Assessing the Desirability Management Decisions Taking into Account Factors of their Quality and the Preferences of the Decision-Maker

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Abstract

The primary driving force in making a decision is our complete confidence in its correctness. Therefore, only when a decision evokes confidence in its correctness do we have the right to make it. Confidence in making a decision is closely linked to its desirability. Desirable decisions can evoke positive emotions, which, in turn, enhance confidence in the correctness of the choice. Therefore, assessing the desirability of a decision is not only desirable, but also necessary, since it allows one to evaluate the influence of desirability on a person's confidence in making a decision, since the more desirable the decision, the higher the level of confidence in its correctness.

This article proposes an approach to assessing the desirability of management decisions, which are considered the most important and responsible decisions. Within this approach, a desirable decision is defined as one that combines high quality and the desired preferences of the decision maker. The factors determining the desirability of decisions are examined, their content is revealed, and mechanisms for assessment are presented. An example is provided to illustrate the proposed approach.

Keywords

Management decision, quality of decisions, validity and completeness of information, confidence, desirability, Harrington function.

1. Introduction

Any purposeful human activity is always connected with decision-making. Every day there are situations that require decision-making. As the famous Spanish philosopher Jose Ortega-y-Gasset noted, "Circumstances and decisions are the two basic elements that make up life" [1,2].

Among all the variety of decisions, management decisions occupy a special place, as they are the most complex and responsible. They represent a set of interconnected, targeted and logically consistent management actions that ensure the implementation of management tasks. The manager makes a management decision and bears full responsibility for the consequences of its implementation. An essential feature of management decisions is the high price of incorrect decisions. This is since their erroneousness is revealed only at the implementation stage, and this can lead to unjustifiably large or even irreparable economic and material costs (losses).

From a psychological point of view, the main driving force in our decision-making is our complete confidence in its correctness [3,4]. Confidence in decision-making is a psychological state when a person feels a firm conviction in the correctness of his choice, despite possible doubts or fear of making a mistake. When we lack confidence, we can make inadequate decisions that do not meet our own interests. On the other hand, when we make a decision with confidence, we are more likely to trust our judgment, agree to possible risks, and make a choice that is consistent with our goals

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and values. Therefore, confidence is an important factor that affects the success of the decision-making process and the achievement of set goals.

Therefore, when and only when a decision makes a person confident in its reliability (correctness), he has the right to make it. This provision imposes increased requirements for the validity of management decisions, namely, the decision must be justified to the extent that it can make a person confident in making it. In this case, not only the correctness of decisions becomes important, but also the degree of confidence in them of the decision-making subject.

Therefore, when preparing a decision, it is necessary to be guided by the principle of convincing validity - to to form such decisions, the validity of which allows convincing the decision maker of their reliability (correctness), and, as a result, make him confident in the need to make them.

Confidence in making a decision is closely related to its desirability. As a rule, the more desirable the decision, the higher the level of confidence in its correctness, and vice versa. If the decision is desirable, a person is inclined to believe in its success and doubt the correctness of the choice less. Desirable decisions can cause positive emotions, which, in turn, increase confidence in the correctness of the choice [5,6]. Therefore, assessing the desirability of a decision is not only desirable, but also necessary, since it allows one to determine the degree of its influence on a person's confidence in the correctness of the decision.

Several methods exist for assessing the desirability of a solution. These include the Harrington desirability function method and the psychophysical desirability scale, which allows for a direct assessment of the degree to which a solution approaches the desired outcome [7]. The desirability functions of Derringer and Suich, which are easier to use since they do not require transformation of natural values of the indicators [8]. However, certain difficulties arise when using these functions, related to expert assessment of their parameters. The Microsoft desirability assessment method, which is aimed at identifying and analyzing users' emotional reactions to product design [9] and a group model for assessing desirability and feasibility, which is used for joint multi-criteria assessment of public policy [10]. These methods allow you to quantitatively assess how well the solution meets the goals and preferences set, and select the most desirable option.

This article examines one possible approach to assessing the desirability of management decisions, taking into account factors such as their quality and the decision-maker's preferences. this will give an opportunity enable the development of decisions whose validity will allow convince a person of their correctness and, consequently, inspire confidence in the necessity of making them.

