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Methodological principles of building an international rating as a component of information and analytical provision of law enforcement activities

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Abstract
Due to the fiscal needs of a modern state, the issue of choosing methods for assessing priority and effective directions of development of law enforcement structures is becoming increasingly relevant. The purpose of this article is to justify a methodological approach, rules, modern techniques, and methods to effectively determine the rating level of the activity of a specific law enforcement structure, unit, or the system as a whole. General scientific methods (generalization, abstraction, analogy, analysis, and synthesis) and a system of statistical methods – mass observations, absolute, relative, and average comparative values, tabular, correlation-regression, and analysis of score estimates, parametric analysis, modelling, etc., were used for the study. For a comprehensive characterization of international rating assessment, a series of constructive approaches has been proposed, which can be used separately or simultaneously, depending on the need. The identification of existing types of assessment from the standpoint of qualitative and quantitative characteristics made it possible to form a legal assessment of each of them, to justify the expediency of using a universal type of law enforcement activity assessment – international rating assessment, based on the compilation of a universal indicator. This allows evaluating both qualitative and quantitative characteristics of a particular object, law

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enforcement system, and determining the country's ranking in the overall international rating. It has been proven that comparing the results of the activities of different structural units, types of law enforcement activities, regional and international structures involves conducting both internal and external ranking. Based on the research results, it is recommended to ensure the information focus of indicators with a view to standardizing procedures, dividing them into stimulants and depressants. As one of the simplified and accessible methods for assessing the international rating, the use of a multidimensional average is proposed, the algorithm of which is described in the article. The practical value of this work lies in the fact that the proposed methodologies can be used in decision-making and justification of management decisions

Keywords:
international rating assessment; ranking; modelling; information and analytical support; efficiency; monitoring

Introduction

The Russian military invasion of Ukrainian territory has led to an increased military burden on both the economy and society of Ukraine and its partners. This has created an urgent need to fill defence budgets efficiently. This necessitates the implementation of more effective mechanisms for assessing the performance of state structures to save budgetary funds and prevent the funding of inefficient projects, particularly in the field of law enforcement. Evaluating the effectiveness of law enforcement activity as a comprehensive indicator that characterizes its performance is a necessary condition for creating an optimal and balanced regulatory system as a component of national security.

The attention of scholars both in Ukraine and abroad is focused mainly on the methodological and practical principles of building an international ranking in such areas of human activity as economic, financial, social, educational, etc. At the same time, new challenges have contributed to the fact that this issue has been raised as one of the priorities in the field of law enforcement. Researchers G.T.W. Wong & M. Manning (2022) raise the issue of modifying the process of solving crimes by detectives and investigative police, which allows them to increase the effectiveness of their work without increasing the number of police resources. In this case, the pooled frontier analysis method is used to measure the relative performance of police districts in Hong Kong from 2007 to 2015. An effective district is a model for an ineffective one in terms of ensuring and achieving optimal input and output of broadcasts to solve crimes. This study represents the first cutting-edge analysis of police effectiveness in solving crime in Hong Kong using the most recent effectiveness methodology. In doing so, the authors have created a methodology that can be used to inform police policy on the use of scarce resources and improve crime detection efficiency without compromising other institutional objectives.

S. Baldwin *et al.* (2022) assessed the performance of 122 active duty police officers in a realistic fatality scenario to test whether performance was affected by officers' level of operational skills training, years of police service, and stress response. The average performance score for the scenario was 59%, with 27% of participants making at least one deadly error. The level of training and years of service in the police had different and complex effects on both performance and errors. The results show the need to critically analyse police training practices and continue to improve training based on evidence. In other words, ranking law enforcement officers in terms of professional abilities, stress in critical situations, etc. is an integral part of improving the performance of all law enforcement agencies.

A logical continuation of the issues raised is the study by M. Asif *et al.* (2018), who describe the use of various performance measures to make decisions on resource allocation, prioritize improvements, and set benchmarks for performance improvement. The various performance measures are presented in a structured framework. The key contribution is the creation of a multifaceted performance measurement system that can provide a detailed understanding of the sources of inefficiency and help to make scientific decisions.

Noteworthy is the research aimed at diagnosing international experience in assessing the effectiveness of law enforcement agencies in preventing crime. V. Halunko *et al.* (2021) conclude that such an assessment in different countries is based on a set of quantitative and qualitative criteria. At the same time, such criteria sometimes contradict each other, as some are beneficial for bureaucratic reporting, while others reflect the interests of society.

The effectiveness of a police organization and the level of security it provides to citizens largely depends on its governance and characteristics. A. Orlovic (2020) conducted a survey in the Croatian police service using a five-point rating scale from poor to excellent. The survey involved 106 police station commanders working in police administrations, headquarters located in regional police administrations, and adjacent police administrations. The survey indicated that police managers perceive the quality of all five main management functions and their sub-functions to be mediocre. The purpose of this study was to obtain a preliminary diagnosis of the (perceived) status of police leadership, as well as to determine the relevance and necessity of the

main functions and sub-functions. management and their establishment in the police system.

In conclusion, the research theme is relevant, but there are few scientists conducting studies specifically on ranking in law enforcement. Therefore, the aim of this study was to substantiate the methodological principles of constructing an international rating as a component of information and analytical support for law enforcement activities.

