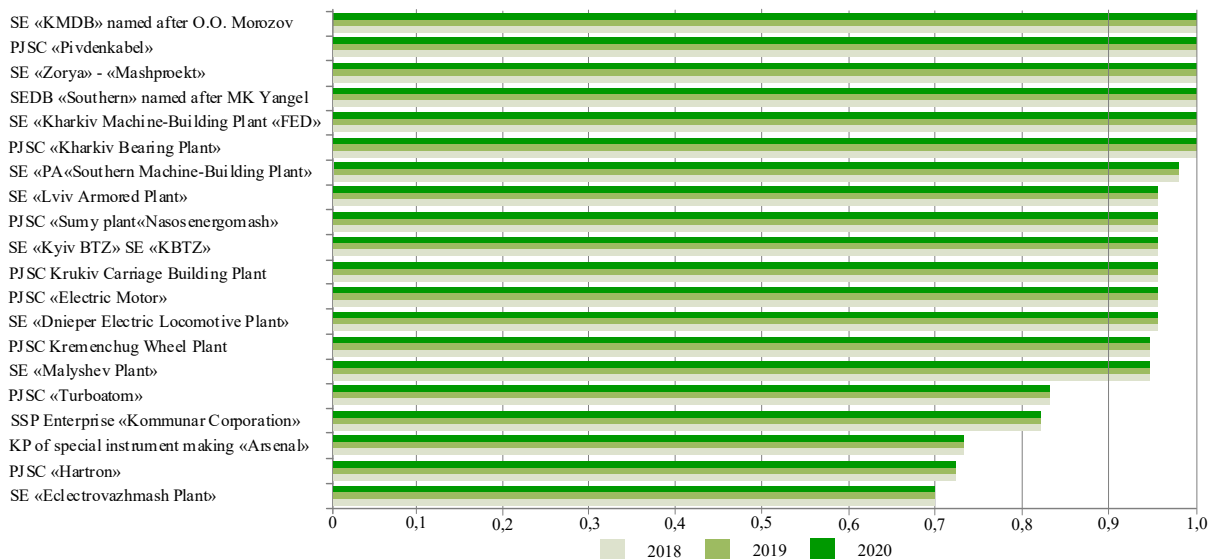


Figure 4. Dynamics of the index of financial flows operational optimization of the corporate security system.

According to the proposed method of calculating the index of financial flows operational optimization of the corporate security system (I_{opt}^{LogF}) on the bases of the financial flow rate ratio ($K_{t_0 \rightarrow 1}^{LogF}$) for investigated enterprises, namely PJSC Krukiv Carriage Building Plant, PJSC Kremenchug Wheel Plant, PJSC «Electric Motor», PJSC «Sumy plant «Nasosenergomash», SE «Dnieper Electric Locomotive Plant», SE «Malyshev Plant», SE «Lviv Armored Plant», SE «Kyiv BTZ» SE «KBTZ», which are referred to a sufficient or medium corporate security level have conditionally limited liquid and conditionally average liquid value of the calculated ratio. It also indicates the excess of revenues over payments and conditionally stable development of the corporate security system of these enterprises but requires constant monitoring of strategic development parameters.

Similarly, the index of financial flows operational optimization of the corporate security system on the bases of the financial flow rate ratio for such enterprises as PJSC «Turboatom», KP of special instrument making «Arsenal», SE «Electrovazhmash Plant», PJSC «Hartron», State Scientific Production Enterprise «Kommunar Corporation» showed conditionally low liquid, conditionally poorly liquid and conditionally illiquid levels. In previous research, we classified these machine-building enterprises from the research panel as enterprises with the weak corporate security level and they require certain emergency management solutions development.

The lowest values of the index of financial flows operational optimization of the corporate security system without positive dynamics have PJSC «Hartron» (0,716, 0,717 and 0,717 in 2018, 2019 and 2020 years respectively), and KP of special instrument making «Arsenal» (0,725 in 2018, 0,725 in 2019 and 0,726 in 2020 year).

CONCLUSIONS

It should be noted that algorithms for finding and analyzing performance indicators and decision-making criteria form the basis of the decision-making model of effective management of industrial enterprises financial security in conditions of instability and significant changes in the micro and macroeconomic environment [21, p.183-184].

The implementation of the proposed distribution model makes it possible to reasonably determine the complexity of the production of specific products throughout the technological process in order to effectively manage the industrial enterprise resource potential. The economic and mathematical apparatus and information support of such system allow decision-makers to make rational decisions in conditions of limited resources of the production process.

The goals of the financial strategy of the corporate security system in enterprises should be subordinated to the general strategy of economic development of the system and aimed at maximizing the profit and market value of the enterprise. When developing a financial strategy should take into account the dynamics of macroeconomic processes, trends in domestic financial markets, the possibility of diversification of the enterprise and changes in the institutional environment.