2. Structure of management decisions

A management decision is a choice of targeted influence on a management object, which is based on an analysis of the situation and contains a program for achieving the goal. Management decisions are an integral part of any function of the management process and permeate all management activities - from the formulation of the goal to the moment of its achievement through the implementation of specific actions [11].

Any action is usually preceded by an analysis and assessment of the situation, the formation of an action plan and its implementation. Assessment of the situation is the first stage of preparation of a certain action, but it can also be an independent task. To assess the situation means to build its model with a certain degree of detail; to establish the essential features of the situation and to decide for each of them whether it exists in a given situation. The result of the assessment of the situation are information decisions that provide answers to questions that determine the purpose of the upcoming actions. For example, what, when and where did it happen? Information decisions are the most responsible since any miscalculations in assessing the situation can lead to undesirable consequences - unjustified time and material losses. Therefore, it is generally accepted that to correctly assess the situation means to already solve half of the task.

Then organizational decisions are made. These decisions determine the strategy of the upcoming actions and answer the question: what needs to be done in this situation to achieve the goal? And, finally, operational decisions are made that determine the tactics of actions. These decisions answer the question: how to act to achieve the goal? The decisions considered act as stages and elements of the general decision and constitute its content [12,13].

3. Factors of Decision Desirability

The desirability of a decision refers to the extent to which it meets certain criteria or goals and the extent to which it is preferred or desirable by the decision maker [14]. In the context of decision making, this means that the decision must have certain quality characteristics that make it suitable and effective for achieving the stated goals and characteristics that make it attractive or useful to the individual or group. Therefore, factors of decision desirability must include factors quality and personality factors.

The quality of a solution is understood as the objective characteristics of the solution itself, its compliance with the requirements of the task, completeness of information, risk minimization, and other factors that influence the success of its implementation. The most significant factors determining the quality of solutions are thecompleteness and reliability of information, as well as the quality of the mathematical model for developing the solution [15].

Reliability of information is the property of information to reflect objective reality with the necessary accuracy. The criterion for reliable information is the absence of distorted or false data, and the probability of its truth is used as a measure of quantitative assessment.

Completeness of information means that the available data is sufficient to make a decision. Incompleteness of data is related to the main information dialectical contradiction between the need for complete knowledge of the situation to make an optimal decision and the lack of this knowledge. That is, it is impossible to fully describe the objects and phenomena of the real world, since reality is infinite in each of its manifestations.

Quality of the decision-making model. The decision-making model reflects the depth of scientific knowledge of the laws of the controlled process and the degree of use of this knowledge in developing a specific decision. The quality of this model is determined by how reliable its provisions and/or control parameters are. A decision provision is understood as its main idea (statement) aimed at achieving the control goal, and control parameters are specific values of the elements of the control object. For example, in the decision "after work I will go home by bus #64", the provision is the statement "after work I will go home by bus", and the parameter is "#64". In the future, for simplicity of presentation, by control parameters we will understand both the provisions of the decision and its parameters.

Personality factors are subjective factors (characteristics) of something that make it attractive, useful, or preferable to a person or group of people. Personality factors play an important role in the decision-making process. They influence the choices we make and depend on the decision-making task. For example, the desirability of a car can be assessed by its color, brand, price, appearance, etc., depending on the personal preferences of the buyer. Let us consider the methods for assessing the factors considered in the context of work [16].

4. Evaluation of information completeness

In socio-technical systems, information completeness is an indicator, characterizing the degree of its sufficiency for decision-making. This is a rather vague and relative indicator, since the completeness of information is assessed exclusively in relation to a very specific task. Taking into account the above, we will evaluate the completeness of the initial data using the filtering method, by comparative analysis of the information used in making the decision R and the "reference" information, which, from the point of view of the decision-maker, is sufficient for making it. We will represent such information by a corresponding morphological tree (filter), consisting of elementary structures (Fig. 1), which set the morphology of the corresponding information headings (*H*) with the required level of detail (*hi*).

For example, to make a decision on commanding troops in a combat operation, the commander and staff must have, evaluate and take into account various data on the situation. Despite all the diversity, this data is grouped by elements that make up the combat situation: enemy troops, friendly troops, terrain.