Materials and Methods

The methodological toolkit is based on such general scientific methods as the method of generalization, abstraction, analogies and empirical methods of research, analysis and synthesis, and system analysis. A system of statistical methods is used to a large extent – mass observations, absolute, relative, and average comparative values, correlation, and regression and cluster analysis, matrix, scoring, modelling and others. Since the proposed article is mainly methodological in nature, it is based on several methodological approaches of both general scientific and special nature.

The method of generalization made it possible to record the general features and properties of law enforcement actions, both at the level of individual law enforcement agencies and at the international level. The method of abstraction used in this article made it possible to build an objective international rating and assess the quality of law enforcement activities from individual law enforcement agencies to the international level. In the course of a creative approach to solving this problem, the article uses the method of analogies, which proves that the level of certain law enforcement agencies (regions, countries) meets international standards and their priority in terms of efficiency (quality) of activity. The method of system analysis created the basis for a logical and consistent approach to the problem of supporting management decision-making in the field of law enforcement. In this case, the international ranking is presented as an object of an integral set of elements – law enforcement agencies of regions and countries in the totality of relations and connections between them, i.e. as a system model.

The empirical research method has a fairly wide range of statistical methodological tools in its arsenal, which is an appropriate means of learning and testing the results of research on law enforcement in general and the determination of the international efficiency rating. Practice has shown the priority role of using statistical tools as a means of knowledge in the formation and use of information and analytical support for assessing the effectiveness of law enforcement management. It is crucial for the definition and validity of empirical research.

In the course of diagnosing the issues raised, the world law enforcement system was imaginatively divided into subsystems according to the allocation of law enforcement structures (regions, countries) with further in-depth consideration of each of them. Thus, relying on the peculiarities and specifics of the analytical research method, which contains elements of simplification, abstraction and formalization, the author has studied and identified certain aspects of law enforcement, properties, and interrelationships. At the same time, the use of synthesis as a method allowed imaginatively combining the individual aspects, properties, connections, and components of the law enforcement world as a complex whole into a unity. This expands on previous experience and constructs new approaches to addressing this issue. Using absolute and relative indicators, the author applies the method of averages as one of the most reliable and simple methods for determining the international law enforcement efficiency rating. In particular, the author recommends for practical use the multidimensional average, which is a type of integral assessment of complex law enforcement phenomena, and which is used to rank or typify law enforcement agencies. The use of the correlation-regression method of analysis made it possible to establish the relationship between the results of law enforcement agencies' (regions, countries) activities and the factors that shape them.

One of the most effective means of understanding the laws, trends, and patterns occurring in the field of law enforcement is modelling as a simplified, schematic image of reality. By replacing the real law enforcement process with a certain construction which reproduces the main, most essential features, abstracting from the secondary, insignificant ones, the article presents a holistic model for determining the international rating. It meets the main requirement for such models – similarity and adequacy to the real law enforcement process.

The article presents a system of methods for creating international ratings that can be used both separately and with the use of all methods simultaneously. These include the method of building international ratings based on the ranking of key performance indicators characterizing the activities of law enforcement agencies at all hierarchical levels of management, the method of cluster analysis, the matrix method, the scoring method, the comparative rating assessment, and the international rating analysis. The above system of methods for international rating assessment of law enforcement efficiency is relevant, comprehensive and focused on meeting the requirements of international standards.

Results

Improving the efficiency of law enforcement management requires the creation of a mechanism for identifying and optimizing the use of reserves and developing constructive ways to use them. This requires the development and implementation of specific recommendations for measuring the degree of their impact on the outcomes. The most common types of assessment are

qualitative, quantitative and rating. Qualitative evaluation belongs to the category of verbal evaluations that are not included in a regulated scale. Such assessments are often not ordered either by composition or by the rank of the grades used. A qualitative assessment, at a minimum, meets or satisfies the requirements. The content of qualitative evaluations is significantly enhanced if it is specified in advance which aspects of the object were evaluated (e.g., relevance, practical significance, novelty, effectiveness, meeting deadlines, etc.), thus forming a vector of evaluations whose components correspond to certain features or criteria. Quantitative measurement, expressed in numerical form, also has a multifaceted and insufficiently standardized structure. Numerical indicators can be both dimensional, expressed in certain units of measurement, and dimensionless, relative.

Given the above, it is most appropriate to choose a universal type of assessment that can be used to determine the level of performance at all hierarchical levels of governance, from primary law enforcement agencies to the international level, such as an international rating assessment. It is also important to bear in mind that rating assessments are dynamic (predictable) and can be adjusted if necessary, which makes this type of assessment universal. In the course of such an assessment, it is important to ensure the uniformity of the underlying data, since, as a rule, various types (names) of assessment are distinguished in the course of the analysis. The information used in the assessment procedures should be transparent to all stakeholders interested in a reliable assessment (Zakhozhai, 2023).

The international rating is a certain class, a number assigned in the process of quantitative or qualitative characteristics of individual objects, phenomena, and international law enforcement processes. In the modern sense, an international rating is a comprehensive assessment of the state of the analysed entity, which is formed on the basis of international rating standards and makes it possible to assign it to a certain categorical feature (class). In other words, the results of the study of the activities of certain entities are expressed by a combination of symbols, which are used to make a certain clustering. The main goal of official international ratings, the classification of which is presented in Table 1, is to provide reliable information to build law enforcement policy on their basis, which is to focus on the structures and countries that have the highest rating.

