

# INNOVATION SCIENCE AND TECHNOLOGY



Scopus || Electronic journal specializing in Scopus

**ISSUE 3**

 Acceptance of papers **March, 2026**



**Acceptance of  
papers**

Published monthly



**Topics**

economics,  
technology, social  
sciences

## Editorial board:



### EDITOR-IN-CHIEF:

Mirzaliyev Sanjar Makhmatjon ugli

### DEPUTY EDITOR-IN-CHIEF:

Makhmudov Nosir Makhmudovich  
DSc., Prof., Academician

### DEPUTY EDITOR-IN-CHIEF:

Ochilov Bobur Bakhtiyor ugli – Senior  
lecturer at TSUI

THE SCIENTIFIC-POPULAR ELECTRONIC  
JOURNAL **"INNOVATION SCIENCE AND  
TECHNOLOGY"** HAS BEEN REGISTERED  
UNDER THE NUMBER **C-5669633** BY THE  
AGENCY FOR INFORMATION AND MASS  
COMMUNICATIONS (AOKA) OF THE  
REPUBLIC OF UZBEKISTAN, EFFECTIVE  
FROM OCTOBER 9, 2024.

### CONTACTS

Phone: **+998 50 737 87 88**

Website: <https://ist-journal.uz>

Email: [innovationist2025@gmail.com](mailto:innovationist2025@gmail.com)

The scientific electronic journal "Innovation Science and Technology" has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.



