

## ТЕХНИЧЕСКИЕ НАУКИ

ИНФОРМАТИКА, ВЫЧИСЛИТЕЛЬНАЯ  
ТЕХНИКА И УПРАВЛЕНИЕ

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РАЗРАБОТКА МЕТОДИКИ ПОИСКА И АНАЛИЗА  
АКТИВНОСТИ КОНТРАГЕНТОВTHE DEVELOPMENT OF THE SEARCHING AND ANALYSIS  
METHODS OF THE CONTRACTORS' ACTIVITY

*В данной работе представлен подход к разработке методики поиска и анализа активности контрагентов. Предложены разные методы поиска и анализа активности деятельности контрагентов. Разработана автоматизированная система поиска и анализа активности контрагентов (АСПААК). Получены результаты данных методов, с помощью которых выполнена оценка эффективности процедур поиска и анализа активности контрагентов.*

*This article presents an approach to the development of the searching and analysis methods of the contractors' activity. Various methods of searching and analyzing the activity of the contractors are proposed. The automated system of searching and analysis of the activity of contractors (ASSAAC) is developed. As a result we have got the methods by which the effectiveness of the searching and analysis of the contractors' activity can be estimated.*

**Ключевые слова:** активности контрагентов; ABC-анализ; XYZ-анализ; FMR-анализ; RFM-анализ.

**Key words:** activity of contractors; ABC-analysis; XYZ-analysis; FMR-analysis; RFM-analysis.

One of the most important tasks of the automation of a travel company is the automation of data analysis and receiving statistics. To make the right strategic decisions the software, used by a travel agency, should form an exhaustive number of statistical reports showing the profitability of the company during the time interval, and the average yield of applications in the fields and tour operators, etc. This gives the agency the proper focus on the market and allows developing the necessary activities, building relationships with tour operators, at the right time to give the necessary advertising and to assess how it works.

The purpose of this work is to improve the efficiency of the search and analysis of the activity of contractors by combining different methods of statistical analysis.

Existing methods of analysis may be:

- ABC-analysis. The tool allows you to explore the product range, to determine the ranking of goods specified criteria and to identify the part of the range that provides maximum effect [1];
- XYZ-analysis. The tool allows you to divide the products according to the degree of stability of sales and the level of volatility of consumption [2];

- FMR-analysis. The tool is used to study the product range of the frequency of references / capture;

- RFM-analysis. The tool is used for the customer segmentation in the analysis of loyalty marketing [3, 7];

Combining the methods of analysis is applied for the formation of the rules of management of goods / inventory using a joint ABC – XYZ – FMR – VEN classification, specifying for each of the subgroups its own unique logistics management rules [4, 5, 6, 8].

#### **The design of the automated system of searching and analysis of contractors' activity**

Basic requirements for ASSAAC must be the following:

- organization of reference data;
- maintaining databases «tour», «customers» and the information (the firm for travel agents);
- classification permits according to their importance;
- classification of passes on the degree of stability of sales;
- classification permits the frequency of calls / taking;

- predicting the behavior of travel agents;
- carrying out the recommendations and create a report based on the analysis result;
- searching for travel permits by criteria.

Table 1

Description of the methods for analyzing the contractors' activity

Name	Parameter for grouping	The purpose of analysis
ABC-analysis	The number of permits issued to customers (i.e. the number of tourists)	Classification of resources, travel agents (vouchers) on the degree of stability of sales and the level of volatility of consumption
XYZ-analysis	The number of permits issued to customers (i.e. the number of tourists)	Classification of resources, travel agents (vouchers) on the degree of stability of sales and the level of consumption' volatility
FMR-analysis	The number of permits issued to customers	Classification of resources, travel agents (trips) the frequency of calls / taking
RFM-analysis	The time of the latest sale of tickets, the number of customers served by travel agents, the sales vouchers	Predicting the behavior of travel agents, based on their past sales of permits