Table 1. Classification of ratings

<table>
<tr><th colspan="4">Law enforcement sphere</th></tr>
<tr><th>Rating of military power</th><th>Reliability rating of departmental structures</th><th colspan="2">Anti-corruption rating</th></tr>
<tr><td>Rating by forms of ownership</td><td>Starting rating</td><td>Rating of the level of corruption</td><td>Rating of perception of corruption</td></tr>
<tr><td>Cybersecurity rating</td><td>Current rating</td><td colspan="2">Rating of prevention, detection, investigation, and prosecution of terrorist financing</td></tr>
<tr><td>Rating of corporate governance</td><td>Control rating</td><td colspan="2">Rating of the most dangerous countries</td></tr>
<tr><td>Rating by the number and share of the imprisoned population</td><td>Synthesizing rating</td><td colspan="2">Ranking of countries by the level of intentional homicides</td></tr>
<tr><td rowspan="3">Ranking by number of suicides</td><td>Individual rating</td><td colspan="2">Financial stability rating</td></tr>
<tr><td>Integral rating</td><td colspan="2" rowspan="2">Social rating of departmental structures</td></tr>
<tr><td>Rating by types of crimes</td></tr>
</table>

Source: systematized by the authors

When analysing law enforcement activities, the question arises of the possibility of comparing the performance of different structural units, regional structures, types of law enforcement activities, including law enforcement structures at the European and international level. This is done by addressing two methodological aspects. The first is related to the comparison of international or regional law enforcement indicators selected by the analyst based on the importance of these values for providing a comprehensive characterization. This comparison is called "external". The second concerns the problem of compliance of the achieved results with a certain benchmark against which the results are compared. In this case, the benchmark may be, for example, a certain planned task that a particular unit (region, country) must fulfil during the period under review, the results of the baseline period, or simply a perception of a certain "ideal" level of law enforcement agencies' performance. To address the first aspect (external comparison), various types of ratings are used, while the second aspect is related to the development of integrated ways to assess the dynamics of law enforcement performance, which can be called "internal". The methodology of parametric analysis is used in the course of rating compilation. However, normative conclusions are drawn on the basis of a quantitative comparison, i.e., based on selected indicators (coefficients) weighted by their relative importance, the total score of law enforcement units is calculated, which is the basis for determining the final place in the ranking.

Methodological approaches to determining the international rating of, for example, law enforcement

agencies in a region or a country make it possible to compare their effectiveness in time and space. The implementation of this approach allows for a more thorough approach to the process of reforming and restructuring law enforcement units (Zakhozhai, 2023). Its application makes it possible to present their activities at different hierarchical levels of management, from the structural unit to the international level, in the most generalized way, to identify the most effective ones and to make appropriate management decisions more reasonably. It is important to note that international rating assessments may also consider industry-specific features of the work being carried out. The assessment can be carried out using each of the methods described above separately, or using all methods simultaneously.

The method of creating a ranking based on many indicators is relatively simple and is based on ranking law enforcement agencies according to the values of key indicators selected for analysis. At the same time, a systematic comprehensive approach to a comprehensive assessment of law enforcement agencies in general is more reasonable. The advantage of this method is its ease of use, while the disadvantage is that not all indicators characterize the state of law enforcement.

The cluster analysis method allows dividing the set of law enforcement agencies (countries) under study into groups called clusters according to certain criteria. To form a rating, for example, in accordance with the level of the crime situation in the regional aspect, the cluster analysis method is recommended to use the following indicators: the level of prevalence of criminal offences in society; the intensity of criminal offences; the level of criminal activity of crimes (how many crimes are committed on average by one criminal); the level of severity of criminal offences and others. The results of the cluster analysis can be presented as shown in Table 2.

Table 2. Results of cluster analysis

Country	Cluster				
	1	2	3	4	Final
USA	X	X	X	X	X
Great Britain	X	X	X	X	X
Ukraine	X	X	X	X	X
etc.	–	–	–	–	–

Source: developed by the authors

In Table 2, clusters 1-4 correspond to the values of the above indicators. If a country or region is ranked 1st in a cluster by the criterion of maximizing the relevant indicator, it is given 1 point, if it is ranked 2nd – 2 points, and so on. The countries (regions) are arranged in the final cluster based on the principle of minimum points. Thus, the final cluster is a rating assessment of the overall level of crime in a country (region). The advantage of this method is that it is the most accurate, while the disadvantage is the inaccessibility and difficulty of obtaining the necessary information.

The matrix method of analysis is used for a generalized assessment of the effectiveness of law enforcement. It is based on the concept that reveals the process of law enforcement through the input-output system in the form of a matrix model. The matrix model of law enforcement analysis is based on a square table – a matrix. The elements of the matrix reflect the specific content that each individual title consists of. Some of them are quite well known, while others are not well known and do not have precise names (for example, the ratio of production assets to material costs and other relationships). Nevertheless, they characterize one or another aspect of law enforcement activities and are considered as coefficients that characterize law enforcement activities (Zakhozhai, 2017). The indices of relative indicators under the diagonal of the matrix are used to determine the value of the rating number:

$$A = \frac{\sum_{i=1}^{n} A_i}{n}, \quad (1)$$

where A_i is the index (growth rate) of the i element matrix models; n– quantity elements.

With the help of the matrix method, a comparative analysis of law enforcement activity in the dynamics for several reporting periods is carried out and the value of the general indicator of the effectiveness of the activity is determined. If the value of the generalizing indicator exceeds 1, then the efficiency has increased, if not, it has decreased. This method gives both a generalized description of the state of law enforcement activity and the dynamics of its development, and also determines changes in the process and results of work, as well as reveals reserves for improving the efficiency of activity.