**Sharipov Kongiratbay Avezimbetovich,**  
Doctor of Technical Sciences (DSc), Professor



**Abdurakhmanova Gulnora Kalandarovna,** Doctor of  
Economic Sciences (DSc), Professor



**Cham Tat Huei,**  
Doctor of Philosophy (PhD), Professor (Malaysia)



**Muhammad Imran Sadiq**  
Doctor of Philosophy in Economics (PhD), Professor,  
Malaysia



**Ahmed Aziz Ismail**  
Doctor of Technical Sciences (DSc),  
Professor (Egypt)



**Lee Chin**  
Doctor of Philosophy in Economics (PhD), (Malaysia)



**Asongu SImplice**  
Doctor of Philosophy in Economics (PhD), Cameroon



**Rui Dang**  
Doctor of Chemistry (DSc), Professor, China



**Zahoor Ahmed**  
Doctor of Philosophy in Economics (PhD), Turkey



**Shujaat Abbas**  
Doctor of Philosophy in Economics (PhD), Russia



**Tina A Coffelt**  
Doctor of Philosophy in Educational Sciences (PhD),  
USA



**Abdikarimova Dinara Rustamxanovna**  
Doctor of Economic Sciences (DSc), Professor

**Kurbonbekova Mohichehra Turobjonovna**  
Doctor of Economic Sciences (DSc), Professor

**Alimardonov Ilkhom Muzrabshokovich**  
Doctor of Economic Sciences (DSc), Professor



**Razakova Barno Sayfiyevna**  
Doctor of Philosophy in Economics (PhD)



**Khasanov Sarvar Ulugbek ugli**  
Doctor of Philosophy in Economics (PhD)



**Kholikova Rukhsora Sanjarovna**  
Associate Professor (PhD)

# CONTENTS

FINANCING OF SMALL BUSINESSES THROUGH INVESTMENT LOANS BY COMMERCIAL BANKS.....	15
<b>Yangiboyev F.B.</b>	
INTEGRATION OF THE TRANSPORT SECTOR INTO THE GREEN ECONOMY AND IMPACT ON SUSTAINABLE DEVELOPMENT: ECOLOGICAL TRANSFORMATION AND INNOVATIVE SOLUTIONS .....	20
<b>Narziyev Umidjon Bakhriylayevich</b>	
FOREIGN EXPERIENCE IN INCREASING THE INVESTMENT ACTIVITY OF JOINT-STOCK COMPANIES .....	24
<b>Begamov. S.X.</b>	
AN ENHANCED FINANCING MODEL FOR STARTUP PROJECTS IN HIGHER EDUCATION INSTITUTIONS OF UZBEKISTAN .....	27
<b>Kasimova Nargiza Sabitdjanovna</b>	
STRATEGIES FOR ENHANCING INVESTMENT POTENTIAL.....	32
<b>Tillayeva Barno Ramizitdinovna</b>	
THE IMPORTANCE OF USING ARTIFICIAL INTELLIGENCE IN HOTEL MANAGEMENT.....	36
<b>Husenova Madina Farkhodovna</b>	
MARKETPLACES AND ECONOMIC SECURITY IN UZBEKISTAN: RISKS AND REGULATION .....	42
<b>Umarkhodjayeva Zaynabkhon Nodirkhonovna</b>	
TECHNOLOGICAL STRENGTH AND PROPERTIES OF METAL OF AUSTENITIC JOINTS DURING WELDING WITH VARIOUS FLUXES.....	47
<b>Khudoykulov Nurilla Zikirillaevich, Khudoyorov Sardor Sadullaevich</b>	
MODERN SYSTEMS OF PRODUCT COST CALCULATION: METHODOLOGICAL FOUNDATIONS AND DIRECTIONS OF PRACTICAL TRANSFORMATION .....	51
<b>Abdumalik Abdiraximovich Tulyaganov</b>	
SUPPORTING ECONOMIC EXPANSION AND MAXIMIZING PRODUCTION EFFICIENCY WITHIN A MARKET ECONOMY.....	56
<b>Aytmuratov Qutlimurat Jalgasovich</b>	
SUCCESS FACTORS OF DIFFERENTIATION STRATEGY IN A MARKET ECONOMY.....	62
<b>Sodiqov Miraxror Abbos ugli</b>	
THE “MISSING MIDDLE” PROBLEM IN SOCIAL PROTECTION SYSTEMS AND MECHANISMS FOR ADDRESSING IT .....	67
<b>Farrukh Juraqulovich Bafoev</b>	
IMPROVING POPULATION INVESTMENT ACTIVITY THROUGH THE DEVELOPMENT OF BANK BROKERAGE SERVICES AND FINANCIAL LITERACY IN FORMING A SECURITIES PORTFOLIO IN THE KHOREZM REGION .....	72
<b>Bakhtiyorov Khudaybergan Hamdam ugli</b>	
DEVELOPMENT OF THE SERVICE SECTOR AND ITS IMPACT ON POVERTY REDUCTION.....	79
<b>Dauletmuratov Adilbay Mirzabaeovich</b>	
THE ROLE AND IMPORTANCE OF A SYNERGETIC APPROACH IN DEVELOPING THE MANAGEMENT SKILLS OF SCHOOL DIRECTORS.....	84
<b>Yusupova Dilnoza Fayzullayevna</b>	
REGIONAL INNOVATION DEVELOPMENT INDICATORS AND THEIR EVALUATION SYSTEM .....	89
<b>Xamrayev Quvvat Iskandarovich</b>	
GADGETS AND VALUES: HOW DOES THE VIRTUAL WORLD IMPACT THE EDUCATION OF YOUTH? .....	97
<b>Makhmudova Sohiba Ravshan kizi, Mirzaliyev Sanjar Makhamatjon ugli</b>	
WAYS TO IMPROVE SERVICE QUALITY AND SAFETY IN THE HOSPITALITY INDUSTRY THROUGH DIGITAL TECHNOLOGIES .....	101
<b>Musayeva Shoira Azimovna</b>	
DIRECTIONS FOR INCREASING HOUSEHOLD INCOMES BASED ON FOREIGN EXPERIENCE.....	104
<b>Eshbaeva Shahnoza Faxriddinovna</b>	

