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**Decision-making method and recommendations for selecting and using a stock  
exchange terminal**

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**Abstract**

Today, the number of brokers in the financial market is huge, which creates a kind of financial management problem and actually amounts to a situation of uncertainty. Consequently, it becomes difficult for investors to make an effective decision to sign a contract with an intermediary. Purposeful use of modern information technologies creates new opportunities for financial management of the stock market. Such technologies provide the stock market with effective decision-making rules to adapt to the changing environment arising from uncertainty. The article discusses an analysis of the characteristics of the most used stock exchange terminals, the rate of their usability, and the risk content. Based on the analysis, a new method and recommendation for terminal selection-use decision-making has been developed.

**Key words:** Stock market, securities, investor, broker, information technology, exchange terminal, decision making, alternative, ranking.

The stock exchange, as is known, is a system of settlement of securities or monetary relations. The securities settlement system organizes financial management: the accumulation, distribution and investment of funds through the sale and purchase of securities. Modern systems for such purposes should have a well-developed infrastructure to create a favorable environment for potential investors to achieve the goal of making a profit. One of the outstanding participants of this process is the intermediary (broker). It arranges credit, commercial, foreign exchange and insurance operations between the buyer and the seller on certain types of goods and services on the basis of a legal fact - an agreement (contract).

Today, the number of brokers in the financial market is huge. This is what creates a kind of financial management problem, which equates to a situation of uncertainty and complicates the effective decision-making process of signing a contract with one or another intermediary on the part of investors. Therefore, a large number of investors lose their savings and the chance of profit in an unequal "battle" with professional players.

Targeted use of exchange information technologies and communications as modern tools can play a certain role in the sustainable development of the mentioned process [1].

Modern information technologies include new opportunities and new tools for financial management of the stock market, which dictates effective decision-making rules for the stock market to adapt to the changing environment created in a situation of uncertainty. A high-level intermediary should be able to offer its client, as an additional service, trading information technology with a wide range of capabilities. This technology should provide optimal management of all other processes, starting with simple "advice" on transactions and recommendations without the participation of the investor, ending with fully automated trading of the investor's trading account.

The symbiosis of information technology and financial management can change the world of stock markets, and make its environment more accessible, which will lead to a sharp change in the current trends of financial market management, and improvement, development, and sustainability of intermediary services.

The securities market information system (SMIS) as a whole should include: a set of organizational, technical, software and information tools that will effectively perform management and decision-making support functions - Fig. 1.

The organizational tool of SMIS includes the means of organizing the information support of the financial management process. Information support helps the intermediary to receive timely useful and reliable information

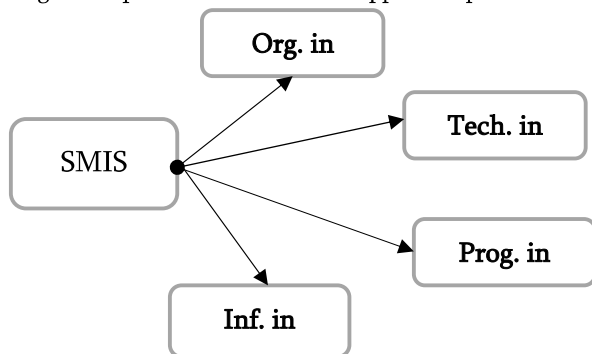


Fig. 1. Structure of the securities market information system

available on the exchange market for all links of the financial management system.

Here we would like to point out that for private investors, the information they receive from news agencies through TV channels or in the form of information printed in newspapers is sufficient. As for intermediaries, this information is not enough for them. They need to provide statistical and analytical information, and at the same time, modern means and methods of rapid information delivery, so that information can be provided in real time. Without this, the delay in information can affect the operation and decision-making process, leading to the failure of the investment deal.

The organizational tool also includes an automated system for controlling financial management processes. This is necessary because the securities market system is characterized by instability, which is caused by the constant dependence of the system on the external environment and changes in the corresponding inevitable processes, such as: currency exchange rate, international situation, stock price fluctuations, etc.

The organizational tool of SMIS should provide a reliable connection between the structure of the internal information system and the information flow of the external environment. To perform this role effectively and reliably, a proper, modern technical (computer and digital) and software system is required. We emphasize that technical support is one of the important components of investing, which includes, first of all, software, which is necessary for the search, acquisition and subsequent monitoring of the investment portfolio.

