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METHOD OF ASSESSING THE EFFECTIVENESS OF INFORMATION SUPPORT FOR DECISION-MAKING

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This article presents a method for assessing the effectiveness of decision support information systems. It synthesizes approaches based on an analysis of the total cost of operating decision support systems, an index of the maturity of artificial intelligence used in such systems, and the formalization of control systems in terms of automatic control theory. The proposed method enables a comprehensive assessment of both the technological and economic effectiveness of decision support information systems, taking into account their strategic alignment with the goals of the organization (department), the risks, and the long-term effects of using decision support information systems. The theoretical and practical significance of the method is confirmed by testing it using decision support systems in government agencies and industrial enterprises. The method provides specialized tools for justifying financial investments in information technology, optimizing the architecture of decision support information systems, and improving the quality of management decisions.

Keywords: decision support system; efficiency; integrated assessment; maturity index; automatic control theory; key performance indicators; artificial intelligence.

Introduction

In the context of the digital transformation of governance and the growing volume of source data used for decision-making, decision support systems (DSS) are becoming a critical tool for government agencies and businesses. They are designed to improve the validity, speed, and quality of decisions by processing heterogeneous, often unstructured data, modeling scenarios, and providing recommendations to decision makers (DMs) [1, 2]. However, the costs of developing and implementing such systems are associated with high risks, as the benefits of implementing a DSS may not be justified due to the high costs of their development, operation, and modernization [3]. Therefore, there is a persistent need for reliable and comprehensive methods for assessing their effectiveness, allowing not only to justify the feasibility of implementing DSS in management decision support practices but also to monitor their performance throughout their entire life cycle.

Existing approaches to assessing the effectiveness of information support for decision-making (ISDM) using specialized systems are often fragmented [4]. Financial methods such as ROI (return on investment) and IRR (internal rate of return) focus on direct economic returns but weakly consider strategic benefits and intangible effects. Methodologies based on assessing technological trends can ignore the managerial context and human factors. Currently, there is no single, generally accepted methodology that integrates technological, economic, organizational, and strategic aspects into a single evaluation model.

Thus, the objective of the study is to develop a comprehensive method for assessing the effectiveness of ISDM, combining quantitative and qualitative indicators and taking into account the maturity stage of the information system and its strategic role.

1. Analysis of Key Approaches to Assessing the Effectiveness of Information Support for Decision-Making

The analysis revealed several key areas for assessing the effectiveness of ISDM. Let's consider them in more detail.

Assessment based on key performance indicators (KPIs) and functional modules. As shown in the study [5], the effectiveness of ISDM can be assessed using a set of indicators grouped by functional modules: efficiency (by module or process), effectiveness, total costs, response time (quality of service), and security. The final score is calculated using a matrix model and the maturity index of the implemented technologies. The formula for the average effectiveness score based on the above parameters (indicators) can be represented as:

$$Y_j = \frac{\sum_{i=1}^{n} L_i}{n},$$

where Y_j is the integral efficiency assessment; L_i is the process efficiency assessment for the i-th parameter; n is the number of parameter values being assessed.

Methods of economic evaluation of investments in technology projects. The paper [6] examines the Total Value of Opportunity (TVO) methodology. It involves a qualitative and quantitative assessment across five areas: direct return on investment, strategic alignment, impact on business processes, alignment with information technology architecture, and risk assessment. The integrated TVO indicator (V_{TVO}) is calculated as a weighted sum of scores for each area:

$$V_{\text{TVO}} = w_1 \cdot V_{\text{TCO}} + w_2 \cdot V_{\text{ST}} + w_3 \cdot V_{\text{BP}} + w_4 \cdot V_{\text{AV}} + w_5 \cdot V_{\text{RV}},$$

where w_i are the weighting factors reflecting the importance of the area; V_{TCO} is the total cost of ownership of the DSS; is strategic alignment; V_{BP} is the impact on business processes; V_{AV} is alignment with the information technology architecture; V_{RV} is the risk assessment.

The total cost of ownership (TCO) assessment is considered the most important component, taking into account direct (hardware, software, personnel) and indirect costs (equipment downtime, training) of the information system.