IMPROVING METHODS FOR DETECTING FRAUD CASES IN CURRENT ASSET AUDITS.....	108
<b>Mavlyanova Dilobar Makhkamovna</b>	
GLOBAL TRENDS IN WORLD MARKETS AND THEIR IMPACT ON THE DEVELOPMENT OF INTERNATIONAL TRADE .....	113
<b>Meliqulov Abduhalil Norinovich</b>	
THEORETICAL ASPECTS OF FORMING AND APPLYING THE INTEGRATION MECHANISM OF SMALL BUSINESS .....	119
<b>Rustambek Ibragimovich Israilov</b>	
THE IMPORTANCE OF USING PERFORMANCE INDICATORS IN IMPROVING ROAD MANAGEMENT METHODS.....	125
<b>Sirojiddin Yadgarov</b>	
WAYS TO IMPROVE BANKING EFFICIENCY IN THE CONDITIONS OF TRANSFORMATION.....	131
<b>Babakhanova Dildora Rustamovna</b>	
THE ROLE OF PROGRAM-BASED BUDGETING MECHANISMS IN ENSURING STATE FINANCIAL SECURITY .....	137
<b>Abduganiyev Uchkun Khabibulla ugli</b>	
ANALYSIS OF THE IMPACT OF PUBLIC FINANCIAL MANAGEMENT EFFICIENCY ON SOCIAL JUSTICE THROUGH PEFA AND CEQ METHODOLOGIES.....	143
<b>Zokirjonov Muhammadsodiq Ravshanbek ugli</b>	
MANAGERIAL MECHANISMS OF CORPORATE HYBRID BUSINESS MODELS: FINTECH INTEGRATION IN E-PAYMENT SYSTEMS OF UZBEKISTAN .....	151
<b>Mokhirakhon Abdullaeva</b>	
TOKENIZATION OF REAL SECTOR ASSETS AND DEEPENING OF CAPITAL MARKETS: A NEW FINANCIAL ARCHITECTURE FOR EMERGING ECONOMIES .....	156
<b>Oybek Qo'shboqov</b>	
TECHNOLOGIES OF ARTIFICIAL INTELLIGENCE IN OPTICAL COMMUNICATION AND THEIR INTEGRATION INTO INTELLIGENT TUTORING SYSTEMS.....	162
<b>Maxamadov Rustam Xabibullayevich, Djamatov Mustafa Xatamovich</b>	
APPROACHES TO ENHANCING THE EFFECTIVENESS OF GOVERNMENT SUPPORT FOR SMALL BUSINESSES IN THE REGION .....	169
<b>Madraimova Marxamat Raximberganovna</b>	
INNOVATIVE WAYS TO INCREASE THE INVESTMENT CAPACITY OF REGIONS BASED ON DIGITAL TECHNOLOGIES.....	174
<b>Qabilov Anvar Eshpulatovich</b>	
TAXATION OF AGRICULTURAL ENTERPRISES AND THE ORGANIZATION OF THEIR ACCOUNTING SYSTEMS.....	179
<b>Abdullayev Abdurauf</b>	
DEVELOPMENT PROSPECTS OF THE VEGETABLE FARMING SECTOR IN THE REPUBLIC OF UZBEKISTAN .....	183
<b>Sobir Xasanov</b>	
AI FOR TEACHING ENGLISH AS A FOREIGN LANGUAGE TO UNIVERSITY STUDENTS.....	191
<b>Nurzhanova Zhainash, Rajapova Guldon</b>	
REVIEW OF THERMAL STRENGTHENING METHODS FOR ROLLING ROLLS MADE OF ALLOY STEELS USED IN THE PRODUCTION OF SEAMLESS PIPES .....	198
<b>Saydumarov Botir Muradovich, Xasanov Kamoliddin Akmal o'g'li, Ergashev Davron Ortiq o'g'li, Saydumarov Botir Muradovich</b>	
IMPROVING THE METHODOLOGY OF STRATEGIC MANAGEMENT IN ENHANCING THE COUNTRY'S INTERNATIONAL IMAGE: IN THE EXAMPLE OF SOUTH KOREA.....	203
<b>Kurolov Maksud Obitovich</b>	
SOCIO-ECONOMIC DEVELOPMENT OF TASHKENT CITY: TRENDS AND KEY INDICATORS.....	212
<b>Karimova Shirin Zokhid qizi</b>	
PSYCHOLOGICAL FACTORS INFLUENCING PROCRASTINATION AMONG GENERATION Z UNIVERSITY STUDENTS.....	216
<b>Abdukaxxorova Durdona, Qadamova Rayhona, Muhammadova Shaxzoda, Salimov Ozodbek, Hojiyeva Iroda Avezovna</b>	