The scoring method is relatively simple and is based on the conclusions of experienced experts. The rating is assigned in accordance with the system of indicators by the sum of points. Indicators are divided into classes: 1st class – indicator values exceed established or theoretically justified standards; 2nd class – indicator values are at the normative level; 3rd class – the values of indicators are lower than the normative level. During the calculation of the rating, various options for assigning indicators to one or another class are possible. The indicator in the first case is estimated at 3 points, in the second – at 2 points, in the third – at 1 point. The results of the analysis using the method of point evaluations can

be presented in Table 3. At the same time, the criterion for forming the rating is the maximum sum of points for all indicators. Thanks to the use of this method, it is possible to identify the strengths and weaknesses of each analysed object, and the evaluation is a subjective assumption of experts, which is its drawback.

Table 3. The results of the analysis by the ballpoint method evaluations

Law enforcement agencies of the country	Groups indicators				Total points
	1st class/points	2nd grade/points	3rd grade/points	4th grade/points	
A	X	X	X	X	X
B	X	X	X	X	X
C	X	X	X	X	X
etc.					

Source: developed by the author

The method of comparative rating evaluation consists in the fact that the basis of the final indicator is a comparison of the objects of law enforcement structures (region, country) for each indicator with a conditional reference law enforcement agency that has the best results, in such a structure all indexes acquire optimal values. In general, the method of comparative rating evaluation of the structure of law enforcement activities can be presented in the form of the following sequence of execution of the following actions. First, initial data are presented in the form matrices (A_{ij}), i.e table in which the rows are written rooms indicators ($i = 1, 2, 3 \dots n$), and in columns – numbers enterprises ($j = 1 \dots m$). With and each indicator is defined the maximum value and is entered in the column conditional reference by a thrush ($m + 1$). Then the initial ones matrices of the law enforcement unit (A_{ij}) are standardized relatively corresponding indicator reference law enforcement officer division by the formula:

$$X_{ij} = \frac{A_{ij}}{max\ A_{ij}}, \quad (2)$$

where X_{ij} – standardized indicators of the state of the j law enforcement unit. At the next stage for each analysed under the section, value him rating assessment determined by the formula:

$$P_i = \sqrt{(1 - x_{1i})^2 + \dots + (1 - x_{nj})^2}, \quad (3)$$

where P_i – rating assessment of the ilaw enforcement unit; $x_{1i} \dots x_{nj}$ – standardized Indexes of the i law enforcement unit. At the last stage, the structural units are arranged (ranked) in descending order of the rating assessment. The unit with the lowest comparative score has the highest rating. The advantage of this method is that the assessment is based on public reporting data of law enforcement agencies, while the disadvantage is that it is time-consuming to make calculations.

The method of international ranking analysis of law enforcement activity is based on the fact that its level is determined by the allocation and use of means and sources of its formation. The evaluation criteria are the relevant coefficients. Such coefficients are grouped by the main areas of law enforcement activity. On this basis, it is possible to assess the level of law enforcement activity not in terms of proximity to the reference level, but in terms of distance from the critical level. Therefore, when choosing a reference base for rating assessment, it is necessary to introduce the concept of "conditionally satisfactory law enforcement structure" of a region or country. It can be assumed that a conditionally satisfactory law enforcement structure has indicators that meet the normative minimum values determined on the basis of the criteria of law enforcement effectiveness. The rating number (R) is determined by the formula:

$$P = \sum_{i=1}^{L} \frac{1}{LN_i} K_i, \quad (4)$$

where L is the number of indicators which are used for rating assessment; N_i – regulatory requirements for the i coefficient; $\frac{1}{LN_i}$ – gravimetric index of the i coefficient; K_i – i coefficient. When full compliance values coefficients of law enforcement activity $K_1 \dots K_L$ their normative minimal levels of the rating of the studied structure will be equal to 1, it is selected as the rating conditionally to the satisfaction of the law enforcement structure. The level of the structure with a rating score of less than 1 is characterised as unsatisfactory.

Options for reconciling the results obtained by different methods can be carried out using the arithmetic mean method, the mathematical method of weighting the assessment results, the subjective weighting of the assessment results, and the combined method. The most reliable results of an integrated international rating assessment are achieved when using the combined method.

Thus, the main areas of application of international performance ratings include: management decision-making; planning and forecasting of performance indicators of a particular law enforcement agency (country, region); conducting market research; compiling tables of the use of ratings in these areas; taking into account the scope of application of ratings in each of the key areas, as well as the purposes of the ratings. Thus, the author proposes a classification of types of international ratings, which describes their different types

by areas of application, as well as systematic methods for compiling international ratings of law enforcement agencies. Based on the analysis, it can be concluded that the methods of international rating assessment are diverse and ambiguous. Their application allows for the most objective assessment of the effectiveness of a law enforcement agency (country, region).

Based on the use of comprehensive methods, the following model of rating assessment of law enforcement agencies (country, region) is proposed. The weight of individual indicators can be determined by experts and is derived from a specific political, social situation and other factors. Law enforcement activities are assessed on the basis of a certain set of indicators, which are used to make an integral assessment and determine the corresponding rating. Generally, the generalising indicator for the *j* multidimensional object is defined as the arithmetic mean of the standardised values of the indicators:

$$G_j = \frac{1}{m}\sum_{i=1}^{m} z_{ij}, \quad (5)$$

where G_j is a multidimensional indicator reflecting the generalizing property of the *j* object; z_{ij} – the standardized value of the *i* indicator of *j* object; *t* is the total number of indicators. This method of aggregation averages the values of the indicators included in the set of the set; all of them can be considered equal (equally weighted), which does not happen in real conditions. Mitigating this undesirable phenomenon can be done by using weighting factors that reveal the importance of each indicator, as well as their significance and position in the study. This process does not lend itself to a clear functional definition, and the assignment of weighting factors can be carried out mainly by experts after a comprehensive analysis of the qualitative essence of the phenomenon.