Then the morphological tree of sufficient initial data for a commander to make a decision on commanding troops in a combat operation may have the following form [13] (Fig. 2)

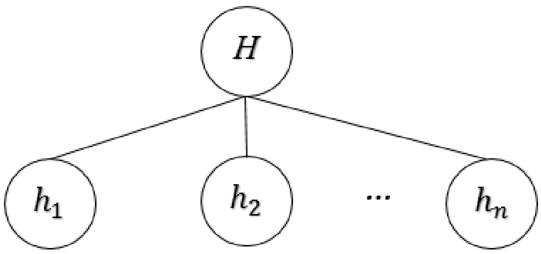

Figure 1: Elementary structure of the morphological tree.

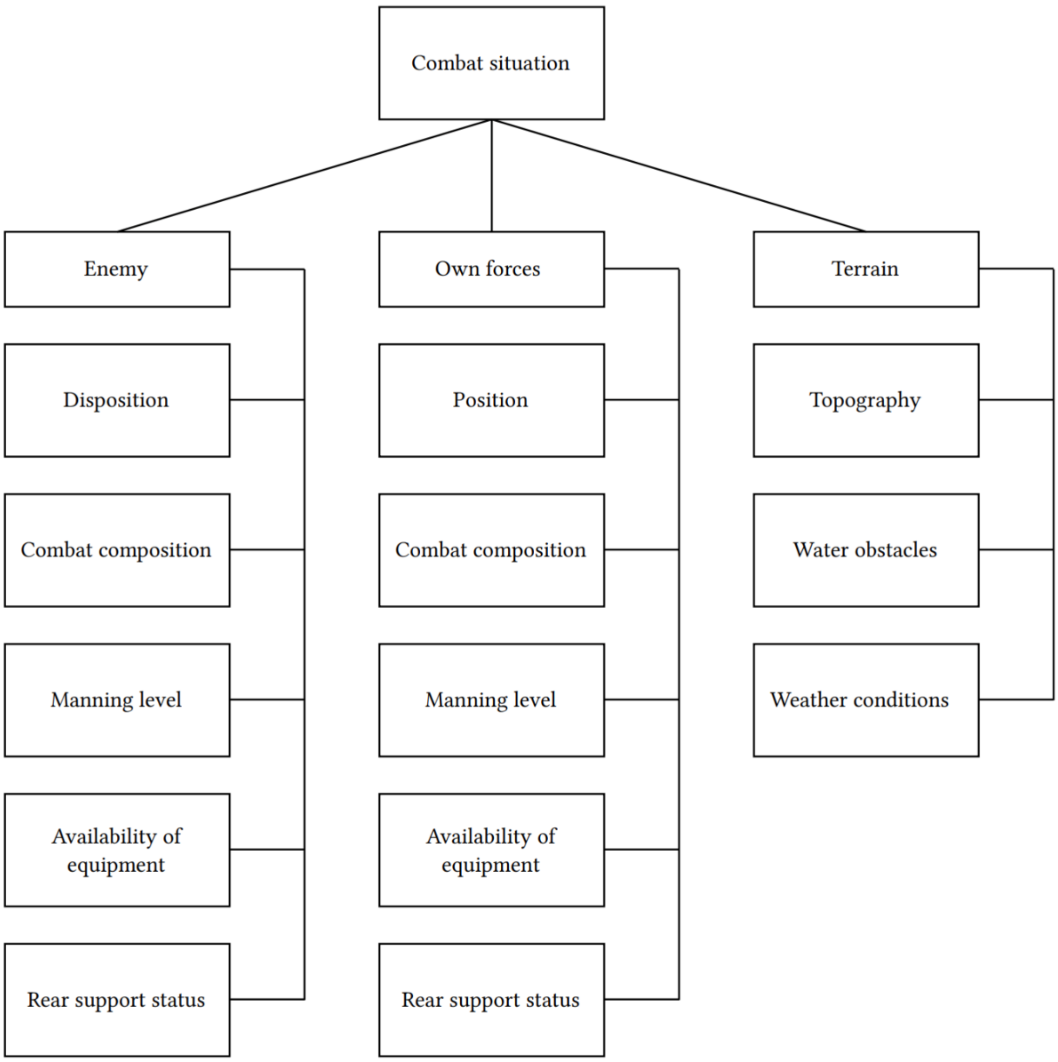

Figure 2: Example of a morphological tree of combat situation data.