IMPROVING THE MANAGEMENT SYSTEM OF PRIVATE SCHOOLS BASED ON INNOVATIVE TECHNOLOGIES.....	222
<b>Shohida Esanova</b>	
ASSESSMENT OF TECHNICAL EFFICIENCY IN CENTRAL ASIAN TELECOMMUNICATION OPERATORS USING THE DEA-CCR MODEL: THE EXPERIENCE OF UZBEKTELEKOM AK .....	230
<b>Salimova Husniya Rustamovna</b>	
DETERMINANTS OF MUTUAL TRADE BETWEEN THE REPUBLIC OF UZBEKISTAN AND THE CIS COUNTRIES .....	235
<b>Munisa Turdibaeva</b>	
INTERNAL CONTROL SYSTEM IN THE DIGITAL ECONOMY: PROBLEMS AND SOLUTIONS.....	241
<b>Mekhmonaliev Ulugbek Erkinjon ugli</b>	
PROSPECTS FOR ENSURING SUSTAINABLE GROWTH IN INDUSTRIAL ENTERPRISES THROUGH THE USE OF GREEN TECHNOLOGIES .....	248
<b>Abbosbek Jurayev</b>	
COMPLIANCE OF BANKING AI SYSTEMS WITH EU AI ACT REQUIREMENTS AND THEIR ROLE ..... 253	
IN RISK MANAGEMENT	
<b>Usmonov Faridun F., Zainalov Zh.R.</b>	
A MODEL FOR DETECTING URBAN INFRASTRUCTURE PROBLEMS IN CITIZENS' APPEALS BASED ON GEOLOCATION FEATURES .....	258
<b>Mallayev Oybek Usmankulovich, Gazatov Jamoliddin Abduvoidovich, Aliyev Jaloliddin Kokand oglu</b>	
DETERMINATION OF THE INFORMATIVENESS OF INPUT PRINTS USING THE MULTI-CRITERIA DISPERSION METOD .....	264
<b>Turapov Ulugbek Urazkulovich, Akulbayev Musabek Islamovich, Dzhanatayeva Sholpan Kalmakhanovna, Madalievna Gul'nar Urazalievna</b>	

# DETERMINATION OF THE INFORMATIVENESS OF INPUT PRINTS USING THE MULTI-CRITERIA DISPERSION METHOD

## **Turapov Ulugbek Urazkulovich**

Associate Professor of the Department of "Information Systems and Technologies"  
Tashkent State Agrarian University  
Republic of Uzbekistan  
Email: [tuu\\_1224@gmail.com](mailto:tuu_1224@gmail.com)  
ORCID: 0000-0001-7274-4162

## **Akulbayev Musabek Islamovich**

Procurator for Science, Candidate of Sciences, Professor  
University of Friendship of Peoples, Academician A. Kautbekova  
Republic of Kazakhstan

## **Dzhantayeva Sholpan Kalmakhanovna**

Senior Lecturer of the University of Friendship of Peoples, Academician A. Kautbekova  
Republic of Kazakhstan

## **Madalieva Gul'nar Urazalievna**

Senior Lecturer of the University of Friendship of Peoples, Academician A. Kautbekova  
Republic of Kazakhstan

