

**Yana Tsymbalenko,  
Volodymyr Koval,  
Maksym Boiko,  
Mariia Tepliuk,  
Anna Zimina,  
Lesia Skurinevska,  
Andrii Blyznyuk,  
Andrii Biliuk,  
Natalia Lavruk,  
Oksana Lavruk**

# MODELING OF RESOURCE PROVISION OF ECONOMIC SECURITY OF CORPORATE CULTURE IN PUBLIC ADMINISTRATION

The object of research is the resource provision of economic security of corporate culture in public administration in the context of digital transformation. The problem being solved is to form a comprehensive approach to the specified object. Currently, the implementation of digital transformation tools is forming new requirements for organizational behavior, personnel stability and the management apparatus of state institutions. A generalization and justification of the place of corporate culture as a component of an intangible asset, which creates opportunities for authorities to ensure an appropriate level of economic security. The paper proposes a mathematical model for assessing the impact of corporate culture on economic security based on sequential actions: assignment, normalization of weight coefficients and multi-criteria assessment of subordinates. The methodological basis is the use of tools for correlation and regression analysis, index method, expert assessment and adaptive modelling. Resource elements of corporate culture are identified, such as digital competencies, mentoring, experience, and innovative activity. All of them have an impact on the aggregate indicator of economic security ( $r = 0.82-0.91$ ). The results obtained indicate a transition to a digital cultural environment, which provides an increase in the indicator of the integral index of economic security by 0.27–0.34 units. Optimization of card distribution contributes to increasing the efficiency of managerial decision-making ( $f = 8.27$ ). It is substantiated that further implementation of digital practices into corporate culture will increase resource provision indicators by 18–22% and enhance management transparency. The results can be used in the formation of a strategy for resource provision of economic security of public administration by improving corporate culture.

**Keywords:** company culture, civil service, institutional sustainability, resources, optimization, security, management, personnel, potential.

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## 1. Introduction

The relevance of studying corporate culture stems from the fact that understanding its characteristics for a specific organization allows to assess its stability. This allows to determine its competitiveness, anticipate possible management decisions, and determine its ability to achieve planned results [1]. Corporate culture is a complex social phenomenon that is shaped within an organization by several factors. Due to its social nature, individuals are strongly influenced by corporate culture [2]. At the same time, individuals influence the formation and change of corporate culture itself.

Corporate culture fosters long – term, sustainable employee motivation focused on achieving the organization's strategic goals, which is an integral part of strategic management [3]. Interest in corporate culture is persistent and enduring in sociology, psychology, and management. This rigorous approach allows not only to diagnose problems caused by cultural factors but also to consciously plan and shape its effectiveness [4].

One of the first to study corporatism and corporate culture was Max Weber. He defined the foundations of corporate self – organization and the interrelationship of such principles as the moral, ethnic, and socioeconomic well – being of individual corporate structures. He also developed a model for the “rational organization of free labor”. This model demanded responsibility, precision, discipline, and stability from workers [5]. Another idea [6] is the presentation of a unipolar model of industrial organization of production in industrial society. They, like M. Weber, adhered to a rigid hierarchy of prescribed roles and statuses, and viewed people not as creators, but as functionaries [7].

The civil service has recently become the focus of intense attention in virtually all social sciences. Primarily because the effectiveness of its activities determines the direction and outcome of not only public administration but also social governance [8]. The transformation of Ukrainian society, the reform of public administration, and the gradual decentralization of national functions have raised the pressing need to strengthen the personnel of government agencies and improve the

effectiveness of management [9]. Many of these factors have a significant impact on the processes occurring within them and the organizational behavior of employees. Corporate culture can play a significant role in mobilizing all state resources to achieve goals, but it can also act as a brake on its further development [10]. Therefore, the question of how to influence the processes of forming, maintaining, or changing corporate culture has become particularly pressing.

In the context of public service, the term “departmental culture” is more relevant, emphasizing its formalized, hierarchical, and ideologically saturated nature [11]. Edgar Schein’s concept of levels seems most applicable to the analysis of this culture, according to which culture consists of three interconnected layers [12]. The surface level is formed by artifacts – visible manifestations of culture, such as form, symbolism, rituals, and communication style [13]. The middle level is made up of proclaimed values – established operational processes, interaction, and complete operational connectivity [14]. The highest level is strategies, goals, and philosophy, recorded in charters and codes. The basic level shapes subconscious perceptions and potential solutions at the level of beliefs and principles, which ultimately determines people’s overall behavior. In terms of government institutions, all the presented levels have a high level of formalization and obligations [15]. All of them are fundamentally mandatory, meaning they ensure precise subordination, coordinated actions, and, accordingly, risk mitigation in uncertain situations [16, 17].

Corporate culture plays a significant role in the civil service. It’s crucial to highlight employee engagement and each employee’s definition of corporate identity [18]. Regardless of their position, rank, or jurisdiction, corporate culture sets the tone for commitment. This means that it serves as a motivational tool for work and integration for development [19]. This is especially important given the different financial components compared to the commercial sector [20]. Corporate culture also functions as a regulatory function. This can be seen in the clearly developed rules of conduct for all subordinates in the civil service, which are implemented in uncertain situations [21, 22]. This means that every civil servant can act in accordance with the charter in any challenging situation. In this case, it’s also possible to speak of a stabilizing function. Adaptation and development are further functions [23]. When new employees are hired, they can easily adapt to the new team in accordance with the established rules. In this case, the norms, values, and behavior patterns necessary for career development are quickly adopted within the team. Image and reputation are also important [24]. These functions are reflected in the public consciousness, which perceives the civil servant as an individual [25]. Thus, a civil servant who meets all the norms and rules of corporate culture is the embodiment of their service [26]. In this case, their reputation directly influences the overall corporate culture of the government agency. For example, the image of a heroic rescuer, an altruistic doctor, or a social worker strengthens public trust [27]. The protective function is also worth noting. In this case, culture serves as a buffer for civil service personnel. In the event of severe psychological trauma, stress, and shock, support can be found among people with shared values [28].

Traditions in the system of state and local governance relate to national cultural characteristics and managerial mentality. As [25] rightly notes, «the historical context of the development of our statehood, the entrenchment of its paternalistic orientation, embedded in mental foundations and behavioral stereotypes, must also be taken into account [29]. The dominant social relations, cultural characteristics, and institutional environment significantly influence the functioning of the civil service [30]. Society consciously cultivates their rational, somewhat conservative function, accepting any authority as prevailing over the population [31].