This tree consists of four elementary morphological structures with the root elements combat situation, enemy, friendly forces and terrain, which are headings of combat situation data and include corresponding subheadings.

After the morphological tree is constructed, its headings (subheadings) are assigned weights of their influence on the top-level elements and Boolean parameters

$$\alpha_i = \begin{cases} 1, & \text{if the } i-\text{th heading (subheading) is present in the original data} \\ 0, & \text{otherwise.} \end{cases}$$

Then, similar to the procedure for synthesizing global priorities in AHP, the obtained estimates of the morphological tree elements collapse. As a result, an estimate of the completeness of the initial data will be obtained, considering their importance for decision-making.

Let the initial information consist of one heading (Fig. 1) and the elements of this structure have the following parameters: $H = (\mu, \alpha)$, $h_i = \{(\mu_i, \alpha_i) \big| i = \overline{1,n}\}$, where μ, α and μ_i, α_i- are the weight coefficients and Boolean values of the elements H and h_i, respectively. Then the completeness of the information H is calculated as $P(H) = \sum_{i=1}^{n} \mu_i \cdot \alpha_i$. If the information consists of several headings, then in this case its completeness is calculated as the convolution of the completeness values of these headings.

It should be noted that the weight coefficients of the elements of the morphological tree can be effectively calculated using the hierarchy analysis method [17]. At the same time, in conditions where increased requirements are imposed on the accuracy of the results, the approach [18] can be used, which will improve the consistency of paired comparisons.

5. Evaluation of the reliability of information

The reliability of information generally depends on two factors: the reliability of the source of information and the method of obtaining information. The source of information in the preparation of management decisions can be people, documents and technical means (systems) [19].

The reliability of a source is characterized by its ability to provide true data and is determined by its characteristics. For technical means, such characteristics are their parameters. If a person is the source of information, then in addition to personal qualities, it is also necessary to take into account his psychophysiological state, on which the level and quality of perception of the surrounding environment depends. In [20], criteria for the quality of information are given, according to which an assessment of the reliability of a source can be made.

When assessing the reliability of information, it is also important to know the source's method of obtaining the data, since even complete reliability of the source does not guarantee the reliability of the information. Therefore, first-hand information is more reliable than information from an unspecified source, and records based on fresh impressions differ from descriptions of the same events some time later.

The following methods of obtaining information by a source can be noted: information is obtained independently; information is obtained from another permanent source of information (for example, an open source) that can be trusted; information is obtained from another "one-time" source (for example, during negotiations, informal communication, etc.) [21].

Let $D = \{d_i \big| i = \overline{1,n}\}$ be the set of initial data, $S = \{(s_i, z_i)\}$ be the set of sources, where s_i is the source of data d_i, and z_i is the method of obtaining this data by the source s_i. Also, let a group expertise be carried out to assess the reliability of the data d_i.

Next, let $\xi_j^i(s_i)$ and $\xi_j^i(z_i)$ be the reliability estimates of source s_i and method z_i, respectively, obtained by the j-th expert. Then the reliability estimate of data d_i is calculated as

$\xi_j^i(d_i) = min(\xi_j^i(s_i), \xi_j^i(z_i))$. Note that when there are k data sources d_i, the estimate $\xi_j^i(d_i)$ is obtained as a result of the maximin convolution $\xi_j^i(d_i) = \max_k(min(\xi_j^i(s_i), \xi_j^i(z_i)))$. As a result, the reliability of data d_i can be calculated using the formula

$$A(d_i) = \sum_{j=1}^{m} r_j \cdot \xi_j^i(d_i), \quad (1)$$

where m is the number of experts, r_j are their weight coefficients, moreover $\sum_{j=1}^{m} r_j = 1$.

As a result, the reliability of the initial data D is calculated using the formula $A(D)) = \min_i(A(d_i))$.

Note that when assessing the reliability of the source s_i of the initial data and the method z_i of obtaining them, the Kent scheme [22] can be used, which provides a visual classification of information from the point of view of the degree of its reliability (Fig. 3).