Evaluation in the context of integrated management systems and production systems. In [7], the authors focus on assessing the effectiveness of change management support information systems within an integrated management system. A two-tier approach is proposed, using the geometric mean to aggregate disparate indicators. For example, the integrated performance indicator for the integrated management system (IMS) is calculated as:

$$E_{\text{IMS}} = \sqrt[3]{Q \cdot S \cdot B},$$

where Q is the level of implementation of the sustainable development plan (quality); S is the safety level; B is the level of greening, which is understood as the process of steadfast and consistent implementation of a system of technological, managerial, and other solutions that improve the efficiency of natural resource use. Each of these indicators, in turn, is calculated as the geometric mean of the individual indicators.

Mathematical modeling based on automatic control theory. The study [8] proposes a fundamentally different approach based on the formalization of the DSS in terms of automatic control theory (ACT). The system is represented as a feedback control loop consisting of transmission links. Efficiency is related to the parameters of the open-loop transfer function $W(p)$, such as the gain k, which characterizes the quality of automated control, and the time constants T_1 (decision-making time) and T_2 (information collection time). For the purposes of this study, the coefficient k can be defined as a measure reflecting how effectively the decision-making system converts input information about the current situation into recommendations for the DMs on developing optimal control actions. In general, the effectiveness of the DSS based on the ACT is calculated using the formula:

$$W(p) = \frac{k}{p(1+T_1 p)} + \frac{kp}{1+T_2 p} = \frac{k(p^2 T_1 + p + T_2)}{p^2 T_1 T_2 + p(T_1 + T_2) + 1}.$$

In the approach under consideration, stability criteria (Hurwitz, Nyquist) allow one to assess how changes in system components (automation, personnel training) affect its controllability and quality.

The reviewed works aimed at assessing the effectiveness of ISDM are not exhaustive. Each approach has its own strengths: TVO emphasizes comprehensiveness and links to organizational strategy, TCO emphasizes financial detail, KPI emphasizes process focus, and ACT emphasizes in-depth analysis of the system's dynamic properties. However, their isolated application does not provide a comprehensive understanding of the effectiveness of ISDM and requires the development of an integrated method that combines their advantages.

2. Method for Assessing the Effectiveness of Information-Based Decision Support

Conceptually, the proposed method is based on three interrelated assessment levels.

1. The level of technological and functional effectiveness, which allows for assessing the system's performance.

2. The level of economic and strategic effectiveness, which is designed to assess financial costs, payback, and the alignment of the DSS with organizational goals.

3. The level of maturity and dynamic properties, which enables an assessment of the system's development level and its sustainability as a dynamic entity. The presented levels are assessed in parallel, and their results are aggregated into an integrated indicator. For this purpose, a system of indicators is defined, grouped according to their compliance with the assessment level.

Group 1. *Functional indicators (KPIs)*:

- K_1 accuracy of output data and recommendations, measured as a percentage (0–100%);

- K_2 system response time to a request (sec);

- $K_3 \in [1, 10]$ user interface usability, measured based on expert assessments;

- K_4 uptime (system reliability and availability), measured as a percentage of uptime (0-100%);

- $K_5 \in [1, 10]$ scalability and flexibility of function customization, measured based on expert assessments.

To adequately calculate the integrated indicator, all its individual indicators must be normalized. To do this, we normalize their values to the range [0, 1] depending on the type of influence on the result.

For indicators whose values are subject to the principle "more = better" (incentive indicators), the expression is used:

$$K_i^{\mathrm{norm}} = \frac{K_i - K_i^{\min}}{K_i^{\max} - K_i^{\min}},$$

and for indicators whose values are subject to the principle "less"= better" (destimulator indicators), the expression is used:

$$K_i^{\mathrm{norm}} = \frac{K_i^{\max} - K_i}{K_i^{\max} - K_i^{\min}},$$

where $K_i^{\min} \in [0,\ 1]$ is the maximum possible or target values of the indicator, established on the basis of expert assessments; $K_i^{\max} \in [0,\ 1]$ is the minimum possible or target values of the indicator, established on the basis of expert assessments.

Thus, the integral functional indicator is calculated based on the expression:

$$\begin{gathered} I_F = \sum_{i=1}^{5} w_i \cdot K_i^{\mathrm{norm}}, \\ \sum_{i=1}^{5} w_i = 1, \end{gathered} \tag{1}$$

where K_i^{norm} is the normalized i-th indicator; $w_i \in [0, 1]$ is the weight of the i-th indicator.