However, the weighting factors are mostly subjective and therefore not reliable enough. Greater objectivity can be achieved by establishing the relationship between the results of the activities of individual objects and the factors that determine them. For this purpose, it is advisable to resort to the methods of correlation-regression analysis, which measure the relationship between the effective feature *y* characterizing the effect of the activity and the factor features $x_1, x_2 ... x_n$ on the basis of which the international rating of this or that region or country is built. At the same time, the overall effect must be distributed among individual factors.

For this, you can use multivariable linear equations:

$$y = b_0 + b_1x_1 + b_2x_2 + ... + b_nx_n. \quad (6)$$

Taking into account multicollinearity the relationship between the indicators, the assessment of the weight of individual factors in the formation of the resulting characteristic can be determined on the basis of indicators of multiple determination of R^2, pair correlation r_{ij} and standardized regression coefficients - β - according to the formula:

$$d_j = \frac{\beta_j r_{x,yi}}{R^2}. \quad (7)$$

At the same time, an assessment of the importance of the influence of each of the indicators of a set of features on the general property of the object is carried out, and the form of a multidimensional indicator is formed – an arithmetically weighted average:

$$G_j = \sum_{i=1}^{m} z_{ij} d_i, \quad (8)$$

where d_1 is the weight of the *i* indicator and $\sum_{i=1}^{m} d_i = 1$.

Therefore, the construction of a multidimensional generalizing indicator can be carried out in four stages: formation of a set of characteristic indicators x_i; alternative method of standardization of indicators; justification of the function of weighting coefficients d_i; determination of the procedure for aggregating indicators.

An important condition in the process of forming a set of signs is ensuring the information unidirectionality of indicators, which is connected with the definition of generalizing indicators, the influence of which may be different. Indicators can have different information orientation, which must be taken into account when forming a general indicator. According to the gradation of information orientation, the indicators are divided into stimulators and destimulators . There is a direct relationship between the values of the generalizing indicator G_j and the stimulator indicator, and the inverse relationship with the value of the destimulator indicator.

This is considered in the data standardization procedure, the main purpose of which is to establish the effectiveness of indicators of a set of characteristics that are reduced to one basis (foundation), that is, the transition to dimensionless values while maintaining the ratio between individual indicators. It is important to ensure that all indicators of a set of signs are standardized according to the same procedure, which depends on the content of the indicators and the purpose of the study. The standardization procedure includes the following indicators: standardization of rank scale indicators and standardization of metric scale indicators. The first globalization direction is defined in three ways:

- if the indicators are evaluated by experts, and the features of the set are a set of expert evaluations, then the latter can be replaced by the corresponding ranks;
- if the set of features consists of indicators that are measured by different types of scales, then the values of the indicators can be replaced by ranks;
- if the indicators cannot be directly represented in a numerical expression (opinions), then their value can be displayed using a rank scale.

Since the ranking of objects usually occurs from R_{min} to R_{max}, the minimum rank is given to the maximum

value of the stimulus indicator and the minimum value of the destimulator indicator. In this case, a lower rating value indicates a higher rating of the object.

The second globalization direction in the procedures of standardization of indicators of a set of features is the mathematical exploitation of algorithms for indicators of the metric scale. Their essence consists in comparing the empirical values of the indicator x_{ij} with a certain value a, which can be: the maximum value of the indicator x^{max} the minimum value of the indicator x^{min} average value $\bar{x}$; reference (or conditional) value x^0. Mathematically, such a procedure can be written either in the form of standardized deviations $\frac{x_{ij}-a}{q}$, (where q is the unit of standardization), or in the form of relations $\frac{x_{ij}}{a}$. These two procedures have one important property, which is characterized by the help that considers the informational orientation of the indicators of the characteristic set, as well as the use of certain modified standardization formulas for indicators-stimulators and destimulators.

Standardized deviations from the mean level are traditionally used in multivariate analysis, where they have the form:

a) for stimulants:

$$z_{ij(\text{st})} = \frac{x_{ij}-x}{\sigma_i}, \quad (9)$$

b) for destimulators :

$$z_{ij(\text{dest})} = \frac{x-x_{ij}}{\sigma_i}, \quad (10)$$

where σ_i is the standard deviation of the i iindicator. However, this standardization procedure has one rather significant limitation. Since it is based on average values and standard deviations of indicators, it is used only for qualitatively homogeneous populations with a distribution of elements close to normal. During the conduct of some law enforcement studies or socio-economic law enforcement studies, international economic and law enforcement comparisons, it is sometimes difficult to ensure the fulfilment of this condition. In such a case, the procedure based on deviations, where the unit of standardization is the variation range of the indicator, will be effective. At the same time, there is a transition to standardized values of indicators:

a) for stimulants:

$$z_{ij(\text{st})} = \frac{x_{ij}-x_i^{min}}{x_i^{maxx_i^{min}}}, \quad (11)$$

b) for destimulators:

$$z_{ij(\text{dest})} = \frac{x_i^{maxx_{ij}}}{x_i^{maxx_i^{min}}}. \quad (12)$$

The choice of the value a is determined by the need to ensure the information unidirectionality of the standardized values z_{ij}. The stimulator indicator will characterize the higher development of the phenomenon in the field of law enforcement, if its value x_i becomes closer to the maximum x^{max}; therefore the difference will be greater (x_{ij} - x_i^{max} ()). In the case of the destimulator indicator , under the same conditions, the value x_i should approach the minimum x^{min}, then the difference will be greater ($x_j^{maxx_{ij}}$ ()). Thus, the value of z_{ij} addition is always between 0 and 1 and has a direct relationship with the state of development of the object: its value approaches 1 at a high value of the i indicator, and vice versa.