The second level of developing the corporate culture of the civil service is the regional level, which is designed to take into account the economic, socio-demographic, cultural-historical, and ethno-national

specifics of each region [32, 33]. This includes the specific conditions for the functioning and development of the regional civil service in a given territory, as well as the characteristics of regional government, namely, the specifics of managerial relations between regional and local authorities.

The final stage of employee culture formation is the local level. It is here that the development of the corporate culture of local officials can be assessed [34]. Given the authoritarian traditions of governance in Ukraine, the personality of its leader and management style play a special role in shaping the corporate culture of a particular local government body. Furthermore, the interactions between government employees, who possess different abilities, their professional experience, their value system, and their work motivation also contribute to the formation and development of corporate culture [35]. Of course, at this level, the socio-economic, ethnic, and geographic characteristics of the local entity itself also influence the formation and development of corporate culture [36].

The analysis of scientific developments confirms the current lack of established approaches to the formation of the entire spectrum of key elements of resource provision of economic security [37]. The analysis of the work also indicates the fragmentation of approaches to assessing corporate culture in public administration at the proper level. Currently, the paradigm of using digital tools for all market entities, regardless of the form of ownership, is already changing quite significantly [38]. Accordingly, this direction is quite relevant for public administration but has not yet been fully explored. Within the framework of combining all elements as a direction of modern scientific research, it is worth noting the gaps in determining the resource provision of economic security of corporate culture as a significant intangible asset. Accordingly, *the object of research* is the resource provision of economic security of corporate culture of public administration of government bodies in the context of digital transformations. *The aim of this research* is to form and substantiate a model of resource provision of economic security of corporate culture in public administration, considering digital changes, organizational transformations and management factors of influence.

To achieve the aim, the following tasks have been defined:

1. To identify the relationships and structural patterns of ensuring the economic security of corporate culture in public administration as a result of the action of managerial and digital factors.
2. To identify, determine and assess the impact of digital, human and organizational resources on the integrated indicator of economic security.
3. To substantiate ways of optimizing human resources and management decisions based on multi-criteria modeling.

## 2. Materials and Methods

At the beginning of model construction, the modelling object under consideration is defined as a system. The key features that characterize the system and its elements, as well as the relationships through which these features are realized, are identified. Next, the purpose of modelling the system is determined. Following this, a mathematical model is developed with several levels of detail. At the substantive stage of model construction, a conceptual or substantive model is created. The initial system is studied, and its substantive description is provided. Such a description is called a conceptual model, representing a verbal formulation of the mathematical problem. At the structural or topological stage, the balances and constraints of the designed system are determined, and the mathematical formulation of the problem occurs. The third stage is called algorithmic or functional. At this stage, an algorithm for solving the described model is developed. Software implementation of the created algorithm occurs at the fourth level of detail – the parametric level – where the model parameters are defined. The final stage verifies the adequacy of the model for the modelling object.

Let's consider applying this algorithm to the problem of assigning an employee to a specific task, which they must complete as quickly and efficiently as possible. To do this, it is possible to formulate the optimization problem as a linear programming model.

Problem statement: a manager is faced with  $i$  types of tasks that can be performed by  $j$  employees, where  $i$  and  $j$  are integers. Each employee can perform only one task, and each task can only be performed by one employee. The performance of each employee across all the tasks under consideration is calculated using the formula

$$C_{ij}(\forall i, j \in 1, 2, n), \quad (1)$$

where  $C_{ij}$  – the employee performing the task.

The presented calculation approach determines the basic objective function of labor productivity by individual type of work. It turns into a matrix of compliance of employees about their specific work and the main direction of activity (state administration). But it is worth noting that from the point of view of the formalization of the optimization process, it is logical to build a model considering the transition from statistical evaluation to distribution according to the matrix method. Accordingly, the distribution of the parameter  $C_{ij}$  will reflect the complex integral coefficient of efficiency of the  $i$ -th public service employee under the condition that it performs the  $j$ -th functional task. The indicated parameter  $C_{ij}$  is a dimensionless quantity, namely an indicator  $0 \leq C_{ij} \leq 6$ . That is, its value can be obtained because of the calculation and aggregation of all the added indicators of the performance of functional duties. In addition, the values of parameters of professional skills and digital competences of the worker are included in the calculation. As a result, the final value for the indicator is the score. At the same time, the higher the result, the greater are the synergy effects of the combination of skills and abilities in the performance of official duties by a civil servant.

It is necessary to distribute employees among all tasks in such a way that the overall efficiency of execution is the best [39]. The mathematical formulation of the problem is as follows

$$C_{ij}x_{ij} \rightarrow \max_{x \in \Delta\beta}, \quad (2)$$

where  $C_{ij}$  – the employee performing the task;  $x_{ij}$  – the assignment of employees to assigned tasks ( $x_{ij} = 1$  will mean that the employee is assigned to the task, otherwise  $x_{ij} = 0$ );  $\Delta\beta$  – the set of feasible options, which is defined by the following system of constraints.

The presented mathematical expression of the objective function (2) indicates a universal approach to optimizing personnel potential. It is aimed at the maximum generalization of the spectrum of operational efficiency of public administration employees. It is considered that this parameter is basic for ensuring the strengthening of the indicator of the level of economic security of state administration:

$$\sum_{j=1}^n x_{ij} = 1, \forall i \in 1, 2, \dots, n, \quad (3)$$

$$\sum_{i=1}^n x_{ij} = 1, \forall j \in 1, 2, \dots, n, \quad (4)$$

$$x_{ij} = 1, \forall i, j \in 1, 2, \dots, n, \quad (5)$$

where  $x_{ij}$  – assignment of employees to perform assigned tasks.