Group 2. *Economic and strategic indicators based on the TVO and TCO approaches*:

- E_1 the total cost of expenses on maintaining the DSS (TCO) for period T, calculated using the formula:
$$E_1 = \sum (C_1 + C_2 + C_3 + C_4),$$
where C_1 is the cost of acquiring (developing) the DSS; C_2 is the cost of implementing the DSS; C_3 is the total operating costs; C_4 is indirect costs (equipment downtime, training);

- E_2 direct economic effect of using the DSS, expressed as increased revenue or reduced costs (thousands/million rubles);

- $E_3 \in [1,\ 10]$ the degree of strategic alignment, determined based on expert assessments;

- E_4 impact on key business processes, such as process acceleration, error reduction, etc.;

- E_5 risk assessment, which is a weighted sum of scores for business, technological and management risks.

The integrated economic and strategic indicator is represented by the expression:

$$I_E = \lambda_1 \cdot \frac{\Delta E_{\text{norm}} - \Delta E_{\min}}{\Delta E_{\max} - \Delta E_{\min}} + \lambda_2 \cdot \frac{S_{\text{norm}}}{(w_3 + w_4) \cdot 10} - \lambda_3 \cdot \frac{R_{\text{norm}}}{w_5 \cdot 10}, \quad (2)$$

where $\Delta E = E_2 - E_{1_{\text{norm}}}$ is the net economic benefit, expressed in monetary units (thousand/million rubles); $S = w_3 E_3 + w_4 E_4$ is the weighted assessment of strategic benefits; $R = w_5 E_5$ is the weighted assessment of risks; w_3, w_4, w_5 are weighting coefficients that determine the significance of individual indicators and are set based on expert assessments; $\lambda_1, \lambda_2, \lambda_3$ are weighting coefficients that reflect the importance of each component, provided that $\lambda_1 + \lambda_2 + \lambda_3 = 1$.

To convert each component of the integrated economic and strategic indicator to a dimensionless form in the range [0, 1], we perform their min-max normalization:

$$\Delta E_{\text{norm}} = \frac{\Delta E - \Delta E_{\min}}{\Delta E_{\max} - \Delta E_{\min}},$$

$$S_{\text{norm}} = \frac{S - S_{\min}}{S_{\max} - S_{\min}} = \frac{S}{w_3 \cdot 10 + w_4 \cdot 10},$$

$$R_{\text{norm}} = \frac{R - R_{\min}}{R_{\max} - R_{\min}} = \frac{R}{w_5 \cdot 10},$$

where $\Delta E_{\min}, \Delta E_{\max}$ are the minimum and maximum possible net benefit, expressed in monetary units (thousand/million rubles); $S_{\min}, S_{\max}$ are the minimum and maximum possible strategic benefit; $R_{\min}, R_{\max}$ are the minimum and maximum acceptable risk levels.

Group 3. *System maturity and dynamics indicators*:

M_1 is a component of the maturity coefficient of the applied artificial intelligence (AI) models, demonstrating the system's advancement in the use of modern AI technologies relative to the benchmark level, and determined based on the expression:

$$M_1 = \left(\frac{M}{M^{\max}} \right)^{\gamma_1},$$

where $M \in [0, 100]$ is the actual value of the AI maturity index for the DSS under consideration, determined by expert assessment [5]; $M^{\max} \in [0, 100]$ is the maximum possible value of the index, determined by expert assessment; $\gamma_i \in [0, 1]$ are elasticity coefficients determined based on expert assessments, allowing for fine-tuning the sensitivity of the final indicator to changes in each component. In this case: $\gamma_1 + \gamma_2 + \gamma_3 = 1$.

The selection of values for γ_1, γ_2, γ_3 can be based on the following rules:

- if $\gamma_2 > \gamma_3$, it is assumed that improving decision quality (increasing k) is more important than the speed of decision-making;
- if $\gamma_1 > 0.5$, it is assumed that the requirements for the technological maturity of the system prevail over decision quality and the speed of decision-making.