CREDIBILITY					
Chances for			Chances against	Degree of credibility expressed in odds	Degree of credibility expressed in terms of probability
Degree of credibility	99 85		1 15	Almost certainly, the information is credible (odds: for – 9, against – 1)	Almost certainly, the information is credible (almost certainly – yes)
	84 60		16 40	There is a strong chance the information is credible (odds: for – 3, against – 1)	Probably, the information is credible (probably – yes))
	59 40		41 60	Odds are approximately equal (odds: for – 1, against – 1)	
	39 15		61 85	There is a strong chance the information is not credible (odds: for – 1, against – 3)	Probably, the information is not credible (probably – no)
	14 1		86 99	Almost certainly, the information is not credible (odds: for – 1, against – 9)	Almost certainly, the information is not credible (almost certainly – no)
UNCREDIBILITY					

Figure 3. Kent's scheme illustrating the degree of reliability of information.

6. Evaluation of the quality of the decision-making model

The quality of the decision-making model is determined by how reliable its provisions and/or control parameters are. By the provision of the decision, we will understand its main idea (statement) aimed at achieving the control goal, and by the control parameters - specific values of the elements of the control object. For example, in the decision "to accept 100 students to the history department", the provision is "to accept students to the history department", and the parameter is 100. In the future, for simplicity of presentation, by the control parameters we will understand both the provisions of the decision and its parameters.

The reliability of control parameters is determined by the extent to which the decision-making model ensures the unification of formally optimal decisions generated by mathematical models and the creative ideas of a person.

Let $p_1, \ldots, p_n$ be the control parameters of the solution R, and $A(p_i)$ be the reliability of the parameter p_i. In order to obtain an estimate of $A(p_i)$, we represent the process of determining the parameter p_i by the functional operation FO_i as the following tuple:

$$FO_i =< X_i, p_i, M_i >,$$

where X_i is the input data, p_i is the result of the operation, M_i is the operation model in the form of a mapping $M_i: X_i \rightarrow p_i\ (F_i)$. Here $F_i \in [0,1]$ is the coefficient of confidence in the truth of the implication. It is equal to the weight coefficient of the expert who formulated this rule. By default $F_i = 1$.

Then, according to L. Zadeh's composition rule, $A(p_i) = \min(A(X_i), F_i)$, and $A(X_i)$ can also be obtained using Kent's scheme. As a result, the quality of the model is determined as $\mathrm{K}(M) = \min_i A(p_i)$.

When the process of obtaining the parameter p_i consists of several stages, the mapping M_i is multi-step and is represented as follows:

$$M_i: X_i \rightarrow y_{i1}(F_{i1}), X_{i2} \rightarrow y_{i2}(F_{i2}),\dots,X_{im} \rightarrow y_{im}(F_{im}) = p_i,$$

where $X_{ij} \subseteq (X_i \cup y_{ij-1})$, m is the number of stages. In this case, $A(p_i) = \min_j A(y_{ij})$, where $A(y_{ij}) = \min(A(X_{ij}), F_{ij})$.

Note that the reliability of $A(p_i)$ can also be obtained by a problem-oriented method of automatic theorem proving [23].

7. Evaluation of personal factors

As noted, personal factors of desirability belong to the category of subjective factors, which can be both quantitative and qualitative. If the factor is quantitative, for example, the cost of a car, then the possible range of its values is indicated. If the factor is qualitative (car appearance), then its assessment is indicated on the verbal- numerical Harrington scale.

8. Assessing the desirability of a solution

As noted, a desirable solution combines high quality and the preferences of the decision maker. However, in practice, there is often a trade-off between these two aspects. For example, a solution that is desirable in terms of quality may be difficult to implement or costly, making it less desirable for some stakeholders.

One way out of such situations is to structure the task of assessing the desirability of a solution in the form of a dominant hierarchy of factors of desirability, which will allow finding a balance between objective criteria and subjective preferences, and by assessing the solution by these factors to find a compromise assessment of desirability. Figure 4 shows the hierarchy of factors determining the desirability of a solution.

Each element of the hierarchy is assigned a relative priority relative to the element at the top level. That is, objective and subjective factors are assessed based on their impact on the desirability of a decision, and elements of the corresponding factors are assessed based on their impact on the quality of the decision and the desirability of preferences. Such priorities can be obtained through the Analytical Hierarchy Process (AHP).