Constraint (3) corresponds to the requirement that each employee performs only one task, and constraint (4) corresponds to the requirement that each task is performed by only one employee. Then the total number of Boolean variables in the problem is  $n^2$ . Under the presented constraint (3), a mathematical expression of the formalized rules of a

unique personalized sub-task for each task is given. That is, a separate civil servant ( $i$ ) must perform a certain task ( $j$ ). In this case, there will be a concentration of the most prepared employee on a certain task. And it is possible to avoid the dispersion of the collective's intellectual capabilities, which leads to concentration of attention in critical situations. Constraint (4) is focused on full functional support, that is, each submitted task ( $j$ ) is assigned to the corresponding employee ( $i$ ). That is, such an action eliminates collective irresponsibility, and pinpoints the obligation to a certain civil servant. Constraint (5) sets the decision-making as a binary device, according to which the model is transformed into Condition (5) sets the binary nature of the decision space, transforming the model into an integer linear programming problem with the number of Boolean variables  $n^2$  (where  $n = i = j$  under the condition of a square assignment matrix). From the standpoint of economic security, such an approach makes fractional assignments impossible ("partial execution of the task by two people"), which produces managerial chaos and institutional risks. According to the logic of economic interpretation, the specified system of constraints (2)–(5) will be present for possible duplication of personnel. Or, in the event of a shortage of personnel, such a system indicates the need for additional involvement of employees. Accordingly, both conditions help reduce transaction costs. And because of saving money, it is possible to prevent the destruction of the system of economic protection of the financial resources of the old institution. For a more detailed overview, a detailed specification is presented: The problem of asymmetric form tasks can be represented as a formula: The economic logic of forming a system of constraints (3)–(5) is to prevent duplication of functions and the occurrence of a shortage or surplus of personnel during the distribution of tasks, which minimizes transaction costs and prevents the destruction of the system for protecting the institution's information and financial resources. Let's give the specification of these constraints in expanded form

$$\sum_{i,j=1}^k a_k x_{ij} \rightarrow \max_{x \in \Delta\beta}, \quad (6)$$

where  $a_k$  – a set of efficiency coefficients when an employee performs a task;  $x_{ij}$  – assignment of employees to perform assigned tasks;  $\Delta\beta$  – a set of acceptable options.

The set of admissible variants  $\Delta\beta$  is defined by the following system of constraints:

$$\begin{aligned} x_{11} + x_{12} + \dots + x_{1j} &= 1, \\ x_{21} + x_{22} + \dots + x_{2j} &= 1, \\ \dots & \\ x_{i1} + x_{i2} + \dots + x_{ij} &= 1, \\ x_{11} + x_{12} + \dots + x_{1j} &= 1, \end{aligned} \quad (7)$$

where  $x_{11}$  – the assignment of the first employee to the first task;  $x_{12}$  – the assignment of the first employee to the second task;  $x_{1j}$  – the assignment of the first employee to the  $j$ -th task;  $x_{21}$  – the assignment of the second employee to the first task;  $x_{22}$  – the assignment of the second employee to the second task;  $x_{2j}$  – the assignment of the second employee to the  $j$ -th task;  $x_{i1}$  – the assignment of the  $i$ -th employee to the first task;  $x_{i2}$  – the assignment of the  $i$ -th employee to the second task;  $x_{ij}$  – the assignment of the  $i$ -th employee to the  $j$ -th task.

From a practical point of view, unequal institutions structurally have asymmetry in terms of employees. That is, the available number of specialists does not correspond to the number of tasks assigned to them ( $i \neq j$ ). Accordingly, to adapt the model, it is necessary to simplify complex nonlinear models by expanding them into a vector format and reducing them to a linear function. That is, for each pair of employees – task ( $i, j$ ) there is a corresponding through-index  $k$  ( $k = 1, \dots, m$ , where  $m = i \times j$ ). And according to this approach, the asymmetry is converted into the format of the mathematical expression (6), according to which  $k$  is the linearized coefficient of relative efficiency.

It is worth considering that structural relations become more complicated depending on the number of employees and tasks, therefore, the constraints (7) are changed to a block-diagonal matrix of coefficients. In the economic context, system (7) within the framework of the asymmetry of the model consists in calculating the possible surplus of personnel ( $i > j$ ). In this case, part of the calculation will have a zero value, which forms a reserve of safety characteristics. And if there is a deficit ( $i < j$ ), the model indicates the failure to achieve optimal task performance without additional personnel or disruption of process digitalization.

Let's define the parameters characterizing the importance of the criteria under consideration as a set  $V = (v_1, v_2, \dots, v_d)$ . The importance determines how important it is to consider each parameter when solving the given problem. Let's create a function (8) that calculates the coefficient of best compliance with the given task for each individual employee, considering all criteria

$$\alpha = \frac{d}{i=0} S_i \cdot V_i, \tag{8}$$

where  $a$  – conformity coefficient;  $S_i$  – criterion value;  $V_i$  – criterion weight;  $d$  – number of criteria.

To form the matrix  $C_{ij}$ , it is worth using a multi-criteria approach. Because different parameters cannot be evaluated equally correctly and accurately, based on the nature of their formation. Accordingly, the set of criteria for calculation is defined as a vector  $S = (s_1, s_2, \dots, s_d)$ , then the degree of a certain influence on the overall level of safety is determined by the vector of weight coefficients  $V = (v_1, v_2, \dots, v_d)$ . Weight coefficients in this case should be determined by an expert method, provided that

their sum is 1. In addition, the greater the weight of the coefficient, the greater the influence of the indicator on the overall result and, accordingly, its significance.

The presented direct convolution (8) is quite generalized in the presented form. Under such conditions, different indicators have different units of measurement. In order to take this into account and to avoid the effect of absorption of small values by more significant ones, it is worth using the minimax method. That is, it is logical to calculate the relative deviation from the actual value of the criterion  $S_i$ .

Since each criterion specifies a separate minimum and maximum range value that differs from one another, it's best to calculate the fit coefficient using normalization. Function (8) then becomes the following

$$\alpha = \frac{d}{i=0} \frac{S_i - \min_{1 \leq i \leq d} S_i}{\max_{1 \leq i \leq d} S_i - \min_{1 \leq i \leq d} S_i} \cdot V_i. \tag{9}$$

The obtained data will determine the employee's weight when assigning them to a specific set of tasks. The task of optimizing human resource allocation can be solved using MS Excel. Let's determine the complexity of the assignment problem by applying the described algorithm in a spreadsheet.

### 3. Results and Discussion

#### 3.1. Analysis of the relationships and structural patterns of modeling the economic security of corporate culture in the civil service

To find the objective function, it is necessary to calculate the performance indicators that will be used in the assignment problem. The calculations will be based on information presented in the database (Table 1).

Let's represent the criteria used to evaluate an employee as a set  $S = (s_1, s_2, \dots, s_d)$ . The data used to evaluate an employee is assigned a numerical coefficient, which carries a specific weight in subsequent calculations. Table 2 presents the coefficients of the initial data that will form the basis for calculating the candidate's effectiveness search function for a specific task.