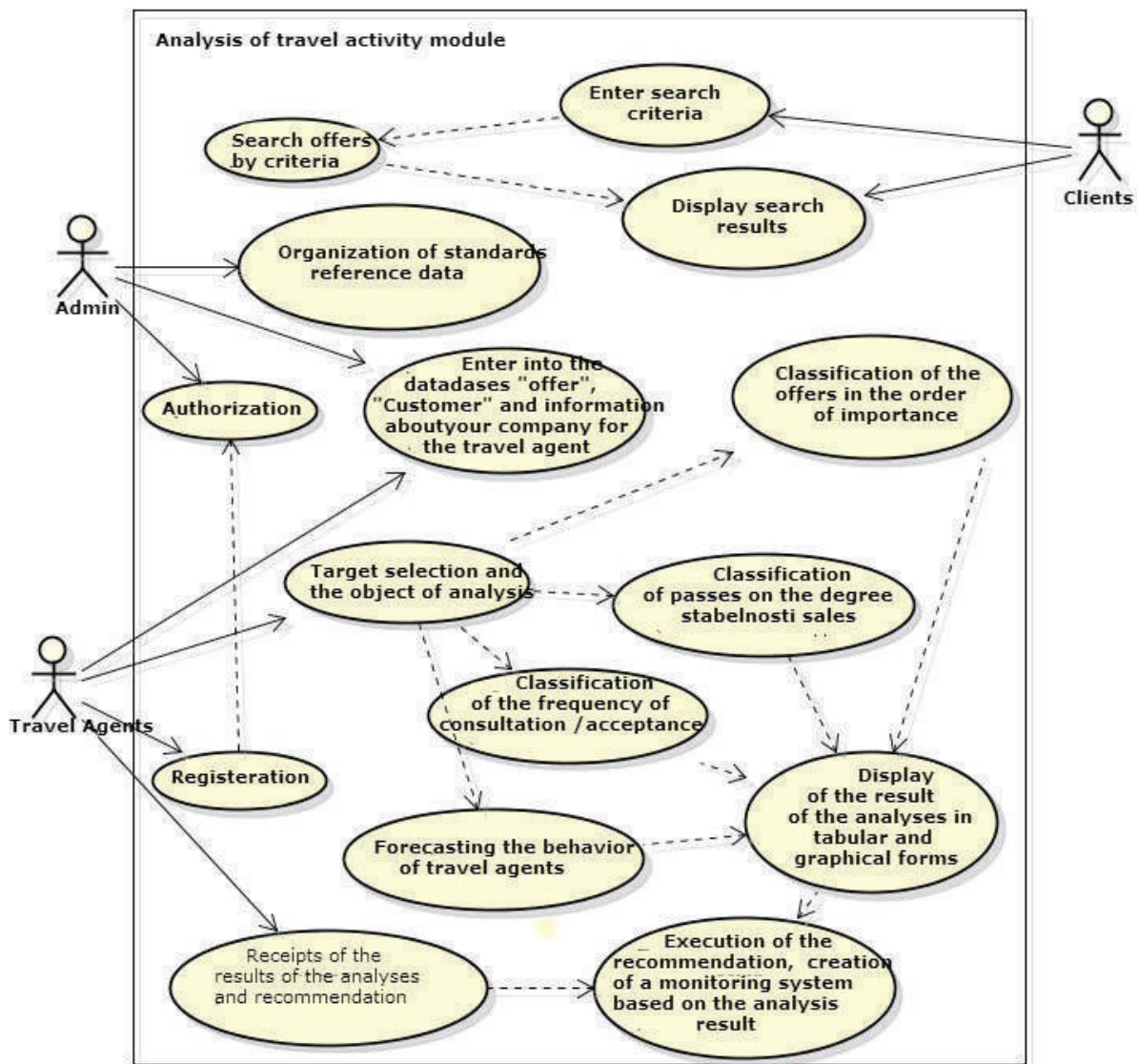


Figure 1. Diagram of precedents based on the requirements to ASSAAC

While designing ASPAAK the following classes were developed (Fig. 2): WebPagePutevki.aspx (maintaining a database of permits); DataAccessLayer (database management); Putevka (tour description); WebPageTuragenta.aspx (maintaining a database of travel agents); Poisk (Search travel agents); Analiz (analysis of the activity of travel agents); and other classes.

To show the interaction between the developed classes ASSAAC the sequence diagram was designed, it is shown in Fig. 3.