After constructing the hierarchy and determining the priorities of its elements, the desirability of the solution quality and subjective preferences are calculated. In this case, the formula of the generalized Harrington desirability function of the form:

$$D = \prod_{i=1}^{n} d_i^{wi}. \quad (2)$$

where n is the number of indicators, d_i is desirability of the i-th indicator, w_i is its weighting coefficient, moreover $\sum_{i=1}^{n} w_i = 1$.

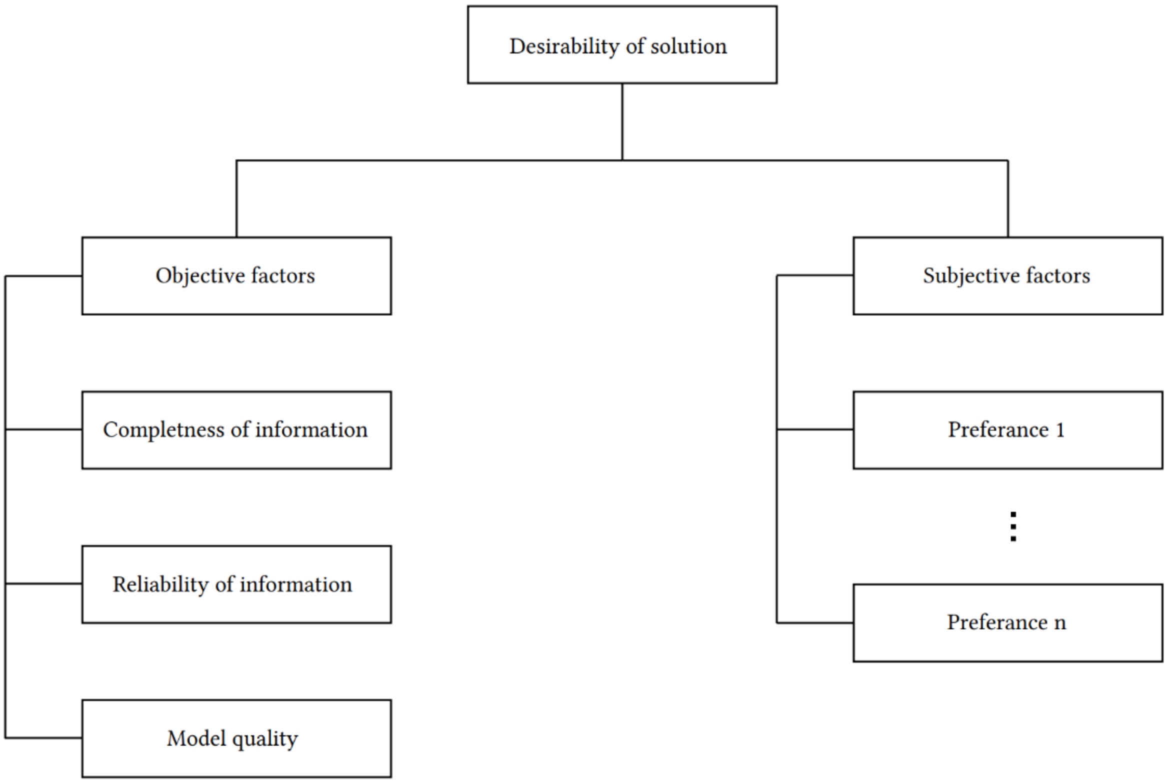

Figure 4. Hierarchy of factors of decision desirability.

In these formulas, private desirability is calculated by the formula:

$$d_i = exp(-exp(-y_i')), \quad (3)$$

where y_i' is the coded value of the indicator y_i.

The coded values are calculated as follows. Based on the fact that this function asymptotically approaches 0 and 1, therefore, for practical calculations, an interval of effective values y' is specified, at the boundaries of which the values of function (3) are considered equal to 0 and 1. For example, at the boundaries of the interval [-1.5, 4.5] the desirability function is approximately equal to 0.0113 and 0.9889.