Table 1

Personnel of the public service

Full Name	Total Experience, years	Years of experience in the specialty	Education	Mentoring, years	Plan fulfillment, %	ARM development	Application of gamification methods
State official 1	34	14	Higher	5	100	Database in SQL Server	They offered to develop a game
State official 2	10	10	Higher	0	190		
State official 3	50	40	Average professional	30	130	–	Proposed to develop a platform for training
State official 4	5	5	Average professional	0	140	–	Suggested training staff like Pelitte

Table 2

Assigning coefficients to source data

Criterion	Assigned coefficient	Description
1	2	3
Total length of service	0	No experience or experience less than 4 years
	0.2	5 to 10 years of experience
	0.4	10 to 20 years of experience
	0.6	20 to 30 years of experience
	0.8	30 to 40 years of experience
	1	More than 40 years of experience

Continuation of Table 2

1	2	3
Work experience	0	No experience or less than 4 years of experience
	0.5	5 to 15 years of experience
	1	15 to 30 years of experience
	1.5	30 to 45 years of experience
	2	More than 45 years of experience
Education	0	Secondary general education
	1	Secondary vocational education
	2	Higher education
Mentoring	0	No mentoring experience
	1	1 to 15 years of mentoring
	2	15 to 30 years of mentoring
	3	30 years of mentoring or more
Plan fulfillment (overfulfillment)	0	No overfulfillment
	0.4	1% to 20% overfulfillment
	0.8	20% to 40% overfulfillment
	1.2	40% to 60% overfulfillment
	1.6	60% to 80% overfulfillment
	2	80% to 100% overfulfillment
	3	More than 100% overfulfillment
Development (implementation) of automated workplaces	0	No developments (implementation)
	1	Automation of a production process affecting employee performance
	2	Automation of a production process affecting the quality and volume of goods (services) provided
	3	Automation of department employee workstations
	4	Automation of existing software
	5	Development and implementation of new software
Efficiency and application of the proposed methods	0	No results
	1	Efficiency increased from 1% to 20%
	2	Efficiency increased from 20% to 40%
	3	Efficiency increased from 40% to 60%
	4	Efficiency increased from 60% to 80%
	5	Efficiency increased from 80% to 100%
	6	Efficiency increased over 100%

The employee performance indicators that will be decisive in selecting a mentor to solve the designated tasks are specified in Table 3.

Table 3

Optimizing mentors' performance indicators for specific tasks

Problem	Government official 1	Government official 2	Government official 3	Government official 4
Development of ARM	2.35	2.06	1.92	1.78
Implementation of the plan	1.61	1.47	2.27	2.39
Application in public service	1.21	1.26	1.67	2.06

Then the task of appointing a mentor for this example, in accordance with formula (6), can be written as follows

$$2.35x_{11} + 2.06x_{12} + 1.92x_{13} + 1.78x_{14} + 1.61x_{21} + 1.47x_{22} + 2.27x_{23} + 1.21x_{31} + 1.26x_{32} + 1.67x_{33} + 2.06x_{34} \rightarrow \max_{x \in \Delta\beta}, \quad (10)$$

where the set of admissible alternatives  $\Delta\beta$  in accordance with formula (7) is given by the following system:

$$\begin{aligned} x_{11} + x_{12} + x_{13} + x_{14} &= 1, \\ x_{21} + x_{22} + x_{23} + x_{24} &= 1, \\ x_{31} + x_{32} + x_{33} + x_{34} &= 1, \\ x_{11} + x_{21} + x_{31} &= 1, \\ x_{12} + x_{22} + x_{32} &= 1, \\ x_{13} + x_{23} + x_{33} &= 1, \\ x_{14} + x_{24} + x_{34} &= 1, \\ x_{ij} &\in 0,1; \forall i \in 1,2,3,4; \forall j \in 1,2,3. \end{aligned} \quad (11)$$

The first four constraints correspond to the general constraint (3), the next four constraints correspond to constraint (4), and the last one to constraint (5). Let's solve the formulated assignment problem using the Excel program, having set all the initial data and restrictions in the form of formulas. Let's also enter parameters and basic restrictions for the task of appointing a mentor in the solution search wizard. After performing the calculations using the MS Excel program, the quantitative solution shown in Table 4 will be found.

**Table 4**

The result of solving the problem of assigning a mentor

Problem	Government official 1	Government official 2	Government official 3	Government official 4
Development of ARM	1.0	0.0	0.0	0.0
Implementation of the plan	0.0	0.0	1.0	1.0
Application in public service	0.0	1.0	0.0	0.0

The calculations yield the following optimal variable values:  $x_{11} = 1, x_{23} = 1, x_{24} = 1, x_{42} = 1$ , and the remaining variables are set to 0. The maximum objective function value  $f = 8.27$  was also found. Analysis of the assignment problem solution shows that it is recommended to assign Civil Servant 1 to the development of the automated workstation, Civil Servant 3 and Civil Servant 4 to exceed the plan, and Civil Servant 2 to implement the gamification methods.

Thus, the application of gamification methods in HR process management and automation enables automation of personnel assignment, saving the enterprise manager's time, and eliminating human error from the personnel assignment process [40]. To successfully implement gamification methods in HR processes, a clear algorithm should be developed containing rules for implementation, introduction, and analysis of the obtained results.

The developed mathematical model enables systematic evaluation and optimization of digital technology implementation processes in public services. It demonstrates that the correct selection of game-based implementation parameters significantly improves motivation and learning effectiveness. The model is universal and can be adapted to specific enterprise conditions, enhancing competitiveness through more effective human resource management.

### 3.2. Assessing the impact of digital, human resources, and organizational resources of corporate culture on the integral indicator of economic security

The research of the corporate culture of the civil service was conducted according to the model [41], which is based on the analysis of several criteria. The main ones are risk-taking, adaptability, attitude to innovation, desire to improve professional skills, degree of participation in making management decisions, social responsibility. As well as a number of types of criteria for personnel: type of team relations, type of motivation and control, and type of leadership.

According to these criteria, four types of corporate culture are distinguished: innovative, traditional (conservative), "snobbish", and forced. Employees were administered a corporate culture survey [42]. To obtain reliable information, the survey was conducted anonymously among employees and managers of various compositions [43]. By selecting response options, employees rated the "current" and "desired state" options. Thus, this survey allowed for the development of a preliminary strategy for transforming the corporate culture into a more effective one, based on employee desires [44, 45]. This is crucial, as transforming an enterprise's corporate culture against

the will and desires of employees encounters significant resistance. The results of the assessment of the actual state of corporate culture are presented in Table 5.