**Abstract:** In this article, the initial data of the selected input parameters were processed using 7 local criteria, and scientific research was conducted on the problem of determining the informativeness of the output parameters as a result of voting and ordering the level of informativeness in relation to the studied object (informativeness by color). In order to increase the level of accuracy, it has been established that the multi-criteria dispersion method can be used in the formation of a set of informative parameters of input data. As a result, it is possible to solve the problem of forming a set of informative parameters and assessing the adequacy of the model. In this case, we used existing local criteria, and each criterion determines the order of informativeness for each of its parameters based on its own conditions. This repetition is carried out according to 7 criteria, the results of each criterion are summarized to form an informativeness matrix. As a result, a new multi-criteria dispersion method was created, which clarifies the high adequacy of constructing a mathematical model.

**Key words:** informativeness, ranking, mathematical model, local, criterion, object, multi-criteria, dispersion method.

## INTRODUCTION

There are many processes and events today that do not have quantitative characteristics to describe them, or they change rapidly. Mathematical models also use the relationships between input and output variables derived from different considerations. In cases where it is not possible to substantiate the results of experiments or tests and to evaluate the results of decisions made, the method of expert evaluation is used to study the nature of the process or event [1]. The complexity of the formation of the research object or the lack of complete information about the nature of the object requires the use of expert systems. The examination process, on the other hand, involves the identification of a hypothesis that is true on the basis of an overall assessment by each expert from among the predicted hypotheses presented (based on selected factors). As a result, the factor or indicators that significantly affect the object are regulated [2].

The purpose of this article is to study the criteria for regulating the input and output parameters of the object under study using the method of experts.

If it is not possible or appropriate to assess the performance of the objects directly, then the coloring method can be used. The coloring process indicates which of the objects being studied is important. The following methods of coloring are widely used in practice [3,4]:

- simple coloring;
- direct staining;
- pairwise comparison, etc.

The simple staining method is based on arranging objects in ascending or descending order according to their characteristic factors, indicators and traits. In painting, the expert assigns a natural number to each object in order, that is, each object is colored based on its properties. The number of colors is equal to the number of sorted objects. If an object is being studied in  $N$ , the color of the most influential object by its nature is denoted as 1, and the color of the least influential object is denoted by  $N$ . The value of an object's color actually represents its number in an ordered row of colors. For example, if the row of colors is 1,3,5,7,7,10, the color corresponding to 5 numbers is equal to 3.

## REVIEW OF LITERATURE ON THE SUBJECT

The problem of determining the informativeness of input features (prints) has been widely studied in statistical analysis, pattern recognition, and decision-making theory. In particular, the concept of informativeness is closely related to the ability of features to discriminate between classes and to reflect the essential properties of the analyzed system. Kolesnikova S.I. emphasizes that different types of features possess varying levels of informativeness, and their evaluation requires the application of statistical and analytical methods that account for variability, stability, and contribution to classification accuracy. The author highlights the importance of dispersion-based approaches in identifying the most informative attributes, especially when dealing with heterogeneous data structures.

A significant contribution to feature selection problems is presented in the work of Zagoruyko N.G., Kutnenko O.A., and Borisova I.A., where the GRAD algorithm is proposed for selecting informative sub-features. This approach focuses on decomposing complex features into smaller components and evaluating their individual informativeness. Such decomposition is particularly relevant for multi-criteria dispersion methods, as it allows a more precise estimation of the contribution of each component to the overall variability and decision-making process.

Grigan A.M. considers management diagnostics as a multi-criteria process in which the selection of informative indicators plays a key role. According to his research, effective diagnostics requires combining quantitative and qualitative indicators, which aligns with the principles of multi-criteria dispersion analysis. This approach ensures a comprehensive evaluation of system performance and supports more reliable managerial decisions.

The methodological foundation of concordance analysis is also essential in assessing informativeness. The concordance coefficient, as described in methodological sources, serves as a statistical tool for measuring the degree of agreement among expert evaluations. Its application enhances the reliability of selected informative features, particularly in cases where subjective judgments are involved.