M_2 is the component of the gain factor that assesses the improvement in the quality of decisions made thanks to automation and algorithm improvements, and is calculated based on the expression:

$$M_2 = \left(\frac{k}{k_{\text{base}}} \right)^{\gamma_2},$$

where k is the number of erroneous (suboptimal) decisions made by the DMs after the DSS implementation; k_{base} is the number of erroneous (suboptimal) decisions made by the DMs before the DSS implementation (base gain factor).

M_3 is the efficiency component of the control cycle, showing how much the execution time of basic functions has been reduced after a request from the DMs, and is calculated using the formula:

$$M_3 = \left(\frac{T_{\text{base}}}{T_\Sigma}\right)^{\gamma_3},$$

where $T_\Sigma = T_1 + T_2$ is the total time of the control cycle, including the time to collect information and the time to generate a decision; T_{b} is the base (initial) value of the cycle time for the system to execute basic functions.

Thus, the integral maturity indicator of the information technologies used is calculated based on the following expression:

$$I_M = M_1 \cdot M_2 \cdot M_3, \tag{3}$$

Based on the calculations performed, the following formula can be defined for calculating the functional and economic efficiency of the ISDM:

$$I_{\text{base}} = \alpha \cdot I_F + \beta \cdot I_E, \tag{4}$$

where $\alpha, \beta \in [0, 1]$ are weighting coefficients reflecting the priority of functional or economic aspects for the organization, provided that: $\alpha + \beta = 1$.

The final integrated assessment of the effectiveness of the information DSS (IE_{DSS}) is proposed in the form of a multiplicative-additive model:

$$\text{IE}_{\text{DSS}} = I_{\text{base}} \cdot I_M, \tag{5}$$

Expression (5) includes the baseline value of functional and economic efficiency I_{base}, adjusted for the information technology maturity indicator I_M.

3. Practical Application of the Developed Method for Assessing the Effectiveness of Information Support for Decision Making

For the practical application of the presented method, a formalized implementation procedure has been developed, comprising five main steps. This procedure is presented as a flowchart in Figure 1.

1. The first step involves defining the evaluation objectives, selecting the analysis time horizon (T), and setting the weighting coefficients ($\alpha, \beta, \lambda_i, \gamma_i, w_i$) with the assistance of experts or based on the DMs preferences.

2. The second step involves collecting data, including completing assessment forms, analyzing financial statements, technical testing, and conducting expert surveys.

3. The third step involves calculating indicators by group and aggregating them into integrated indices I_F, I_E, I_M.

4. The fourth step involves calculating the integrated IE_{DSS} score.

5. The fifth step involves interpreting the assessment results and developing recommendations. This step involves analyzing the contribution of each group to the final result, identifying deficiencies, and developing plans to improve the ISDM.