Next, let y be an indicator of some numerical factor, and $[y_{min}, y_{max}]$ be the range of its possible values. If the desirability of a factor increases with the increase of the values of y_i, then this factor is characterized by an increasing dependence of desirability on its numerical values. In this case, the values of y' are calculated using the formula:

$$y' = -1.5 + \frac{6(y - y_{min})}{y_{max} - y_{min}} \quad (4)$$

If the desirability of a factor increases with decreasing values y_i, then this factor is characterized by a decreasing dependence of desirability on its numerical values. In this case, the values y' is calculated using the formula:

$$y' = 4.5 + \frac{6(y - y_{min})}{y_{max} - y_{min}} \quad (5)$$

If the factor is qualitative, for example, the appearance of a car, then in this case its desirability is determined by a verbal-numerical scale (Table 1).

Table 1
Verbal-numerical scale of desirability

Numerical value	Modal assessment
0.8-1.0	Very high
0.63-0.8	High
0.37-0.63	Average
0.2-0.37	Low
0.0-0.2	Very Low

After determining the desirability of the solution quality and subjective preferences, the integral desirability of the solution is calculated.

Let D_1 and D_2 be the desirability of the solution with respect to quality factors and subjective preferences. Then the integral desirability of the solution is calculated by the formula:

$$D = w_1 D_1 + w_2 D_2, \tag{6}$$

where w_1, w_2 are the weight coefficients of the quality factors and preferences.

9. Practical implementation

Since the approach under consideration has sufficient generality, we will consider it using the example of assessing the desirability of an information decision solution.

Let the conditional height A be occupied by the enemy. The commander of unit B has been given the task of liberating this height. When starting to perform this task, the commander must first assess the situation and decide whether he can perform it with his own forces and means. Let the headquarters prepared an information solution - the forces and means of unit B can perform the assigned task. Let us assume that the decision was prepared using data on one's own troops, the enemy, and the subjective preference of the commander is the loss of personnel of the unit. Also, let the priorities of quality factors and personal factors be equal to 0.7 and 0.3, and the priorities of quality criteria have the following values: completeness and reliability of information – 0.3 and 0.3, quality of the decision-making model – 0.4. Let's evaluate quality indicators.

Data completeness assessment. To assess data completeness, we use a morphological tree (Fig. 2). Let the weights of headings (subheadings) have the following values: for headings - 0.5, 0.4, 0.1; and for their subheadings, respectively (0.1, 0.3, 0.2, 0.2, 0.2), (0.1, 0.3, 0.2, 0.2, 0.2) and (0.4, 0.4, 0.2).

Further, let (1,1,1), (1,1,0,1,0), (1,1,1,1,1) and (1,1,1) be the Boolean parameters of the headings and the corresponding subheadings of this morphological tree. Then, as a result of convolution of the element assessments of this tree, we obtain the following values of the completeness parameters: for headings - 0.6, 1.0 and 1.0; for the initial data as a whole - 0.8, i.e. P(D)= 0.8.

Assessing the reliability of the data. Let the initial data $D = (d_1, d_2)$ be obtained from two sources: source s_1 (unit B headquarters) - data on one's own troops and terrain (d_1); source s_2 (reconnaissance group) - data on the enemy's troops (d_2). Further, let three experts e_1, e_2 and e_3 be involved in assessing the reliability of the data, whose assessments are given in Figure 5.

Degree of data credibility	Data d_1			Data d_2		
	e_1	e_2	e_3	e_1	e_2	e_3
Data is credible (99%)	+	+	+			
Probably, data is credible %) (75%)				+		+
Data is equally likely to be credible or not (50%)					+	
Probably, the data is not credible (25%)						
Data is not credible (1%)						

Figure 5: Reliability of the data.

Figure 5 shows a possible interpretation of reliability according to Kent's scheme. Using the data reliability estimates according to formula (1), taking into account the expert weighting coefficients of 0.4, 0.3 and 0.3, we obtain $p(d_1) = 0.99$, $p(d_2) = 0.675$ and the reliability estimate of the initial data as a whole A(D)= 0.675.

Evaluation of the quality of the decision-making model. This decision contains only one provision - the forces and means of unit B can accomplish the assigned task. Let the process of developing this provision (decision) consist of two functional operations: FO1 - calculation of the ratio of forces and means of the opposing sides,

FO2 - analysis of the obtained results and formulation of the decision.