An important early contribution to the field is provided by Rastrigin L.A., Khamdamov R.H., and Turapov U.U., who developed a multidisciplinary statistical approach to assessing the informativeness of quantitative features. Their work demonstrates that dispersion-based indicators can effectively capture the variability and significance of features across different conditions. This approach forms the basis for modern multi-criteria dispersion methods, which integrate statistical measures to evaluate the relative importance of input prints.

Overall, the reviewed literature indicates that the determination of informativeness is a complex, multi-dimensional problem that requires the integration of statistical dispersion measures, algorithmic feature selection techniques, and expert-based evaluation methods. The multi-criteria dispersion method emerges as a robust analytical tool that combines these approaches, enabling a more accurate and comprehensive assessment of input feature informativeness.

## RESEARCH METHODOLOGY

The study is based on collecting input feature data from experimental observations and existing datasets, followed by preprocessing and normalization. The analysis employs a multi-criteria dispersion method to evaluate the variability and significance of each feature. Statistical measures, including variance and concordance coefficients, are applied to identify the most informative inputs and assess their contribution to overall system performance.

## ANALYSIS AND RESULTS

In some cases, as a result of the expert giving the same color to several objects, the number of objects, which are differentiated by the number of colors, remains the same. In such cases, objects are given standardized colors. In this case, the number of standardized colors is assumed to be  $n$ . Objects with the same color are assigned an  $X_S$  standardized color. The value of a standardized color is equal to the arithmetic mean of the places of objects of the same rank by color. For example, in the table below, five objects (factors) are given the colors  $x_i$  ( $i = 1, \dots, 5$ ) according to Table 1 (Table 1).

Table 1. Assign colors to objects

i	1	2	3	4	5
$X_i$	1	2	3	2	3

The standardized color of the second and fourth objects, which correspond to the second and third places in terms of color, is  $X_S = (2 + 3) / 2 = 2,5$ . The standardized color of the fourth and fifth objects, corresponding to the fourth and fifth places in terms of color, is  $X_S = (4 + 5) / 2 = 4,5$ . As a result, the final view of the object is shown in Table 2 below (Table 2).

Table 2. Using standardized colors, reassignment of ranks to objects

i	1	2	3	4	5
$x_i$	1	2,5	4,5	2,5	4,5

The set of colors obtained by coloring  $n$  objects  $X_S(n)$  is defined as follows:

$$X_S(n) = \sum_{i=1}^n x_i = \frac{n(n+1)}{2}$$

where  $x_i$  is the rank corresponding to the  $i$ -th object. In fact, applying this formula to Table2, we can be sure that  $X_S(5) = 5(5+1)/2 = (1+2,5+4,5+2,5+4,5) = 15$

If the staining is performed by an expert in  $k$ , then the color of each object  $x_{ij}$  ( $i = \overline{1, n}; j = \overline{1, k}$ ) is determined as the final color by the colors determined by all experts. The object with the smallest set of colors is given the highest (first) color, otherwise the lowest  $n$  colors are given. The rest of the objects are arranged in the order of growth of the sum of colors relative to the first object.

The main advantage of the method of painting is explained by its easy implementation. The main disadvantages of this method are:

- coloring a small number of small objects, because if their number exceeds 15–20, it is difficult to color them;
- in this way, the question of how important the objects under study differ from each other in importance remains unresolved.

**Direct staining method.** This method is based on qualitatively describing the degree of significance of the process or factors when it is difficult to quantify them. In this way, the expert uses their own scale to color the objects in the proposed range of colors. When the number of objects is large, it is difficult to use the direct staining method.

**Pair comparison method.** This method of coloring is convenient when the number of objects is large. Based on this method, objects are compared in pairs to determine which is more important in each pair of objects. To do this, if the number of objects is  $n$ , the expert elements  $x_{ij}$  form a square matrix of dimension  $n \times n$ . The elements of the matrix assume the following values:

if the  $i$ -th object is more important than the  $j$ -th object,  $x_{ij} = 1$ ;

if the  $j$ -th object is more important than the  $i$ -th object,  $x_{ij} = 0$ .