Today, the entire securities industry is geared toward simplifying this process. Accordingly, investors also try to use various technical tools that are convenient for them in their work. In particular, some investors sell and buy securities through the websites of their intermediaries; Some use special web applications or mobile applications developed by intermediaries. We note here that this way is not perfect and effective, because it contains a lot of risks and expected harmful results. We recommend professional investors to use a special exchanges terminal designed for trading.

The purpose of the article is to consider the most used exchange terminals by intermediaries today, to analyze their characteristics, usability and risk content, and to develop a decision-making method and recommendations for terminal selection and use.

As mentioned above, exchange terminals are divided into two types. One is local terminals handled by intermediaries, and the other is universal terminals.

In our case, we have presented universal terminals as the subject of discussion and analysis.

First of all, let's define the selection criteria of the terminals, on the basis of which we can get recommendations and advice for making the selection decision.

As a basis for determining the criterion, we can use such basic characteristics of the terminal as:

1. Availability, convenience and ease of use of the terminal;
2. How it is possible for investors to trade different classes of instruments with the terminal;
3. How comfortably and transparently a trade operation can be conducted;
4. What is the ability to monitor the current state of the purchased individual assets and its entire portfolio;
5. What level of data analysis is possible.

However, our proposed method does not limit the choice of criteria, and it is possible to achieve the desired decision-making result with any number and content of criteria.

At the beginning, we structure the terminal characteristics (criteria) as a set of alternatives - ranking them using pairwise comparisons.

Let's introduce notations:

$i$  – terminal type index;

$j$  – terminal characteristics (criteria) index;

$T_i$  – number of different types of terminals,  $i = \overline{1, n}$ ;

$K_j$  – number of characteristics (criteria) of terminals,  $j = \overline{1, m}$ .

$k_{ij}$  –  $j$  characteristic of terminal (criterion)  $i$ .

We perform a pairwise comparison for every identically named (alternative)  $k_{ij}$  – characteristics of each terminal.

As a result of pairwise comparison, we get three options:

1.  $k_{11} \approx k_{21}$ , where the symbol " $\approx$ " denotes the equivalence of alternatives;
2.  $k_{11} > k_{21}$ , where the symbol ">" denotes  $k_{11}$  is better than  $k_{21}$ ;
3.  $k_{11} < k_{21}$ , where the sign "<" means  $k_{11}$  is worse than  $k_{21}$ .

There are different methods of ranking. In our case, we use the "sum of rows" method. To do this, first of all, we will build a pairwise comparison table for the single-index characteristic of each terminal.

For the first characteristic of the terminals, the table will look as follows (Table 1):

Table 1

General form of pairwise comparison					
	$k_{11}$	$k_{21}$	$\dots$	$k_{n1}$	Total
$k_{11}$	*				
$k_{21}$		*			
$\vdots$					
$k_{n1}$				*	

The names of rows and columns in the table correspond to the names of single-index characteristic (alternatives). The  $k_{ij}$  element of the intersection of rows and columns in the table is defined as follows:

$$k_{ij} = \begin{cases} 1, & \text{if the row naming alternative is better than the column naming alternative;} \\ 0 & \text{if the row naming alternative is worse than the column naming alternative;} \\ 0.5 & \text{if the alternatives are equal.} \end{cases}$$

Nothing is written in the crossing of single-name alternatives of rows and columns (in our case, we write the symbol - "\*\*") .

After filling the table, the sum of the numbers obtained in the row is written in the last column. Based on this total, the ranking table will be built.

To build the ranking table, we find the sum of the results of the comparison of each characteristic of each terminal -  $(T_i K_j)$ :

$$(T_i K_j) = \sum k_{ij};$$

Let's consider the example.

For example, we chose the following four exchange terminals mostly used today: **Metatrader, Fusion, Quik, Transaq** [2].

We have analyzed each terminal according to the above five criteria and as a result we have compiled the tables (Tables 2 – 6).

Table 2

Pairwise comparison for the first characteristic

	$k_{11}$	$k_{21}$	$k_{31}$	$k_{41}$	Total
$k_{11}$	*	0	1	0	1
$k_{21}$	1	*	1	1	3
$k_{31}$	0	0	*	1	1
$k_{41}$	1	0	0	*	1

Table 4

Pairwise comparison for the third characteristic

	$k_{13}$	$k_{23}$	$k_{33}$	$k_{43}$	Total
$k_{13}$	*	0	0.5	1	1.5
$k_{23}$	1	*	0.5	1	2.5
$k_{33}$	0.5	0.5	*	0	1
$k_{43}$	0	0	1	*	1