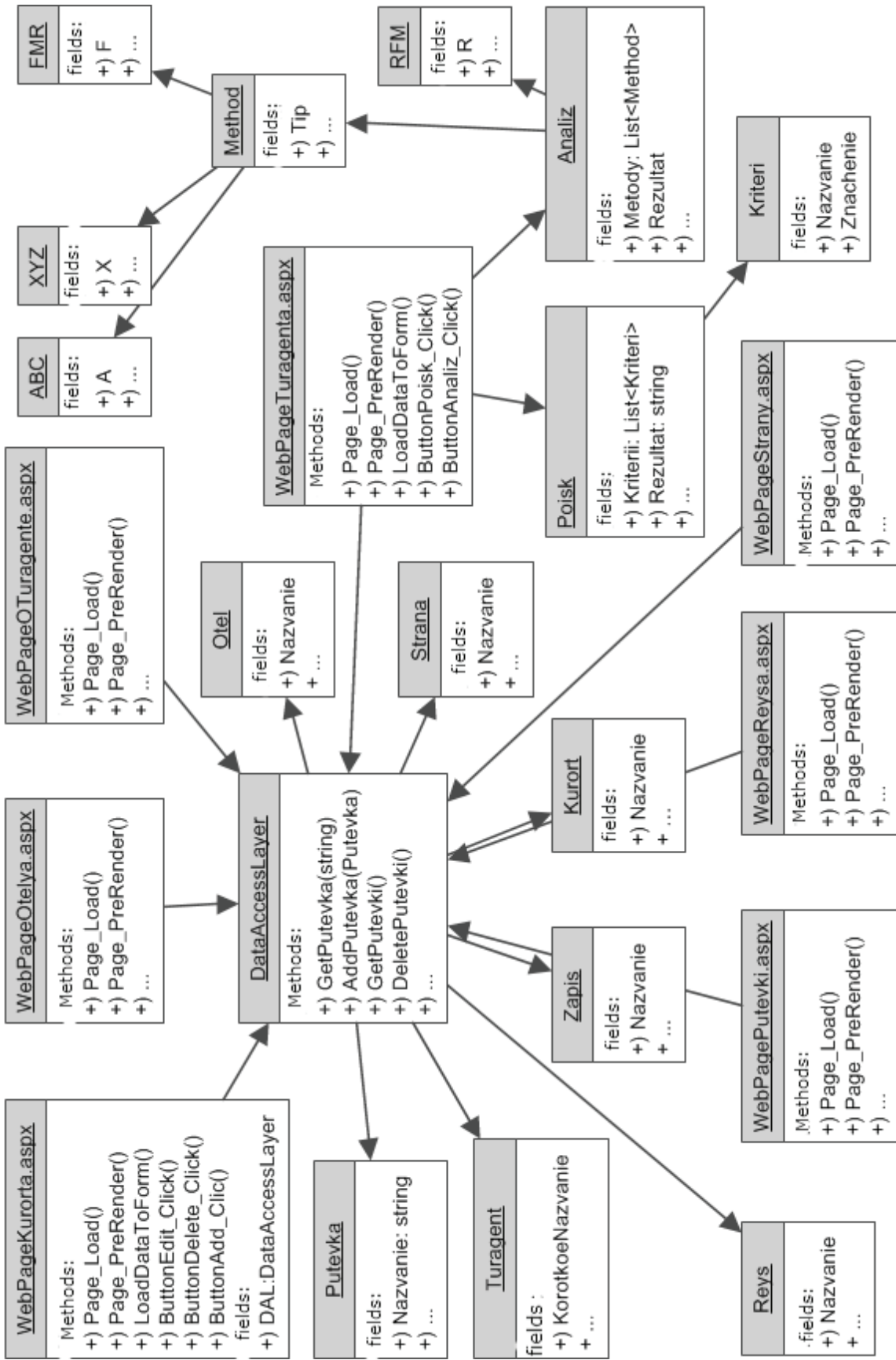


Figure 2. Diagram of classes of ASSAAC

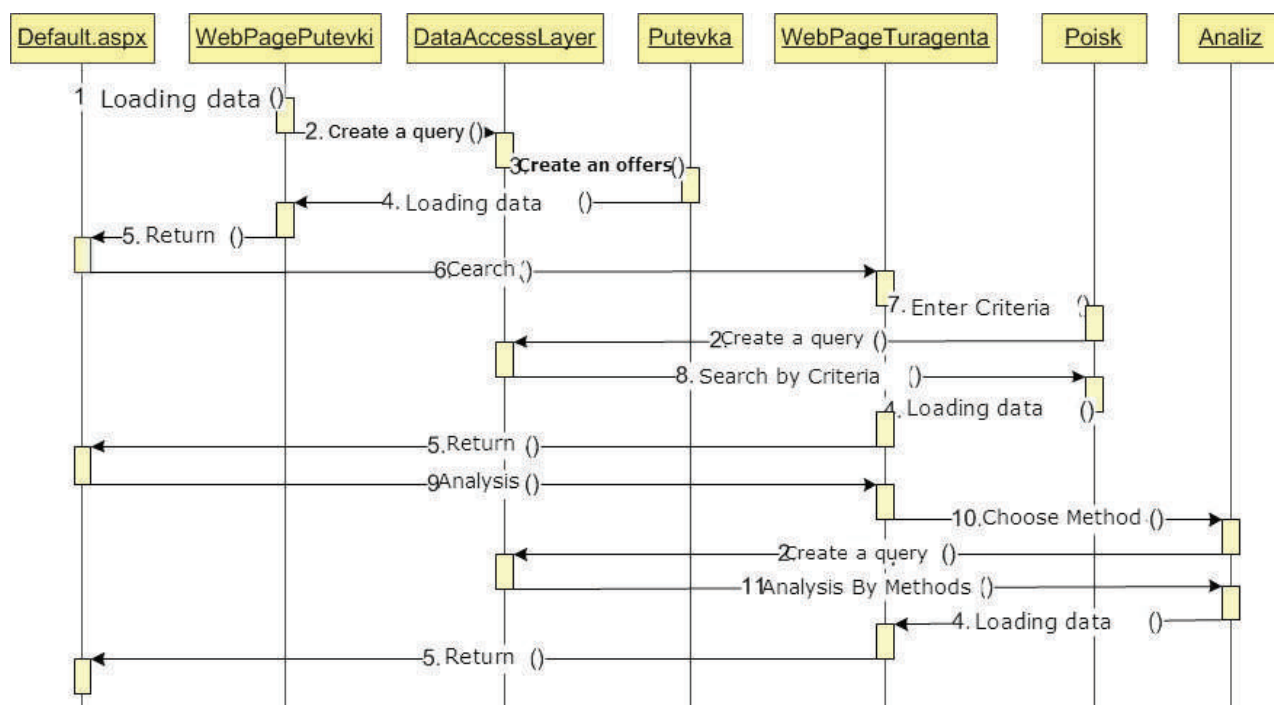


Figure 3. Sequence diagrams of ASSAAC

The implementation and testing of the automated system of searching and analysis of the contractors' activity

The implemented system includes the following subsystems:

- module «Creating and populating the database for all travel agents» provides the following functions: the organization of reference data; management information and database «Tours», «Customers», etc. ;
- module «User data management» has the following functions: maintenance of user information; the resolution of user rights;
- module «Analysis of activities of travel agents' performs the following functions: ABC-analysis for the classification of permits according to their importance; XYZ analysis for classification of passes on the degree of stability of sales; FMR-analysis for the classification of passes on the frequency of reference / capture; RFM-analysis to predict the behavior of travel agents; Combined analysis;
- module «passes by criteria Search» performs the following functions: generation of different sets of criteria; Search permits for a given set of criteria;
- module «Search passes for a given set of criteria» performs the following functions: displaying the input data and effective; the formation of statements.

Tables 2-7 present starting and efficient data analysis using the implemented system.

Table 2

Table source data

Voucher	Duration (hours)	Price (rub)	Travel agency	Country	Resort	Hotel	Flight
GSGM1	19	21000	Interline	USA	Hawaii	Babbling Brook Inn	Moscow - Washington
GIAM1	15	12000	The elephant	Italy	Abano Terme	The westin Excelsior	Moscow - Rome
ZFMM1	23	15000	Well	China	Tsindao	Miltennium Shanghai	Moscow - Bikin

Table 3 shows that 10 % of the positions permit (group A) give 80 % of turnover; 15 % of positions trips (group B) showed 15 % of turnover; 75 % of the positions permit (group C) give 5 % of turnover. This method does not allow to evaluate the seasonal fluctuations in demand for commodities.