Suppose that objects  $O_1, O_2, O_3, O_4$  and  $O_5$  are required to be painted by an expert. In this case, the expert can construct the following matrix (Table 3):

Table 3. Pair comparison matrix

	O <sub>1</sub>	O <sub>2</sub>	O <sub>3</sub>	O <sub>4</sub>	O <sub>5</sub>	Total color
O <sub>1</sub>	0	0	1	1	0	2
O <sub>2</sub>	1	0	1	1	0	3
O <sub>3</sub>	0	0	0	0	1	1
O <sub>4</sub>	0	0	1	0	1	2
O <sub>5</sub>	1	1	0	0	0	2

As you can see from the table, the most important object here is the O<sub>2</sub> object, the most insignificant object is the O<sub>3</sub> object. Taking into account the relative importance of the remaining O<sub>1</sub>, O<sub>3</sub> and O<sub>4</sub> objects, the order of the objects can be arranged as follows:

$$O_2, O_5, O_1, O_4, O_3.$$

The results of any expert are not convincing. Indeed, if the conclusions of the experts differ sharply (for example, if half of the experts are the first color for the factor x<sub>i</sub>, and the color of the remaining experts is the last color), then the consensus criterion is used. The criterion for evaluating the results of any expert is called the consensus criterion (or indicator). The higher the coherence of the experts, the higher the confidence in the results of the expert evaluation [4].

There is a need to quantify the degree of coherence of experts and to explain the inconsistency of expert opinions [5]. The measure of conformity is determined on the basis of statistics available to all experts. If the conclusions of the experts do not differ much, then the level of agreement of the experts can be considered good.

The purpose of assessing the consistency of an expert's opinion is to identify a group of experts who agree with each other. The high final agreement of all groups of experts can be the only final assessment. It is necessary to separate a subgroup of experts with a high degree of consensus from a group of experts with a low level of consensus, and to analyze the work of the group's experts in order to determine the reasons for differences in the views of this subgroup. If the reason for the difference of opinion of the experts is the dishonesty of some of them, then it is necessary to reorganize the expert assessment.

Each expert has his own personal assessment, but the agreement factor can be used to verify the final result of the group of experts. The concordance coefficient is used to assess the coherence of the opinions of experts. This coefficient was introduced by Maurice George Kendall, a well-known statistician in the United Kingdom [4].

Suppose that m requires an expert to evaluate n an object. In this case, the coloring matrix is measured in m\*n || r<sub>ij</sub> || (j=1,..., m; i = 1,..., n). Here r<sub>ij</sub> is the rank assigned to the i-th object by the j-th expert. The values of the elements of the matrix are equal to one of the natural numbers 1,..., n set by the experts, indicating the importance of the objects.

$$r_i = \sum_{j=1}^m r_{ij}, \quad (i = 1, 2, \dots, n)$$

The total color of the object's significance can be defined as the sum of the colors on each column of the matrix:

$$r_1 < r_2 < \dots < r_{n-1} < r_n.$$

The color of this collection shows the importance of the objects in the assessment of all experts. The result is a sequence of n objects arranged as follows:

Given that r<sub>i</sub> quantities are random quantities, we determine their variance estimates. According to the requirement of the minimum standard error, the variance estimate can be determined as follows:

$$D = \frac{1}{n-1} \sum_{i=1}^m (r_i - \bar{r})^2, \quad (1)$$

where  $\bar{r} = \frac{1}{n} \sum_{i=1}^n r_i$  is determined by the formula and represents the mathematical expectation.