As one of the simplified methods, the method of multivariate average is used. For this purpose, a set of surveillance objects (law enforcement structures of various levels – countries, regions, etc.) is selected to establish , for example, a rating of the level of activity efficiency. An appropriate system of indicators is formed (x_{ij}), on the basis of which integral evaluation is carried out. The values of these indicators are calculated for each object and on average for their aggregate:

$$\overline{x_j} = \frac{\sum x_{ij}}{n}. \quad (13)$$

To eliminate the scale of these indicators, generalizing indicators are calculated (p_{ij})in the form of indicators of individual objects to their average value for the totality of objects:

$$p_{ij} = \frac{x_{ij}}{\overline{x_j}}. \quad (14)$$

The average value is calculated ($\overline{p}_i$):

$$\overline{p}_i = \frac{\sum p_{ij}}{k}, \quad (15)$$

where k is the number of indicators used in calculations. The ranked series ($\overline{p}_i$) is the corresponding rating of the structural law enforcement units of the objects, which characterizes the level of its effectiveness. Columns 1-3 of Table 4 for the totality of law enforcement structural subdivisions provide conditional data on three indicators (R_{ij})that characterize law enforcement activities in seven countries.

Table 4. An example of a rating evaluation of the effectiveness of law enforcement agencies of different countries

Law enforcement agencies of the country	Performance indicators			Standardized deviations from the mean			$\sum P_i$	$\overline{P} = \frac{\sum P_i}{3}$	Rating (rank)
	The level of repelled cyberattacks (L_v)	The level of disclosure of criminal offences (L_r)	The level of disclosure of administrative offences (L_a)	P_1	P_2	P_3			
1	0.72	0.44	0.24	1	1.07	0.61	2.68	0.89	4
2	0.68	0.34	0.28	0.94	0.83	0.72	2.49	0.83	6

Table 4, Continued

Law enforcement agencies of the country	Performance indicators			Standardized deviations from the mean			$\sum P_i$	$\overline{P} = \frac{\sum P_i}{3}$	Rating (rank)
	The level of repelled cyberattacks (L_v)	The level of disclosure of criminal offences (L_r)	The level of disclosure of administrative offences (L_a)	P_1	P_2	P_3			
3	0.89	0.31	0.91	1.24	0.76	2.33	4.33	1.44	1
4	0.75	0.42	0.37	1.04	1.02	0.95	3.01	1	3
5	0.45	0.46	0.33	0.62	1.12	0.86	2.6	0.87	5
6	0.83	0.49	0.37	1.53	1.19	0.95	3.67	1.22	2
7	0.69	0.41	0.2	0.96	0.51	0.51	1.98	0.66	7
Σ	5.01	2.87	2.7	–	–	–	–	–	–
Mean value (R)	0.72	0.41	0.39	–	–	–	–	–	–

Note: the data is conditional
Source: developed by the authors

For further calculations, it is necessary to set the average value $\overline{R}$ for each indicator:

$$\overline{R}_1 = 0{,}72;\ \overline{R}_2 = 0{,}41;\ \overline{R}_3 = 0{,}39. \quad (16)$$

Thereafter, it is necessary to calculate the indicators of the deviation of the values values P_{ij} from the average:

$$P_{ij} = \frac{R_{ij}}{\overline{R}_j}. \quad (17)$$

The results of the calculations are shown in columns 4-6 of table 4, the sum of these indicators is in column 7, and the average value is in column 8. Based on the ranks of the indicators $\overline{R}_i$ (column 9), it is possible to compare the level of the summary assessment of the effectiveness of the law enforcement agencies of the countries. All indicators accepted for calculation have a single direction. The rating (rank) is assigned from the largest value of the average standardized deviation to the smallest. The highest rating (rank) is the 3rd structural division of the Ministry of Internal Affairs, the lowest is the 7th. If there is a need for acceleration and improvement during the practical implementation of the considered methodology, it is advisable to use appropriate software and the latest IT technologies.

Discussion

Existing research on the methodological foundations of international rankings is global, as any situation and activity of state institutions should be assessed in a qualified and objective manner. Such an assessment depends on certain indicators, mainly coefficients or a certain type of rating. In researching this issue, it became clear that evaluation can apply to any area of activity. In modern science, such assessments are most often carried out mainly in the economic, environmental, and social spheres, and much less in law enforcement. In the economic sphere, it is common to create ratings of banks, enterprises, risks, business processes, etc. In the course of international ratings, systems of certain indicators are usually used, which are the same for each country. There are ratings that are not included in all countries for certain economic, political or socio-cultural reasons.