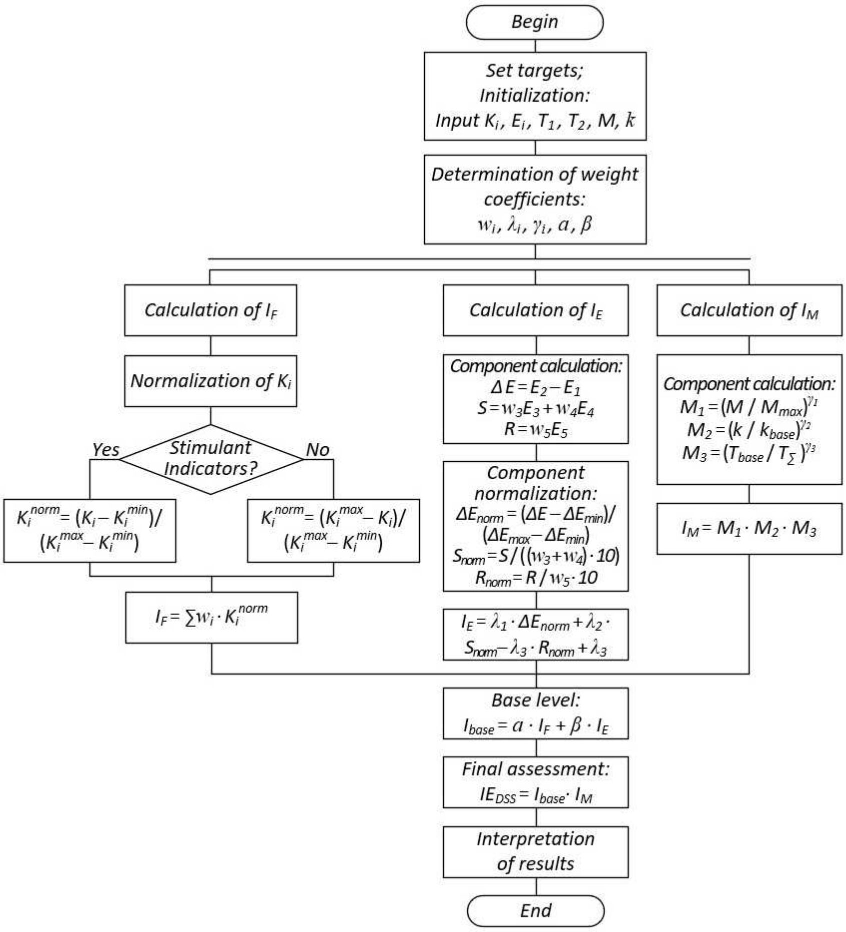

Fig. 1. Flowchart for implementing the method for assessing the effectiveness of information support for decision making.

To verify the adequacy of the developed method, we will examine an example of its practical use for assessing the effectiveness of ISDM at the Russian Helicopters holding company using the 1C:ITILIUM Unified Digital Service Management Platform. For this purpose, we will review the initial data from sources [9, 10]. The 1C:ITILIUM system is a corporate service model and ITSM/ESM platform that has replaced foreign software. It is an import-substituting stack that includes the Astra Linux operating system, the PostgreSQL DBMS, and the 1C:Enterprise platform. This system provides integration with all Russian Helicopters catalog services and HR systems (automatic request generation for personnel changes). The system covers 40000 employees, over 1000 corporate services, and receives 25000 requests monthly. The system is supported by four specialists. The key results of implementing 1C:ITILIUM in the practical operations of Russian Helicopters are [10]:

- a 25% reduction in manual operations;

- a 14% reduction in labor costs for administrative and control services;
- a 30% acceleration in reporting;

Reducing decision-making time for processing HR documents from several days to minutes (a 72-fold reduction).

To calculate the effectiveness of the information-based planned preventive maintenance program at Russian Helicopters, weighting factors were assigned based on expert assessments and presented in Table 1. To simplify presentation and improve the clarity of calculations, the weighting factors were balanced.

Table 1

Weighting factors for calculating the effectiveness of information support for decision-making at Russian Helicopters

Coefficient	Value	Purpose
α, β	0.5	Equality of functional and economic-strategic aspects
w_i (for KPIs)	0.2	All functional indicators are equivalent
w_3, w_4 (for strategy)	0.5	Equal weighting of strategic alignment and impact on processes
w_5 (for risks)	0.5	Risk assessment weighting
$\lambda_1, \lambda_2, \lambda_3$	0.33	Equal priority of benefits, strategy, and risks
$\gamma_1, \gamma_2, \gamma_3$	0.33	Equal elasticity of maturity components

Given the specified weighting factors, we will calculate the partial integrated indicators by group in accordance with the presented method. The indicators for the functional indicator group are presented in Table 2.

Thus, in accordance with formula (1), the I_F value is calculated as follows:

$$I_F = 0.2 \cdot (0.80 + 0.84 + 0.90 + 0.96 + 1.00) = 0.2 \cdot 4.50 = 0.90.$$

The group of economic and strategic indicators (I_E) is represented by the following set of partial indicators. To assess the financial costs and benefits, due to the lack of actual data on the costs of the Russian Helicopters holding company for the development of the system in question, the following values of financial units were set based on expert estimates:

- development and implementation costs E_1 (TCO) amounted to approximately 200 units;
- a 14% reduction in labor costs with an annual administrative personnel payroll fund E_2 economic effect), as well as savings due to the difference between the cost of purchasing and implementing the new system, the cost of licensing, and maintaining the current version of the old Service Desk system, amounted to approximately 1000 units.