**Table 5**

Assessment of the actual type of corporate culture of the public service

Corporate culture type	Total points	Shares, %
Innovative	55	20.4
Snobbish	87	32.2
Traditional	80	29.6
Forced	48	17.8

Table 5 shows that the dominant type of actual corporate culture in the public service is a snobbish corporate culture (87 points), which is based on the principle of individual material gain for each employee. It slightly exceeds the traditional culture (80 points). The values for the forced and innovative cultures represent 48 and 55 points, respectively.

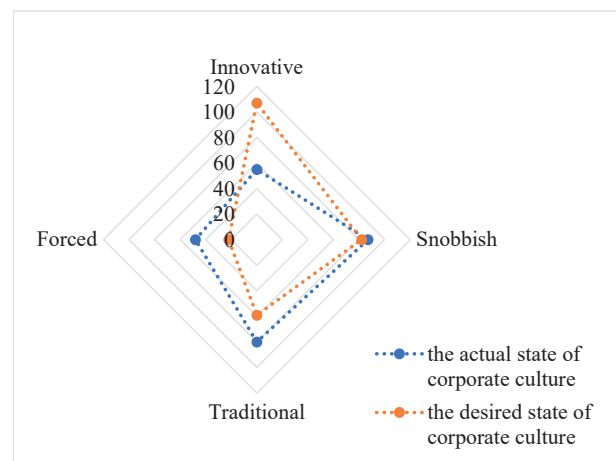
To identify ways to improve the company's corporate culture, an assessment of its desired state was conducted. The results of the analysis are presented in Table 6.

**Table 6**

Assessing the desirable type of corporate culture in the public service

Corporate culture type	Total points	Shares, %
Innovative	107	39.6
Snobbish	82	30.4
Traditional	59	21.9
Forced	22	8.1

From the above data, it is possible to see that civil servants have their own vision of the desired corporate culture. It is based on the dominance of an innovative corporate culture. The main principles are a clear and understandable civil service strategy, professional growth, obtaining new knowledge, fair financial incentives and job satisfaction. The innovative culture received 107 points, the snobbish culture 82, the traditional 59, and the forced 22. The diagram (Fig. 1), which depicts the existing and desired corporate culture of the public service, combines individual core organizational attributes of public administration, which, taken together, reflect the corporate culture of the public service.



**Fig. 1.** Comparison of the actual and desired state of corporate culture in the public service

Table 7

Evaluation of external attributes of corporate culture of public service

Components	Weight ( $w_i$ )	Points ( $b_i$ )	Overall score ( $l_i$ )
Logo, corporate identity	0.2	5	1.00
Slogan	0.25	5	1.25
Employee appearance	0.15	3	0.45
Interior	0.15	4	0.60
Atmosphere	0.10	5	0.50
Traditions	0.05	4	0.20
Holidays	0.10	4	0.40
Total	1.00	–	4.40

To quantitatively compare the actual and desired corporate cultures, it is possible to calculate the absolute deviation from the desired state. The desired state score indicates a shift in priorities from a snobbish corporate culture to an innovative one. The absolute deviation from the desired state has the following values: innovative culture – (+52), snobbish – (–5), traditional – (–21), and forced – (–26).

Thus, determining the type of corporate culture based on a survey of public service employees revealed the need to implement measures to transform a snobbish corporate culture into an innovative one. However, a desirable corporate culture for the public service should emphasize each of the four types of culture, with the innovative type of corporate culture being the strongest.

This balanced approach to corporate culture will ensure maximum compliance with the demands of the competitive environment and the characteristics of the internal environment, which in turn will contribute to organizational success. As a result, the public service will experience fewer difficulties in its struggle to develop and operate effectively by aligning its corporate culture with the internal requirements of its staff.

To study the attributes of the corporate culture of the public service, an expert assessment method was used, allowing each element of corporate culture to be assessed based on its importance to the activities of the public institution.

The company's level of corporate culture was assessed on a five-point scale in two areas:

- evaluation of external attributes of corporate culture;
- evaluation of internal attributes of corporate culture.

The overall evaluation of internal and external attributes of corporate culture was conducted using the following formula

$$l_i = w_i \cdot b_i, \quad (12)$$

where  $l_i$  – overall rating of the  $i$ -th element of corporate culture;  $w_i$  – weight of the  $i$ -th element of corporate culture;  $b_i$  – average score of the  $i$ -th element of corporate culture.

The research of the external components of corporate culture was based on an analysis of the logo, brand mark, slogan, employee appearance, interior design, heroes, legends, and public service holidays.

Corporate colors are important in a company's image. Research by brand colorists shows that a well-chosen color scheme increases trust by 38%, improves information comprehension by 40%, and increases positive attitudes by 22% [42]. The symbolic representation of the public service logo – a blue rectangle with the short company name written in yellow letters – is a successful combination of colors. Yellow promotes communication and is remembered longer than other colors. It is visible from a distance and is used to attract attention. Blue helps focus on what's essential, not getting distracted by trivialities [46].

Most often, the exterior of a public service office is neutral in color. The offices of administrative departments are decorated in a similar style. Some departments have transparent walls, symbolizing transparency and promoting effective communication. Employees wear casual business attire.

An important component of corporate culture is the holding of corporate events. Corporate events bring employees together, fostering a close-knit team. Public service organizations also practice celebrating special occasions, such as birthdays and professional holidays.

An expert assessment of the external manifestations of corporate culture in the public service is presented in Table 7.

Thus, the total score for the assessment of the external attributes of the corporate culture of the civil service is 4.4 points. In general, this indicates a positive state of the corporate culture, but some of its components need to be improved. Namely, the appearance of employees, the interior of the workplaces of sales floor employees, as well as the company's legends and holidays.

### 3.3. Optimization of human resources and management decisions based on multi-criteria modeling

The next stage of corporate culture research is the analysis of internal subjective attributes: mission, goals, values, corporate rules and norms.

The goals of the public service are to meet the daily needs of the population, promote the development of the country/region/city/village, and enhance competitiveness and profitability. The company seeks to achieve these goals by offering high-quality goods, services, and innovative solutions at the best prices, investing in the development of highly professional and dedicated employees who maintain constant direct communication with the public, and establishing long-term cooperation with professional business partners.