The creation of international rankings simplifies the research procedure for certain respondents, consumers, competitors, or society. S. Shojaei *et al.* (2018) note that there are several institutional barriers (formal and informal) at different stages of the venture capital (VC) investment process that hinder funding. Thirty-one detailed surveys were conducted, and the data were analysed using grounded theory, and the study concludes that the main barrier is the lack of a credit rating/score system. This suggests that rating provides wider opportunities for evaluation in any area, including law enforcement, i.e. when an international rating of law enforcement agencies is built, society has better opportunities to determine the effectiveness of a particular structural unit, management, or agency as a whole.

Noteworthy are the studies by I.Yu. Yepifanova *et al.* (2021) on the use of methodological approaches to assessing management decisions of investment attractiveness. The scientists found that several methods are inherent in the methods for assessing investment attractiveness: the method of rating, expert and integral assessment of investment attractiveness; method of comparisons; matrix method; profitability triangle; differentiated approach; methods based on the use of artificial intelligence. The article supports further development and use of the matrix approach to assessing the level of investment attractiveness of enterprises. The use of this approach in law enforcement agencies will make it possible to carry out a comparative analysis for a certain period and determine the effectiveness or ineffectiveness of law enforcement activities, identify the indicators that led to the current state.

In today's environment, when a significant number of countries are trying to stabilize their economies and introduce new advanced technologies that will enhance their development, and competition between large countries is intensifying, the investment attractiveness of regional and state-owned structures is becoming an

important issue. At the same time, state-owned companies in these countries are under tremendous economic pressure and strategic hunger, and usually suffer from a lack of investment resources. Both conventional and international ratings are used to reliably prioritize their investments. Considerable attention is paid to this issue by F. Krueger *et al*. (2020). To assess the effectiveness, the researchers propose to consider ratings as a tool for overcoming risks in the field of environmental social and corporate governance (ESG). The proposals can be applied in law enforcement, as risks, their assessment, and prevention apply to any area, especially where there is a danger to personnel, i.e. law enforcement agencies. Thus, when applying such tools, it will increase the opportunities for making effective investment decisions (Hartzmark & Sussman, 2019). At the same time, numerous scientific studies pay attention to the economic consequences of ESG performance when using the rating as a risk management tool (Hubbard *et al*., 2017; Lins *et al*., 2017; Wan *et al.,* 2023). Researchers are also studying how ESG affects pricing and price increases if investor demand for ESG characteristics increases (Engle *et al.,* 2020; Pedersen *et al*., 2021). The introduction of ESG into law enforcement will create an opportunity to empirically assess the magnitude of the effect of measures taken by law enforcement authorities to increase the detection of criminal cases (crimes).

As China's economy has shifted to a sustainable model, the Chinese socially responsible investment (SRI) market has expanded rapidly, which has deeply stimulated the development of environmental, social and governance (ESG) ratings for Chinese companies. The latter have launched their ESG rating systems. Y. Zhu (2023) suggested that information users should consider a more diverse and comprehensive information perspective when using these ratings. Among them, it is necessary to consider the sources of information for each rating, which are based on the firm's public disclosures, mainly including annual reports and CSR/ESG reports. Ratings such as MSCI and SynTao include information on corporate social networks in their sources; FTSE uses a more proactive strategy, including communication with rated firms to research their undisclosed information. At the same time, discrepancies in ESG ratings are noted (Zhu *et al.,* 2023; Zheng & Aishan, 2023). It is worth noting that these rating models can also be applied to cyber policing. Information might be divided into certain types and an operational process is carried out: collection of raw information; sorting of raw information and filling in basic indicators. The basic indicators are then summarized to form a rating score and verified to form the final result. These operational processes systemize the work of law enforcement agencies and ensure their effective functioning.

During the 2010s, the issue of sustainable finance became increasingly important to investors, and ESG ratings were widely used to put ESG investment strategies into practice. Strikingly, it has been widely documented in both academic literature and investment practice that the ESG ratings of a given firm can vary widely across rating providers. However, although ESG rating discrepancies have been widely criticized, only a few studies have examined the sources and determinants of rating discrepancies. M. Liu (2022) tested whether quantitative ESG disclosure contributes to rating convergence between agencies. The author found that, taken together, the results indicate that quantitative ESG disclosure distorts rating discrepancies. This study can be linked to law enforcement to identify the determinants of differences in ratings conducted by law enforcement agencies in different districts, regions, and countries. Provide them with the same algorithm for conducting rankings and for determining efficiency and further effective actions.

Methodological approaches to determining the rating in the educational sphere are widely presented in the literature. This is understandable, as professional development for teachers at different levels of education is important for the future of the country, and improving teaching effectiveness is a key aspect of human education and professionalism. To assess the effectiveness of teaching in institutions of different levels of education, ratings of pupils, students, young scientists, teachers, as well as leading educational institutions of the world, etc. are used. These rankings can inform policies and practices related to teaching evaluation, graduate employability, and professional development in education (Liu *et al*., 2023). There are many such rankings, and they usually reflect the specifics of the educational institution and the professional orientation of its contingent. This research can also be applied in law enforcement to assess the specifics of law enforcement activities and the professional orientation of law enforcement officers. Thus, the study of A.A. Babych & K.O. Yandola (2021) provides an example of rating the success of the educational activities of a higher education institution.