Table 2

Functional indicators (I_F)

Indicator	Description	Actual value	Normalization	K_i^{norm}	Weight w_i
K_1 (Accuracy)	Integration with HR systems, automatic request generation, 25% reduction in manual operations	96%	(0.96–0.8)/ (1–0.8)	0.8	0.2
K_2 (Response time)	30% faster reporting, high processing efficiency	0.92	(0.92–0.5)/ (1–0.5)	0.84	0.2
K_3 (Usability)	Web access without "thick clients", centralized updates, daily work of 40000 employees	9/10	9/10	0.90	0.2
K_4 (Reliability)	Fault-tolerant architecture on a domestic platform Software in 24/7 operation mode	99.8%	(0.998–0.95)/ (1–0.95)	0.96	0.2
K_5 (Scalability)	Over 1000 services, 25000 requests per month, technical support by 4 specialists	10/10	1	1.00	0.2

Taking into account the considered values of E_1 and E_2, the net benefit ΔE is approximately 800 units, and $\Delta E_{\text{norm}} = 0.40$.

The following values were set for the strategic benefit and risk assessment indicators:

- full compliance with the import substitution and technological sovereignty policy E_3 (strategic compliance) 10/10;
- impact on E_4 processes in terms of ISDM, namely the coverage of information technology, administrative and economic activities, HR work, motor vehicles, transparency, and uniform operating rules 10/10;
- risk assessment of E_5 is due to the import-substituted stack, which minimizes sanctions risks, as well as low dependence on foreign vendors 2/10.

Thus, we have the following values: $S = 10$, $S_{\text{norm}} = 1.0$, $R = 1.0$, $R_{\text{norm}} = 0.20$. According to formula (2), the I_E value is calculated as follows:

$$I_E = 0.33 \cdot (0.40 + 1.0 - 0.20) = 0.33 \cdot 1.20 = 0.396.$$

The group of technology maturity indicators (I_M) is represented by the following components. Component M_1 (AI maturity). The system has a high level of automation, but no machine learning models are declared. This yields the following values: $M = 65$, $M^{\max} = 100$, $\gamma_1 = 0.33$. The value of component M_1 is calculated according to the expression:

$$M_1 = \left(\frac{65}{100}\right)^{0.33} = 0.65^{0.33} = 0.866.$$

Component M_2 (decision quality). Reducing manual operations helps to reduce erroneous (non-optimal) decisions by 25%. Thus, the values are: $\frac{k}{k_{\text{base}}} = 0.75$, $\gamma_2 = 0.33$. Taking this into account, we obtain the following value for component M_2:

$$M_2 = 0.75^{0.33} = 0.909.$$

Component M_3 (efficiency). The actual acceleration of request processing: from 3 days to 1 hour is 72 times. We introduce the reference maximum acceleration for this class of systems: $R_{\max} = 100$. To calculate the normalized efficiency value, we have the expression:

$$M_3 = \left(\frac{T_{\text{base}}/T_{\Sigma}}{R_{\max}}\right)^{\gamma_3} = \left(\frac{72}{100}\right)^{0.33} = 0.897.$$

The value of the integral indicator I_M in accordance with formula (3) is calculated as follows:

$$I_M = M_1 \cdot M_2 \cdot M_3 = 0.866 \cdot 0.909 \cdot 0.897 = 0.706.$$

Based on the calculations performed in accordance with formula (4), we obtain the following value for the basic functional and economic efficiency of the system:

$$I_{\text{base}} = \alpha \cdot I_F + \beta \cdot I_E = 0.5 \cdot 0.900 + 0.5 \cdot 0.396 = 0.450 + 0.198 = 0.648.$$

The calculation of the integrated assessment of the effectiveness of the ISDM is carried out according to formula (5):

$$\text{IE}_{\text{DSS}} = I_{\text{base}} \cdot I_M = 0.648 \cdot 0.706 = 0.457.$$

The resulting values can be interpreted as follows. The system's functional maturity ($I_F = 0.90$) is ensured by a unique organization, in which four technical support specialists maintain 2000 automated workstations, processing 25000 requests monthly through a catalog of over 1000 services. Approximately 40000 employees of the Holding's enterprises also work with the system. Economic efficiency ($I_E = 0.396$) reflects the balance between investment in the system and the annual economic effect. The high strategic importance of import substitution results in a value of $S_{\text{norm}} = 1.00$. The maturity indicator for the information technologies implemented in the system ($I_M = 0.706$) is limited by the lack of advanced AI and machine learning models, but a significant increase in problem-solving efficiency (up to 72 times) significantly contributes to the final integrated IE_{DSS} score. This indicates that the key development focus should be on increasing the system's maturity (implementing more complex AI models, improving data quality), rather than just its functional development.