An important manifestation of corporate culture is also the norms and rules of conduct for employees, partners, and the public. Typically, these are set out in official documents: regulations, codes of ethics, and instructions. The public service has a system of employee conduct rules, which includes basic employee requirements, certain elements related to the conduct culture and culture of the public service, as well as recommendations for actions to be taken in typical situations. The activities of the public service are based on business principles, which include basic values and norms of ethical and business conduct that every public service employee must adhere to:

1. *Avoiding and Resolving Conflicts of Interest.* Public service employees must avoid conflicts of personal and corporate interest. In their cooperation with business partners, only objective criteria must be taken into account.

2. *Offering and Granting Privileges.* Public service employees may not offer personal privileges related to their official duties (e. g., gifts) to any employee of another company, institution, or organization. Exceptions apply only to symbolic and low-value holiday gifts.

3. *Incentives and Receipt of Privileges.* Public service employees may not incentivize or receive privileges (e. g., gifts) related to their official duties from any employee of another company or any third party. Exceptions apply only to symbolic and low-value holiday gifts.

4. *Proper Management of Public Service Information.* Public service employees are prohibited from transferring or otherwise making confidential information and confidential documents available to third parties without appropriate authorization.

5. *Compliance with the Law of Ukraine "On Civil Service."* Civil service employees must adhere to Ukrainian legislation on civil service.

6. *Diversity, equal opportunity, and tolerance – anti-discrimination.* Public service employees have no right to engage in direct or indirect discrimination, especially based on race, ethnicity, religion, worldview, physical and other disabilities, age, sexual orientation, or gender. Furthermore, harassment, especially stalking and sexual harassment, is unacceptable.

7. *Compliance with fair working conditions.* The public service maintains fair working conditions and adheres to all labor law requirements.

8. *Compliance with current legislation and corporate laws.* Public service employees are required to perform their work in accordance with current Ukrainian legislation and corporate standards and rules of the public service.

These principles are enshrined in the company's code of ethics. An informal practice is for all employees to address each other by their first names, which creates a more relaxed atmosphere. The golden rules for interacting with clients include courtesy, friendliness, helpfulness, efficiency, a positive image of the public service, and teamwork. The roles and responsibilities of employees and departments are defined in job descriptions and department regulations.

The values define the goals that management sets for the public service. To ensure the public service's resourcefulness, the core values should be: openness, a focus on the public and long-term relationships with them, meeting their expectations, and high-quality products or services [47]. The key values of the public service company are presented in Table 8.

Table 8

Corporate values of public service

Core values	Characteristics of core values
People come first	<ul style="list-style-type: none"> <li>– the people come first in everything we do;</li> <li>– the people's needs are our job;</li> <li>– smile, tell, help;</li> <li>– strive for new achievements;</li> <li>– we are the best partner for our people</li> </ul>
I take responsibility	<ul style="list-style-type: none"> <li>– I find simple solutions;</li> <li>– I am the captain of my boat;</li> <li>– I keep my promises;</li> <li>– I protect the country's money as if it were my own;</li> <li>– no sooner said than done</li> </ul>
I am driven by success	<ul style="list-style-type: none"> <li>– I share my ideas and consider the ideas of others;</li> <li>– anything is achievable;</li> <li>– I make things happen;</li> <li>– I encourage colleagues to innovate;</li> <li>– teamwork is the key to our success</li> </ul>
I care	<ul style="list-style-type: none"> <li>– I respect others;</li> <li>– I promote people's development;</li> <li>– I trust the skills and experience of others</li> </ul>

The public service's corporate values are aimed at meeting the needs of the public and building a team of professionals to provide high-quality service.

To determine the practical implementation of these values in public service, it was conducted a sample survey of respondents regarding their level of satisfaction with the service provided by shopping center staff. The results of the survey of 50 respondents revealed that 40% were satisfied, 27% were dissatisfied, and 33% were neutral.

Service quality was assessed as follows:

- *Low*: 20–30% of customers are dissatisfied with the service, 10–20% are satisfied, and the rest are neutral;
- *Standard*: 10–0% are dissatisfied, 20–30% are satisfied;
- *High*: 5–10% are dissatisfied, 50–60% are satisfied;
- *Super service*: no dissatisfied customers. 70–90% of the population is satisfied with the service, and 10–30% are neutral.

Thus, the public service has a standard level of service. Among the negative aspects of customer service, violations of corporate values such as "Smile, Tell, Help" and "The People of Ukraine Come First" were noted. The research results of external attributes of corporate culture are presented in Table 9.

Table 9

Evaluation of internal attributes of corporate culture of public service

Components	Weight ( $w_i$ )	Points ( $b_i$ )	Overall score ( $I_i$ )
1. Mission	0.25	5	1.25
2. Goal	0.20	5	1.0
3. Corporate values	0.25	3	0.75
4. Corporate rules	0.15	4	0.6
5. Standards	0.15	4	0.6
Total	1.0	–	4.2

Thus, the overall score for the internal attributes of the public service's corporate culture is 4.2. The problematic aspects of the internal attributes of corporate culture include the cultural gap, namely the discrepancy between proclaimed values, norms, and rules and their implementation in practice. Thus, the external and internal attributes of the public service's corporate culture are rated well. Their average value is 4.3 points, with the score for external attributes slightly higher than the score for internal attributes. Corporate culture development is aimed at creating favorable working conditions, a positive atmosphere within the team, and a sense of pride and satisfaction with one's place of work. The research of the key characteristics of corporate culture was conducted by: defining and evaluating criteria for the social and economic effectiveness of corporate culture; calculating an integrated indicator; determining the level of social and economic effectiveness; and identifying strengths and weaknesses.

The research results of the key characteristics of the public service's corporate culture are presented in Fig. 2.

The figure shows that the highest ratings were given to components such as team atmosphere and conflict level (4.5 points). Slightly lower scores were given to the criteria of working conditions, pride in the company (4.2 points), and loyalty to management (4.1 points). A sense of involvement in company affairs and opportunities for career advancement received a rating of 3.8 points.