REFERENCES / ЛІТЕРАТУРА

1. Repko, M. (2019). Banking fragility rooted in justice failures Evidence from Ukraine. CEPS Paper in Liberty and Security in Europe, 08. Retrieved September 17, 2021, from <https://bit.ly/3FtniYe>.
2. Kirchner, R., Kravchuk, V., Repko, M., & Poluschkin, G. (2020). Banking Sector Monitoring: Ukraine Assessment of past reforms and COVID-19 impact. Retrieved September 17, 2021, from https://www.german-economic-team.com/ukraine/wp-content/uploads/sites/7/GET_UKR_PB_07_2020.pdf.
3. Ramskyi, A., Loiko, V., Sobolieva-Tereshchenko, O., Loiko, D., & Zharnikova, V. (2017). Integration of Ukraine into the European banking system: cleaning, rebooting and Basel III. *Banks and Bank Systems*, 12 (4), 163-174. [https://doi.org/10.21511/bbs.12\(4-1\).2017.05](https://doi.org/10.21511/bbs.12(4-1).2017.05).
4. Segura, E., Pogarska, O., Ustenko, O., Kozyarivska, L., & Kasyanenko, S. (2009). Ukraine's Financial Crisis: Past, Present and Future. Retrieved September 17, 2021, from https://bleyzerfoundation.org/files/tbf_reports/Ukrainian%20Financial%20Crisis%202009.pdf.
5. Shkura, I., & Peitsch, B. (2011). Assessing Ukrainian Banking Performance Before and after the Crisis. *Journal of Entrepreneurship, Management and Innovation*, 7, 29-42. Retrieved September 30, 2021, from <https://ssrn.com/abstract=2010602>.
6. Shevchuk, O. O. (2015). Kharakterystyka zlochynnosti v kredytno-finansovii systemi [Characteristics of crime in the credit and financial system]. Retrieved January 27, 2022, from <http://elar.naiu.kiev.ua/jspui/handle/123456789/7260> [in Ukrainian].
7. Blikhar, M. M. (2008). Customs policy of CEE countries in the context of integration to WTO: Realities and prospects for Ukraine. *Actual Problems of Economics*, Vol. 85, 3-8 (in Ukrainian).
8. Akhnovska, I. O. (2015). Antykryzove upravlinnia pidpriemstvom v umovakh nestabilnoho ekonomichnoho seredovyscha [Anti-crisis management of the enterprise in an unstable economic environment]. *Molody vchenyi - Young Scientist*, 2 (17), 914-918. Retrieved August 28, 2019, from <http://molodyvcheny.in.ua/files/journal/2015/2/514.pdf> [in Ukrainian].
9. Neskorodieva, I. I., & Pustovhar, S. A. (2014). Diahnostyka bankrutstva pidpriemstva z vykorystanniam tekhnolohii faktornoho analizu [Diagnostics of bankruptcy by using factor analysis technology]. *Finansy Ukrainy — Finance of Ukraine*, 7, 114-125. Retrieved August 30, 2021, from http://finukr.org.ua/?page_id=775&lang=ru&aid=4126 [in Ukrainian].
10. Orlova, K. Ye. (2015). Udoskonalennia metodyky analizu zovnishnoho seredovyscha promyslovykh pidpriemstv [Improving the methodology of analysis of the external environment of industrial enterprises]. *Molody vchenyi - Young Scientist*, 2 (17), 204-208. Retrieved August 30, 2021, from <http://molodyvcheny.in.ua/files/journal/2015/2/107.pdf> [in Ukrainian].