Table 3

Table efficient data analysis based on the method of analysis for the ABC-classification permits according to their importance

Voucher	Description	Price (rub)	Amount Share (%)	Cumulative Amount Share (%)	Group ABC
DRSB1	Russia, Health Resort Dunes, Golden Ring	419000.00	36.47	36.47	A
ZIAM1	Italy, Abano Terme, The Westin Excelsior	110000.00	9.57	46.04	A
HIAM1	Italy, Abano Terme, The Westin Excelsior	80000.00	6.96	53.000	A

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HIAM1	Italy, Abano Terme, The Westin Excelsior	80000.00	6.96	59.97	A
NRSB1	Russia, Health Resort Dunes, Golden Ring	60000.00	5.22	84.33	B
KRSB1	Russia, Health Resort Dunes, Golden Ring	50000.00	4.35	88.69	B
GIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	100.00	C
MIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	100.00	C
BIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	100.00	C
SHRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	100.00	C

The proportion of the number of product items in each group:

**Group A** – 80 % of the amount of 35.00;

**Group B** – 15 % of the amount of 10.00;

**Group C** – 5 % of the amount of 55.00.

Table 4 identifies the most popular tours and trips, which for some reason are not in demand all the time. This method allows you to optimize inventory.

Table 4

Table efficient data analysis based on the method of analysis for XYZ-classification of passes on the degree of stability of sales

Voucher	Description	The average number of tourists (people)	Standard deviation	Coefficient of variation (%)	Group XYZ
DRSB1	Russia, Health Resort Dunes, Golden Ring	11.00	4.90	44.54	Z
SIAM1	Italy, Abano Terme, The Westin Excelsior	4.67	3.68	78.90	Z
KRSB1	Russia, Health Resort Dunes, Golden Ring	0.67	0.94	141.42	Z
MIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	0.00	Z
ORSB1	Russia, Health Resort Dunes, Golden Ring	1.67	2.36	141.42	X
SIAM1	Italy, Abano Terme, The Westin Excelsior	4.33	6.13	141.42	Z
SRSB1	Russia, Health Resort Dunes, Golden Ring	1.67	2.36	141.42	Z
KIAM1	Italy, Abano Terme, The Westin Excelsior	2.00	2.83	141.42	Z
NRSB1	Russia, Health Resort Dunes, Golden Ring	2.33	3.30	141.42	Z
HIAM1	Italy, Abano Terme, The Westin Excelsior	3.00	4.24	141.42	Z
SHRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	0.00	X
BIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	0.00	X

Table 5 shows that FMR-analysis is ABC-analysis according to the number of requests for permits. Travel agents want to sell the customer as much as possible of permits of group A according the profit, and the customer wants to see travel agents in the group A in the number of appeals. These two tour lists are different, and to sell the customer something that is advantageous for travel agents they need to consider what he wants.

Table 5

Table efficient data analysis based on the method of analysis for the FMR-classification permits the frequency of references / capture

Voucher	Description	The number of tourists (people)	Frequency Rate	Group FMR
DRSB1	Russia, Health Resort Dunes, Golden Ring	33.00	26.19	F
SIAM1	Italy, Abano Terme, The Westin Excelsior	13.00	10.32	F
SIAM1	Italy, Abano Terme, The Westin Excelsior	13.00	10.32	F
BRSB1	Russia, Health Resort Dunes, Golden Ring	10.00	7.94	F
HIAM1	Italy, Abano Terme, The Westin Excelsior	9.00	7.94	F
HIAM1	Italy, Abano Terme, The Westin Excelsior	9.00	7.94	F
ZIAM1	Italy, Abano Terme, The Westin Excelsior	9.00	7.94	F
NRSB1	Russia, Health Resort Dunes, Golden Ring	7.00	5.56	M
KIAM1	Italy, Abano Terme, The Westin Excelsior	6.00	4.76	M
SRSB1	Russia, Health Resort Dunes, Golden Ring	5.00	3.97	M
SRSB1	Russia, Health Resort Dunes, Golden Ring	5.00	3.97	R
ORSB1	Russia, Health Resort Dunes, Golden Ring	5.00	1.59	R

KRSB1	Russia, Health Resort Dunes, Golden Ring	2.00	0.00	R
GIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	R
HRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	R
AIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	R
BIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	R
SHRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	R
VRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	R
MIAM1	Italy, Abano Terme, The Westin Excelsior	0.00	0.00	R

The total number of tourists (pers.) 126

Table 6 reveals the structure of its customer base through segmentation of clients of travel agents. This will help to increase the response of the stock and special offers.