4. Conclusions on the Main Research Results

The presented method for assessing the effectiveness of information decision support has the following key advantages:

1. Comprehensiveness by combining technological, economic, strategic, and dynamic aspects.
2. Flexibility by using weighting factors that allow the method to be adapted to the specific needs of the organization (public sector, business, industry).
3. Strategic focus by incorporating an assessment of the compliance of the information decision support system with strategic development and risk management goals.
4. Scientific validity through the integration of scientifically proven methods (TVO, TCO, ACT, KPIs) into a single logical framework.
5. Interpretability, allowing not only the calculation of overall efficiency, but also the impact of individual elements on it (for example, low technology maturity with high functionality).

It's also worth noting the limitations and challenges that need to be considered when using this method. These include:

1. The labor-intensive nature of data collection, which requires a developed information accounting system and specialized experts.
2. The subjectivity of weighting factors and expert assessments, requiring the use of agreed-upon evaluation procedures to minimize subjectivity (Delphi method, analytic hierarchy process) [11, 12].
3. The complexity of formalization for unstructured systems. The use of the ACT component requires a certain degree of formalization of the management process, which is a labor-intensive process.
4. Qualitative interpretation of the result. Thus, the numerical value of $\mathrm{IE}_{\mathrm{DSS}}$ is not informative and requires the development of a scale followed by comparison with a reference value or dynamics

The practical significance of the study lies in the possibility of using the presented method for:

- investment justification, since the integrated $\mathrm{IE}_{\mathrm{DSS}}$ indicator provides more substantiated arguments than individual financial models;
- monitoring and auditing of operational DSS systems, thanks to the ability to track performance dynamics across all key performance indicators;
- informed selection of DSS architecture options based on a comparative analysis of initial data and DMs preferences;
- formation of DSS development plans and roadmaps by enabling the selection of specific system components requiring priority improvement.

5. Conclusion

This article presents a method for assessing the effectiveness of ISDM. The method synthesizes practices from various fields: from IT investment management (TVO/TCO) and the process approach (KPIs) to automatic control theory and technology maturity assessment. The key element of the method is a three-level model that aggregates the functional, economic-strategic, and dynamic components of performance into an integrated IE_{DSS} indicator. Data testing demonstrated the adequacy of the method. It allows not only to calculate an integrated assessment but also to identify imbalances in DSS development, which is an important tool for DMs and specialists in DSS architecture development. Implementation of the proposed method in practice can help improve the validity of decisions on automation of DSS processes and optimize the costs of developing automated control systems. A promising direction for further research is the empirical validation of the developed integral indicator IE_{DSS} on a large sample of real DSS implementation projects in various industries to calibrate the α, β and γ_i weighting factors and create industry benchmarks. Furthermore, a specialized software package implementing the developed method can be developed to automate data collection and calculation of the integral indicator, as well as interpret and visualize the assessment results.

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МЕТОД ОЦЕНИВАНИЯ ЭФФЕКТИВНОСТИ ИНФОРМАЦИОННОЙ ПОДДЕРЖКИ ПРИНЯТИЯ РЕШЕНИЙ

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В статье представлен метод оценивания эффективности информационной поддержки принятия решений, синтезирующий подходы на основе анализа совокупной стоимости эксплуатации систем поддержки принятия решений, индекса зрелости искусственного интеллекта, применяемого в таких системах, а также формализации систем управления в терминах теории автоматического управления. Предложенный метод позволяет проводить комплексное оценивание как технологической, так и экономической эффективности информационной поддержки принятия решений, учитывая стратегическое соответствие целям организации (ведомства), риски и долгосрочные эффекты от применения информационной поддержки принятия решений. Теоретическая и практическая значимость метода подтверждена апробацией на примере оценки систем поддержки принятия решений в органах государственного управления и промышленных предприятиях. Метод предоставляет специализированный инструментарий для обоснования финансовых вложений в информационные технологии, оптимизации архитектуры информационных систем поддержки принятия решений и повышения качества управленческих решений.

Ключевые слова: система поддержки принятия решений; эффективность; интегральная оценка; индекс зрелости; теория автоматического управления; ключевые показатели; искусственный интеллект.

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