11. Vassilikopoulou, A., Lepetsos, A., Siomkos, G., & Chatzipanagiotou, K. (2009). The importance of factors influencing product-harm crisis management across different crisis extent levels: A conjoint analysis. *Journal of Targeting, Measurement and Analysis for Marketing*, 17 (1), 65-74.
12. Devece, C., Peris-Ortiz, M., & Rueda-Armengot, C. (2016). Entrepreneurship during economic crisis: success factors and paths to failure. *Journal of business research*, 69, 5366-5370. Retrieved November 30, 2021, from https://www.researchgate.net/publication/303180089_Entrepreneurship_during_economic_crisis_Success_factors_and_paths_to_failure.
13. Jermias, J., & Yigit, F. (2019). Factors affecting leverage during a financial crisis: Evidence from Turkey. *Borsa Istanbul Review*, 19, 2, 171-185. Retrieved November 25, 2021, from <https://www.sciencedirect.com/science/article/pii/S214845017300728>.
14. Sun, J., He, K. Y., & Li, H. (2011). SFFS-PC-NN optimized by genetic algorithm for dynamic prediction of financial distress with longitudinal data streams. *Knowledge-Based Systems*, 24 (7), 1013-1023. <https://doi.org/10.1016/j.knsys.2011.04.013>.
15. Sun, J., & Li, H. (2009). Financial distress early warning based on group decision making. *Computers & Operations Research*, 36 (3), 885-906. <https://doi.org/10.1016/j.cor.2007.11.005>.
16. Almamy, J., Aston, J., & Ngwa, L. N. (2016). An evaluation of Altman's Z-score using cash flow ratio to predict corporate failure amid the recent financial crisis: Evidence from the UK. *Journal of Corporate Finance*, 36, 278-285. <https://doi.org/10.1016/j.jcorpfin.2015.12.009>.
17. Semenov, A., Kuksa, I., Hnatenko, I., Sazonova, T., Babiy, L., & Rubezhanska, V. (2021). Management of energy and resource-saving innovation projects at agri-food enterprises. *TEM Journal*, 10 (2), 751-756. <https://doi.org/10.18421/TEM102-32>.
18. Sohn, S. Y., Kim, H. S., & Moon, T. H. (2007). Predicting the financial performance index of technology fund for SME using structural equation model. *Expert Systems with Applications*, 32 (3), 890-898. <https://doi.org/10.1016/j.eswa.2006.01.036>.
19. Zos-Kior, M., Hnatenko, I., Isai, O., Shtuler, I., Samborskyi, O., & Rubezhanska, V. (2020). Management of efficiency of the energy and resource saving innovative projects at the processing enterprises. *Management Theory and Studies for Rural Business and Infrastructure Development*, 42 (4), 504-515. <https://doi.org/10.15544/mts.2020.52>.
20. Azamatova, R., Shadova, Z., & Shorova, B. (2017). Economic security and international relations in the European Union. *Journal of Security and Sustainability*, 6 (4), 711-718. [https://doi.org/10.9770/jssi.2017.6.4\(15\)](https://doi.org/10.9770/jssi.2017.6.4(15)).
21. Voronkova, O., & Volenko, V. (2021). The advanced experience in the organization of the combined systems of the state financial control and its importance for Ukraine. *Financial and credit activity: problems of theory and practice*, 3 (38), 182-190. <https://doi.org/10.18371/fcaptp.v3i38.237442>.

Сергієнко О. А., Волоснікова Н. М., Решетняк Н. Б., Мащенко М. А., Баранова В. В.

КОНЦЕПЦІЯ УПРАВЛІННЯ ФІНАНСОВИМИ ПОТОКАМИ СИСТЕМИ КОРПОРАТИВНОЇ БЕЗПЕКИ ПІДПРИЄМСТВА

У статті розроблено та обґрунтовано концепцію управління фінансовими потоками системи корпоративної безпеки підприємства. Проаналізовано підходи до оцінки та аналізу фінансових потоків. Визначено, що під фінансовим потоком системи корпоративної безпеки на підприємствах слід розуміти цілеспрямований рух фінансових ресурсів, що являє собою динамічну сукупність у часі та просторі в межах логістизації процесів на підприємствах.

У роботі доведено, що важливим критерієм ефективності управління ресурсною безпекою промислового підприємства є часовий чинник, тому що тривалість часу виконання будь-якого завдання залежить від множини взаємозалежних циклів та параметрів.

Наголошується, що вектор стратегічних цілей у багатоцільовій моделі інтегрованої логістизації процесів на підприємствах у конкретний часовий період визначається комплексно на основі різних коефіцієнтів, сформованих за результатами аналізу внутрішнього та зовнішнього інституційного середовища.

Підтверджено, що моделювання фінансових ресурсів інтегрованих логістичних процесів дає змогу не тільки сформувати оптимальний вектор стратегічних цілей багатоцільової моделі інтегрованої логістизації процесів, а й виявити взаємозв'язки між складом та обсягом вхідних і вихідних фінансових потоків усіх інтегрованих процесів на підприємствах. Розглянуто оптимізацію управління матеріальними потоками як ключового аспекту логістичної діяльності,

що досягається шляхом залучення та розподілу фінансових ресурсів, що реалізуються у фінансових потоках інтегрованої логістизації процесів на підприємствах. Визначено актуальність вимог узгодженості матеріальних, фінансових, інформаційних та інших видів ресурсних потоків інтегрованої логістизації процесів на підприємствах.

Доведено актуальність та релевантність запровадження алгоритмів знаходження й аналізу показників ефективності та критеріїв прийняття рішень, які складають основу моделі системи прийняття рішень ефективного управління ресурсним потенціалом, у тому числі фінансовим, промислового підприємства в умовах нестабільності факторів і суттєвих змін у мікро- та макроекономічному середовищі.

Ключові слова: фінансовий потік, фінансові ресурси, інтегрована логістизація процесів, інституційне середовище, підприємство, корпоративна безпека

JEL Класифікація: G38, G39