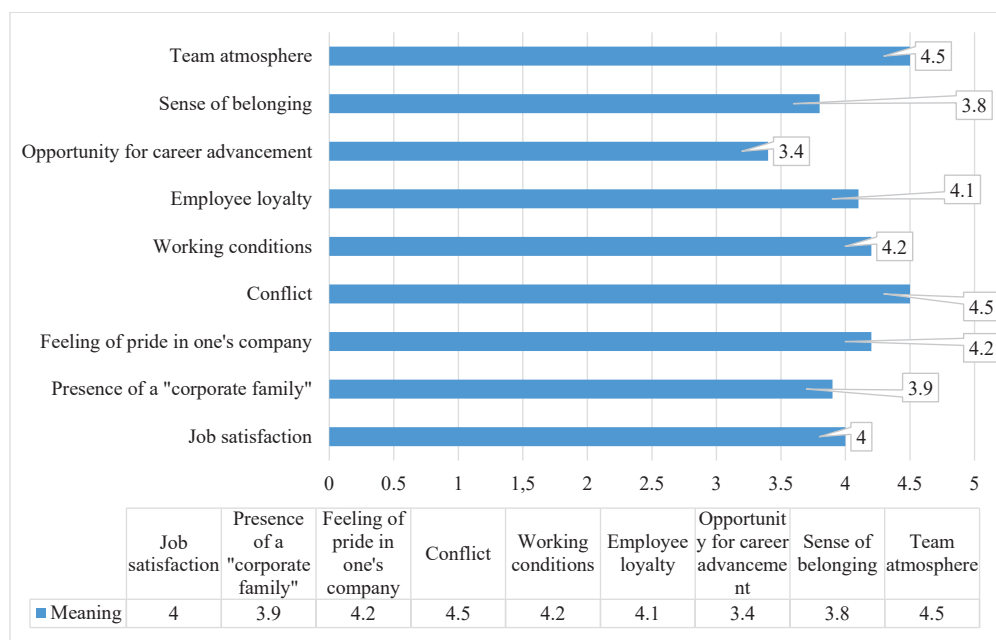


Fig. 2. Evaluation of the components of corporate culture of the public service

The overall assessment of the effectiveness of the public service's corporate culture was conducted in two areas: an assessment of the social and economic effectiveness of the corporate culture.

The research resulted in the values of the integrated indicator of social (32.4) and economic (40.3) effectiveness of the public service's corporate culture. The following scale was used to determine the level of the integrated indicator of social and economic effectiveness of the public service's corporate culture (Table 10).

**Table 10**

The significance of the level of the integrated indicator of social and economic security of the corporate culture of the public service

Estimation interval for the integrated economic security indicator (points)	Economic efficiency assessment result	Evaluation interval for the integrated social efficiency indicator (points)	Social efficiency assessment result	Integrated indicator level
10.5–20.5	–	14.5–24.6	–	Low
20.6–40.5	40.3	24.6–34.5	32.4	Medium
40.6–49.5	–	34.6–44.5	–	High

Thus, the public service company is purposefully developing a corporate culture for the civil service. Among the attributes that can be considered strengths of the corporate culture are the logo, mission, slogan, employee heroes, and the interior design of government agencies. Weaknesses in the public service culture include the country's corporate values, which are not truly reflected in practice, and the appearance of employees. The need to improve individual elements of the public service's corporate culture is confirmed by average social and economic performance indicators.

**3.4. Discussion**

There are certain similarities between all government bodies, based on the functions and operating standards of government bodies established by Ukrainian legislation, uniform principles of organizing activities, standard structure schemes for these bodies, uniform requirements for civil service, etc. [48]. This gives grounds to speak of the existence of a common corporate culture of the civil service [49]. At the same time, against the background of common norms and values, there are also differences in the corporate culture of individual government bodies, caused, in particular, by regional characteristics, the specifics of their activities, and the value orientations of the leader [50]. Thus, in our opinion, the cultures of individual organizations within the civil service system can be considered subcultures in relation to the main corporate culture of the civil service [51]. One of the well-known Western researchers of organizational culture [52] believes that "...over time, any social unit, as a result of the process of natural evolution, produces sublevels that produce subcultures". But this doesn't negate the existence of a unified culture with shared ideas, values, and norms across all organizational subsystems, which are significantly evident during times of crisis [53].

At the same time, the current state of the corporate culture of the civil service leaves much to be desired. Its formation and change are still dominated by largely spontaneous tendencies, which entail a host of negative consequences. These include, in particular, bureaucracy, bribery, corruption, and an indifferent attitude toward the interests of society and citizens. The civil service system is characterized by the preservation of old stereotypes. Namely: the predominance of personal, subjective motives in making managerial decisions, administrative style and management methods. It is also worth including in this list a focus on the short-term perspective and the will of the leadership. While the concentration on the strategy of civil service development remains out of focus. As a result, a negative image of the civil service as a bureau-

cratic and corrupt official has been formed in the public consciousness. This hinders the recruitment of highly qualified specialists, strengthening the human resources potential of the civil service, reduces the level of institutional trust and increases the alienation of society from the authorities as a whole.

The practical significance of the state results can be highlighted in the possibility of comprehensive and unified use by state authorities (different levels of government) to apply the model. These include both state institutions of local self-government and other subjects of public administration. What is presented in the article can be used to form an effective system of resource provision for the economic security of corporate culture. Especially in the conditions of modern changes, digital transformation and digitalization of all organizational and management processes. The presented and substantiated mathematical model provides an opportunity to carry out constant monitoring of several characteristics. These include staff stability, digital competencies, organizational adaptation, innovative activity and the effectiveness of management decisions made. The model also includes additional key elements – a multi-criteria assessment toolkit. With the help of correlation and regression analysis, it is possible to implement the model in public administration practice quite quickly and effectively. Accordingly, in the future, practical testing can become the basis for several personnel changes. Namely: optimizing human resources, improving management, transparency of management processes, improving internal communication mechanisms, ensuring a high level of institutional stability of state institutions. It is worth noting that within the framework of building strategies for the digital transformation of the civil service, the presented model should take its rightful place for implementation. Because the program for the development of human capital, internal control and audit systems, as well as management decisions should improve the quality of functioning of state institutions. And in the future, because of effective changes in strategic management, the trust of the population in the employees of such institutions will also increase. That is, public administration goes beyond intra-corporate management and has a social effect.

As limitations to this research, it is worth noting, first, the adaptability of the model. It is the specifics of the functioning of various bodies of the state apparatus that impose conditions for high-quality implementation. That is, the direction of activity and sphere of influence cannot be standardized, because there are sectors of state secrets, there are areas of protection of human rights, personal data and the creation of state secrets. At the same time, there are several problematic issues in public institutions for the rapid implementation of the model. These include digital maturity and resistance from the staff. It is the heterogeneity of staffing that can create a list of problematic issues in the process of improving the application of the model of resource provision of economic security and corporate culture of the civil service. To have clear relevant results and generalize them properly, it is worth paying attention to the availability of open statistical data. Again, there are problematic aspects regarding the openness of certain data of state institutions, especially if they are related to state secrets and are punishable by law. The reliability of the results received must undergo several stages of blind verification and review. That is why, to expand the practical implementation of the proposed approach, it is necessary to increase the scale of the information base, conduct additional testing at different levels of public administration influence. In this case, relevance will become the next obstacle. Because in addition to the direction of publicity, economic nature and personnel management, changes in the legislative framework must also be considered. The regulatory and legal framework for digital influence must be clearly considered and regulated within the framework of the development of public sector digitalization. The dynamic development of digital tools encourages constant updating of assessment criteria and revision of model parameters to adapt it to realities.