Table 3

Pairwise comparison for the second characteristic

	$k_{12}$	$k_{22}$	$k_{32}$	$k_{42}$	Total
$k_{12}$	*	0	1	0	1
$k_{22}$	1	*	0.5	1	2.5
$k_{32}$	0	0.5	*	0	0.5
$k_{42}$	1	0	1	*	2

Table 5

Pairwise comparison for the fourth characteristic

	$k_{14}$	$k_{24}$	$k_{34}$	$k_{44}$	Total
$k_{14}$	*	0	1	0.5	1.5
$k_{24}$	1	*	0	1	2
$k_{34}$	0	1	*	1	2
$k_{44}$	0.5	0	0	*	0.5

Table 6

Pairwise comparison for the fifth  
characteristic

	$k_{15}$	$k_{25}$	$k_{35}$	$k_{45}$	Total
$k_{15}$	*	0.5	1	1	2.5
$k_{25}$	0.5	*	1	0	1.5
$k_{35}$	0	0	*	1	1
$k_{45}$	0	1	0	*	1

Calculate the relative evaluation of each characteristic of each terminal:

$$(T_i K_j) = \sum k_{ij}; \quad i = \overline{1,4}; \quad j = \overline{1,5}$$

$$(T_1 K_j) = 1 + 1 + 1.5 + 1.5 + 2.5 = 7.5;$$

$$(T_2 K_j) = 3 + 2.5 + 2.5 + 2 + 1.5 = 11.5;$$

$$(T_3 K_j) = 1 + 0.5 + 1 + 2 + 1 = 5.5;$$

$$(T_4 K_j) = 1 + 2 + 1 + 0.5 + 1 = 5.5.$$

According to these data, the ranking of terminals will look as follows - Table 7:

Table 7

Terminal ranks

Rank	Terminal
1	$T_2$ - Fusion
2	$T_1$ - Metatrader
3	$T_3, T_4$ - Quik, Transaq

As we can see, we got a non-strict sort, because the third rank is assigned to two terminals at the same time. However, the first place is taken by the second terminal - **Fusion**.

What action should we take to make the decision to choose a terminal, if two or more terminals were in the first rank at the same time?

In this case, the decision-maker - the intermediary - prefers the terminal, taking into account the advantages of its characteristics.

Consider this case with the example of the third and fourth terminals, which are assigned the same rank.

The total result of comparing the second characteristics of the third and fourth terminals (How is it possible for investors to trade different classes of instruments using the terminal?) is 0.5 and 2, respectively; And the total result of the comparison of the fourth characteristic (What opportunities does the terminal have to monitor the

current state of individual purchased assets and its entire portfolio?) is 2 and 0.5, respectively. The rest of the total is the same.

If the second characteristic is more favorable to the mediator, then terminal  $T_4$  will advance in rank, and if the fourth characteristic is more favorable to the mediator, then  $T_3$  will advance in rank.

In today's world, using computer technology, we can simplify decision making and minimize risks as much as possible. And this issue is especially important when it comes to the financial side, since it is finances and their management that occupy a special place in our lives.

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თამარ ჩაჩანიძე

#### გადაწყვეტილების მიღების მეთოდი და რეკომენდაციები საფონდო ბირჟის ტერმინალის შერჩევა-გამოყენებისათვის

#### რეზიუმე

დღეს, ბროკერების რაოდენობა ფინანსურ ბაზარზე უზარმაზარია, რაც ქმნის ფინანსური მენეჯმენტის ერთგვარ პრობლემას და ფაქტობრივად გაურკვევლობის სიტუაციას უტოლდება. შესაბამისად, რთულდება ინვესტორების მხრიდან შუამავალთან ხელშეკრულების გაფორმების ეფექტიანი გადაწყვეტილების მიღების პროცესი. თანამედროვე საინფორმაციო ტექნოლოგიების მიზანმიმართული გამოყენება ქმნის საფონდო ბირჟის ფინანსური მენეჯმენტის ახალ შესაძლებლობებს. ასეთი ტექნოლოგიები საფონდო ბირჟას აწვდის გადაწყვეტილების მიღების ეფექტიან წესებს გაურკვევლობის სიტუაციაში შექმნილ ცვალებად გარემოსთან ადაპტირებისათვის. სტატიაში განხილულია შუამავლების მიერ დღეისათვის ყველაზე გამოყენებადი საბირჟო ტერმინალების მახასიათებელი თვისებების, მათი გამოყენებადობის ხარისხის და რისკის შემცველობის ანალიზი. ანალიზის საფუძველზე დამუშავებულია ტერმინალის შერჩევა-გამოყენების გადაწყვეტილების მიღების ახალი მეთოდი და რეკომენდაცია.