The coefficient of coherence is an immeasurable quantity and is defined as the variance relative to the maximum variance as follows:

$$W = \frac{D}{D_{max}}. \quad (2)$$

determined by the maximum value of the variance estimate, depending on the number of objects and experts, is determined by the following equation:

$$D_{max} = \frac{m^2(n^3 - n)}{12(n-1)} = \frac{m^2(n^2 + 1)}{12}. \quad (3)$$

Using the notation  $S = \sum_{i=1}^n (r_i - \bar{r})^2$ , Equation (1) can be expressed as follows:

$$D = \frac{S}{n-1}. \quad (4)$$

Considering equations (3) and (4), the coefficient of agreement is expressed as follows:

$$W = \frac{12 S}{m^2(n^3 - n)} \quad (5)$$

Equivalent objects are usually given the same colors, and such colors are called linked colors. The values of the linked colors are equal to the arithmetic mean of the colors. If there are bound colors in the staining, then the maximum value of the variance decreases and the coefficient of concordance is determined by the following relationship:

$$W = \frac{12 S}{m^2(n^3 - n) - m \sum_{j=1}^m T_j}. \quad (6)$$

In formula (6), the color index associated with the  $j$ -th rank is denoted by  $T_j$ . In turn, the value of this indicator is found in the following formula:

$$T_j = \sum_{k=1}^{H_j} (h_k^3 - h_k).$$

Here  $H_j - j$  is the number of groups with the same color as the color, and  $h_k - j$  is the number of colors with the same color in the  $k$  group.

## CONCLUSIONS AND SUGGESTIONS

In conclusion, it should be noted that the agreement coefficient takes values between 0 and 1. The fact that the value of the agreement coefficient is close to 0 means that the agreement is low. If the value of the coefficient is less than 0.3, it means that the opinions of the experts do not agree with each other, that is, there is no consensus. Also, the values of the coefficient of agreement between 0.3 and 0.7 and greater than 0.7 correspond to the average and high agreement, respectively. In the case of  $W = 1$ , the experts agree.

When arranging the parameters by the method of expert evaluation, all input and output parameters are determined. These input and output parameters must be sufficiently studied. Otherwise, their use in the model will not be effective.

### List of used literature:

1. Kolesnikova S.I., Methods of analysis of informativeness of various types of symptoms // Vestn. Tomsk State University: Management, computer technology and computer science. 2009. № 1 (6). C. 69–80.
2. Zagoruyko N.G., Kutnenko O.A., Borisova I.A., Selection of informational sub-signs of signs (Algorithm GRAD) // Mathematical methods of image recognition: docl. 12 th Vseros. conf. M., 2005. p. 06-109.
3. Grigan A.M., Management diagnostics: theory and practice: Monograph / A.M. Grigan. Rostov n / D: Izd-vo RSEI, 2009. 316 p.
4. <https://autogear.ru/article/349/619/koeffitsient-konkordatsii-primer-rascheta-i-formula-chto-takoe-koeffitsient-konkordatsii/>
5. Rastrigin L.A., Khamdamov R.H., Turapov U.U., Multidisciplinary statistical assessment of informative quantitative symptoms. On Sat. "Automation of production". TashGTU. Tashkent, 1991, p.113-115.

**Proofreader:** Zokir ALIBEKOV

**Layout and Designer:** Oloviddin Sobir ugli

---

## 2026. № 3

---

© When materials are reproduced, the INNOVATION SCIENCE AND TECHNOLOGY journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot\_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

**Our address:** Tashkent city, Yunusobod district, 19th block,  
House 17.



**Acceptance of articles**  
Published every  
monthly



**Directions**  
Social, economic, political,  
technological, scientific

 **Scopus || Scientific electronic journal specializing in Scopus**

**CERTIFICATE NUMBER: №390637**

**ORDER NUMBER ACCORDING TO  
THE LICENSE REGISTER: C-5669633**

**CONTACT:**

-  Contact us  
**+998 50 737 87 88**
-  Telegram channel  
**t.me/scopus\_IST2100**

 Journal official website  
**<https://ist-journal.uz/index.php/IST>**