In the future, to develop the proposed mathematical model, it is worth paying attention to adaptive digital platform tools. To assess the level of economic security through resource provision, namely public service personnel, it is worth expanding corporate culture with digital levers. For this, development is envisaged at the expense of intelligent data analysis, forecasting management models and creating HR risk maps. In this case, a promising direction will be tracking the impact of digital culture on the level of trust in state institutions. Effective e-government management and adherence to strategic development should be related directions for state institutions. That is, public administration is transformed under the influence of current changes and is constantly developing.

#### 4. Conclusions

1. As a result, research and development of established approaches, formal patterns and structural relationships were determined and identified. A generalization is given within the framework of the formation of a model of resource provision of economic security of the corporate culture of public administration. It is determined that the structural integrity of the model is determined and formed by systematizing the algorithmic purpose and normalizing weight coefficients. Within the framework of building the model, a significant role is played by multi-criteria assessment of the personnel of a public institution. Accordingly, the presented structural approach provides an opportunity to form nonlinear relationships between the most important components. These include personnel, digital, organizational, etc. The presented mathematical apparatus allows to reduce the subjectivity of the assessment and ensure objectivity. Quantitative expression in this case allows to create a basis for making management decisions and reduce risks, relying on the experience of employees. And the results of the calculation of skills and competencies in digital knowledge form the basis for improving the efficiency of civil servants, creating a safe environment.

2. As a result of the analysis, the influence and importance of the role of digital, personnel and organizational resources of corporate culture on the integral (generalized) level of economic security were determined. The results obtained indicate the presence of stable statistical correlations and dependencies. Within the framework of calculations and analytical research, a high value of the correlation coefficient was determined ( $r = 0.82-0.91$ ). This is confirmed by the presence of skills and achievements in digital competencies among employees, the ability to act as a mentor, professional experience, innovative activity in work and the ability to apply new management solutions. The obtained indicators of the integral index of economic security and its growth by 0.27–0.34 units indicate that the digital transformation of corporate culture is the main lever of influence in increasing the sustainability of public administration. The results obtained during the research indicate that the modernization of internal processes and the strengthening of organizational levers of influence, together with the effect of synergy, can significantly reduce risks. In the future, this directly correlates with the improvement of reliable resource provision and improvement of economic security indicators of the public service.

3. Improving staffing, based on multi-criteria modelling, highlights positive results. It was determined that because of applying the specified methodology, the most effective management decisions were identified, which are confirmed by the result of the objective function  $f = 8.27$ . As a result of modelling, it was determined that the distribution of employees in accordance with their level of competencies, experience and digital skills creates a significant increase in effective management. This, accordingly, subsequently has a positive impact on risk management and improving economic security. It is also presented that digital practices increase the indicator of resource provision of economic security

of public administration by 18–22%. In the future, the results obtained can be effectively implemented within the framework of improving the development strategy of the public service. Considering the subordination in such institutions and in accordance with property rights (public sector), it is worth forming an opinion that corporate culture will play a significant role in the processes of resource provision of economic security in public administration. For further steps, it is worth introducing digital HR models into the public sector, which will ensure long-term institutional sustainability.

#### Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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#### Data availability

Data will be made available on reasonable request.

#### Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies in creating the submitted paper.

#### Authors' contributions

**Yana Tsybalenko:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Project administration, Funding acquisition; **Volodymyr Koval:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Maksym Boiko:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Mariia Tepluk:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Supervision, Funding acquisition; **Anna Zimina:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Lesia Skurinevska:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Andrii Blyznyuk:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Andrii Biliuk:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition; **Nataliia Lavruk:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Project administration, Funding acquisition; **Oksana Lavruk:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review and editing, Visualization, Funding acquisition.

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**Yana Tsybalenko**, Candidate of Sciences in Public Administration, Associate Professor, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0003-0442-7549>

**Volodymyr Koval**, Candidate of Military Sciences, Senior Researcher, Charitable Organization “CHARITABLE FUND “GUARD OF THE COUNTRY”, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0002-6209-6779>

**Maksym Boiko**, Candidate of Economic Sciences, Department of Public Administration and Land Management, Classic Private University, Zaporizhzhia, Ukraine, ORCID: <https://orcid.org/0000-0002-6649-5021>

✉ **Mariia Tepluk**, Candidate of Economic Sciences, Associate Professor, Department of Business Economics and Entrepreneurship, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine, e-mail: [teplukmariia@gmail.com](mailto:teplukmariia@gmail.com), ORCID: <https://orcid.org/0000-0001-6823-336X>

**Anna Zimina**, Candidate of Economic Sciences, Associate Professor, Department of Management, National University “Kyiv Aviation Institute”, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0002-4911-0054>

**Lesia Skurinevska**, Doctor of Economic Sciences, Senior Researcher, Deputy Head of Educational and Research Center, Educational and Research Center for Defence Management, National Defence University of Ukraine, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0003-4536-9170>

**Andrii Blyzniuk**, Doctor of Public Administration, Professor, Department of Public Administration and Administration, Kyiv University of Aviation and Information Technologies, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0001-8768-5177>

**Andrii Biliuk**, Candidate of Sciences in Public Administration, Associate Professor, Department of Public Administration and Land Management, Classic Private University, Zaporizhzhia, Ukraine, ORCID: <https://orcid.org/0000-0002-4348-8312>

**Natalia Lavruk**, Candidate of Economic Sciences, Associate Professor, Department of Public Administration, Management and Inclusive Economy, Educational and Rehabilitation Institution of Higher Education “Kamianets-Podilskyi State Institute”, Kamianets-Podilskyi, Ukraine, ORCID: <https://orcid.org/0000-0003-4724-8460>

**Oksana Lavruk**, Candidate of Economic Sciences, Associate Professor, Department of Management, Kamianets-Podilskyi Ivan Ohienko National University, Kamianets-Podilskyi, Ukraine, ORCID: <https://orcid.org/0000-0001-9089-237X>

✉ Corresponding author