Let us represent the first operation as FO$^1 = < X_1, p_1, M_1 >$, where X_1 is data on our troops and the enemy's troops, p_1 is the ratio of forces and means of the opposing sides, say, 3:1 (the combat potential of unit B is three times greater than the enemy's potential), $M_1: X_1 \to p_1$ - the operation is implemented by a mathematical model. Since $A(X_1) = 0.675$, then $A(p_1) = 0.675$.

Similarly, FO$^2 = < X_2, p_2, M_2 >$. Here X_2 is the 3:1 ratio and terrain data, p_2 is the solution formulation, $M_2: X_2 \to p_2 (F_2 = 0.9)$ is the operation performed, for example, by the chief of staff of unit B, who, taking into account the obtained ratio of forces and means, terrain characteristics and the standards of the governing documents on the conduct of combat operations, formulates the appropriate solution. The input data for this operation is the result of the previous one, i.e. $A(X_2) = 0.675$. Therefore, $A(p_2) = 0.675$ and as a result we have $K(M) = 0.675$.

Let the expected losses of personnel of the unit be large, then on the scale (Table 1) the desirability of this indicator is low and equals, for example, 0.2.

Evaluation of the desirability of the decision. Let us calculate the desirability of the quality of the decision and the preferences of the commander. The desirability of the quality of the decision is calculated using formula (2):

$$D_1 = \prod_{i=1}^{3} d_i^{wi},$$

and the particular desirability's di using formulas (3-4).

Since the intervals of possible values for the factors that determine the quality of decisions are equal to [0,1], formula (4) has the form:

$y' = -1.5 + 6y.$

Then

$d_1 = \exp(-\exp(-y_1'))$, where $y_1' = -1.5 + 6 * 0.675;$

$d_2 = \exp(-\exp(-y_2'))$, where $y_2' = -1.5 + 6 * 0.8;$

$d_3 = \exp(-\exp(-y_3'))$, where $y_3' = -1.5 + 6 * 0.675;$

As a result, we will get the following values $d_i = 0.93,\ d_2 = 0.96,\ d_3 = 0.93$ and

$D_1 = 0.93^{0.3} \cdot 0.96^{0.3} \cdot 0.93^{0.4} = 0.94.$

Since the personal factor has one criterion, therefore the desirability of the commander's preference is equal to D_2=0.2. Then, according to (6), we will receive the following desirability of the solution D=0.7·0.94+0.3·0.2=0.72 In this case, according to D. Polya, a numerical expression of desirability is not applicable and modal assessments should be used. That's why, according to Table 1, the desirability of the solution is high. Figure 6 presents the information on the basis of which this assessment was obtained.

Information	Assessment	
	quantitative	linguistic
Validity of decision	0.675	High
Data Credibility:		
enemy forces	0.675	probably credible
own forces	0.99	credible
terrain	0.99	credible
Data completeness:		
enemy forces	0.8	80% complete
own forces	1.0	complete
terrain	1.0	complete
Quality of the decision-making model	0.675	probably good quality
Desirability of the solution	0.675	is high

Figure 6: Information based on which the desirability assessment of the solution was obtained.

This information will either give the commander confidence and dispel doubts about the advisability of making this decision or send it back for revision.

10. Conclusion

An approach to assessing the desirability of management decisions is proposed, in which a desirable decision is understood as a decision that combines high quality and the desired preferences of the decision maker.

The desirability factors of decisions are considered, which include decision quality factors and personal factors of the decision maker. The factors that determine the quality of decisions include the completeness and reliability of information, as well as the quality of the mathematical model for developing the decision. Their content is disclosed and mechanisms for their assessment are given. The completeness of information is assessed using a morphological tree of sufficient initial data for deciding, and the Kent scheme is used to assess the reliability of information. The quality of the decision-making model is assessed using fuzzy logic mechanisms.

Personal desirability factors are understood as subjective characteristics of something that make it attractive, useful, or preferable for a person or group of people. A verbal-numerical desirability scale is used to assess them. Considering the morphology of factors, the cause-and-effect relationships between them and expert judgments in this approach allows for a simple, accessible way to obtain an evidentiary assessment of the desirability of a solution.

The approach considered does not claim to be complete and can be used as a pilot for developing algorithms for assessing the desirability of management decisions in various areas of activity.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

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