Table 6

Table efficient data analysis on the basis of RFM-analysis to predict the behavior of travel agents

Travel agent	Code RFM	Recency (новизна)	Frequency (Частота)	Monetary (Вложения)
Travel company INTERLINE	1 1 1	1	1	1
Elephant	5 5 5	5	5	5
Eurolink-Tour	1 1 2	1	1	2
Well	1 1 1	1	1	1
Interresortservice-Flight	1 1 1	1	1	1

Table 7

Table efficient data analysis on the basis of the ABC / XYZ-analysis of the activity of travel agents

Voucher	Description	Amount (rub)	The amount of the share (%)	The amount of cumulative (%)	The average number of tourists (people).	Standard deviation	Coefficient of variation (%)	Group ABC/XYZ
DRSB1	Russia, Health Resort Dunes, Golden Ring	419000	36.47	36.47	11.00	4.90	44.54	A-Z
ZIAM1	Italy, Abano Terme, The Westin Excelsior	110000	9.57	46.04	4.67	3.68	78.90	A-Z
KRSB1	Russia, Health Resort Dunes, Golden Ring	50000	4.35	88.69	0.67	0.94	141.42	B-Z
ORSB1	Russia, Health Resort Dunes, Golden Ring	50000	4.35	93.04	1.67	2.36	141.42	C-Z
SIAM1	Italy, Abano Terme, The Westin Excelsior	70000	6.09	73.02	4.33	6.13	141.42	A-Z
SRSB1	Russia, Health Resort Dunes, Golden Ring	20000	1.74	98.26	1.67	2.36	141.42	C-Z
NRSB1	Russia, Health Resort Dunes, Golden Ring	60000	5.22	84.33	2.33	3.30	141.42	B-Z
HIAM1	Italy, Abano Terme, The Westin Excelsior	80000	6.96	53.00	3.00	4.24	141.42	A-Z
SHRSB1	Russia, Health Resort Dunes, Golden Ring	0.00	0.00	100.00	0.00	0.00	0.00	C-X

The scientific work discussed the main methods of searching and analyzing the activity of contractors: ABC-analysis for resource classification travel agents (vouchers) according to their importance; XYZ-analysis for resource classification travel agents (vouchers) on the degree of stability of sales and the level of volatility of consumption; FMR-analysis for resource classification travel agents (trips) the frequency of calls / taking; RFM-analysis to predict the behavior of travel agents, based on their past sales of permits; combined ABC / XYZ analysis. The search techniques and the activity analysis of contractors have been implemented by using each method.

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#### РАЗРАБОТКА МЕТОДИКИ ПОИСКА И АНАЛИЗА АКТИВНОСТИ КОНТРАГЕНТОВ

**Ал-Мерри Гаис, А. С. Мараховский**

В работе были рассмотрены основные методы поиска и анализа активности контрагентов: ABC-анализ для классификации ресурсов турагентов (путевок) по степени их важности; XYZ-анализ для классификации ресурсов турагентов (путевок) по степени стабильности продаж и уровня колебаний потребления; FMR-анализ для классификации ресурсов турагентов (путевок) по частоте обращений/взятия; RFM-анализ для прогнозирования поведения турагентов на основе их прошлого продаж путевок; совмещенный ABC/XYZ анализ. Были реализована методики поиска и анализа активности контрагентов с использованием каждого метода.

#### DEVELOPMENT OF A TECHNIQUE OF SEARCH AND ANALYSIS OF THE ACTIVITY OF CONTRACTORS

**Al-Merri Gais, A. S. Marakhovski**

The paper describes the main methods of search and analysis of activity of the counterparties: ABC analysis for classification of resources of travel agents (vouchers) according to their degree of importance; XYZ analysis for classification of resources of travel agents (vouchers) according to the degree of stability of the sales and fluctuations in consumption; FMR analysis to resource classification of travel agents (trips) the frequency of hits/score; RFM analysis to predict the behavior of the agents based on their last tour; combined ABC/XYZ analysis. Was implemented techniques of search and analysis of activity of the counterparties using each method.