As for ratings in law enforcement, this is a relatively new stage in the development of methods for assessing the effectiveness of law enforcement agencies, but when carrying out this assessment using different methodological approaches, a positive result can be obtained for the whole society, since some ratings help to assess critical situations, and society itself can assess law enforcement agencies using information systems. For example, J.L. Regens *et al.* (2016) conducted a study to assess the situational awareness of various police officers in terms of their individual ability to identify nine key behaviours that indicate terrorist activity. The selected group of police officers was recruited from state, county, and municipal law enforcement organizations. The respondents were asked to rate each component of the scenario on an 11-point Likert-type suspicion scale.

The authors noted statistically significant differences by agency type, officer designation (patrol or detective), experience, gender, agency size, and education.

Therefore, the introduction of the rating as a component of the management system of law enforcement agencies will help to increase the overall efficiency of their activities. In this study, several methods were proposed, which will help to have a more objective idea of their effectiveness. The scientific basis of the rating evaluation will contribute to the development of healthy competition among law enforcement structural units, despite different levels of work and their importance, will stimulate professionalism and competence in difficult working conditions.

Conclusions

The ongoing military conflict on the territory of Ukraine and new challenges to fiscal stability around the world increase the requirements to the quality of law enforcement agencies, the level of relevant management decisions, development, and implementation of measures to prevent and combat crime, which in turn necessitates the search for creative approaches to identify the most effective areas of development of these agencies. One of the main such tools is scientifically based information and analytical support of law enforcement activities, in particular, such an important component as international rating assessment. This theoretical and methodological study examines several methodological approaches to the international rating assessment of law enforcement performance. The diagnostics from the standpoint of qualitative and quantitative characteristics of performance has shown the expediency of their generalization in the form of an integral indicator of international rating assessment, which reflects both the first and second features of the object of study.

It is established that to compare the performance of different units, types of law enforcement activities, regional structures, States, etc., it is advisable to distinguish such methodological aspects as external and internal comparison, which are given an appropriate methodological interpretation. The author proposes a number of the most accessible and constructive rating methods, with the identification of their strengths and weaknesses. This approach allows identifying the level of effective activity through comparison in time and space, and provides an opportunity to take a more thorough approach to the process of reforming and reconstruction of law enforcement agencies.

Regulation (management) of the international law enforcement system is a process related to substantiation of operational and strategic decisions, which requires the availability of relevant information, the production of which is a function of information and analytical support of law enforcement activities, starting from the level of primary law enforcement units and ending with regional, national and interstate ones. The purpose of such information and analytical support is to collect primary information, to classify and store it, to process and summarize it, and to distribute it appropriately between primary law enforcement agencies and international agencies, so that, on the basis of the collected initial data, secondary, processed information is obtained which is the basis for making effective law enforcement decisions. Based on the use of complex methods, the author proposes a model of international rating assessment of the effectiveness of law enforcement agencies of various structural units, in particular, at the regional, State and international levels. When constructing a generalizing indicator, it is important to consider the information diversity of some of them and to divide them into stimulants and discouragers, and to take them into account in the data standardization procedures. It is noted that the most accessible method of international rating assessment of the effectiveness of law enforcement agencies is the multidimensional average method, the algorithm for calculating which is presented in this paper. In this regard, a promising area for future research is to develop ways to apply the proposed methods to build an international law enforcement rating.

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Conflict of Interest

None.

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Методологічні засади побудови міжнародного рейтингу як складової інформаційно-аналітичного забезпечення правоохоронної діяльності

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Анотація
У зв'язку із фіскальними потребами сучасної держави дедалі більшої актуальності набуває проблема вибору методів оцінювання пріоритетних та ефективних напрямів розвитку правоохоронних структур. Метою статті є обґрунтування методологічного підходу, правил, сучасних прийомів і методів, за допомогою яких доцільно визначати рейтинговий рівень ефективності діяльності певної правоохоронної структури, підрозділу, системи загалом. Для дослідження використано загальнонаукові методи (узагальнення, абстрагування, аналогії, аналізу та синтезу), а також систему статистичних методів – масових спостережень, абсолютних, відносних і середніх порівняльних величин, табличний, кореляційно-регресійний та аналіз бальних оцінок, метод параметричного аналізу, моделювання тощо. З метою всебічної характеристики міжнародного рейтингового оцінювання запропоновано низку конструктивних підходів, які залежно від потреби запропоновано використовувати окремо, так і всі одночасно. Виокремлення наявних видів оцінювання з позицій якісної та кількісної характеристик дало змогу сформувати юридичну оцінку кожного з них, обґрунтувати доцільність використання універсального виду оцінки правоохоронної діяльності – міжнародної рейтингової оцінки, що ґрунтується на складанні універсального показника. Це надає можливість оцінити якісні та кількісні характеристики окремого об'єкта, правоохоронної системи, а також визначити рейтингове місце країни в загальному міжнародному рейтингу. Доведено, що порівняння результатів діяльності різних структурних підрозділів, видів правоохоронної діяльності, регіональних і міжнародних структур передбачає проведення як внутрішнього, так і зовнішнього рейтингування. За результатами дослідження рекомендовано забезпечувати інформаційну спрямованість показників з огляду на процедури їх стандартизації з поділом на стимулятори та дистимулятори. Як один зі спрощених і доступних методів оцінки міжнародного рейтингу запропоновано використовувати багатовимірну середню, алгоритм розрахунку якої описано в статті. Практична цінність цієї роботи полягає в тому, що запропоновані методики може бути використано під час прийняття та обґрунтування управлінських рішень

Ключові слова:
міжнародна рейтингова оцінка; ранжування; моделювання; інформаційно-аналітичне забезпечення; ефективність; моніторинг