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Management Practices of General Secondary Education Principals in Conditions of Uncertainty: the Ukrainian Context

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ABSTRACT

The aim of the study is to research and systematize the management practices of general secondary school principals in Ukraine under conditions of uncertainty, and to identify the key features of a new managerial culture in the field of education. The study applies a quantitative research design based on standardized survey data collected from heads of general secondary education institutions. Empirical information is processed using descriptive statistics and an economic-mathematical modelling framework. Survey responses are operationalized through nominal, ordinal, and binary scales and subsequently transformed into normalized indicators. An integral assessment model is constructed by aggregating partial indices of management style, managerial decisions, and leadership models using a weighted linear approach. The study showed the consolidation of the administrative community around the values of safety, adaptability, trust, partnership, and the adoption of flexible, dialogic management. Priority models of leadership point to a new paradigm of educational management based on human-centeredness, partnership, and ethical responsibility. The profile of a modern educational leader was outlined. The features of effective practices were summarized. Relevant directions for further development of management practices in Ukraine under conditions of uncertainty are identified. The results can contribute to improving management practices, developing professional training programs, and formulating policies aimed at strengthening the resilience and adaptability of educational institutions. The article offers a comprehensive vision of the managerial culture of Ukrainian general secondary education institutions in the context of uncertainty and substantiates conceptual recommendations for its development.

1. Introduction

The current stage of educational development in Ukraine is occurring under complex conditions of uncertainty, primarily caused by the full-scale war and its consequences. These conditions are characterized by complexity, ambiguity, contradictions, and a destructive impact on all participants in the educational process. It should be noted that quality education cannot be ensured without taking into account social and cultural factors [1]. Researchers have thoroughly analyzed the various impacts of uncertainty during the COVID-19 pandemic [2]; however, the war in Ukraine has added new factors to the list of risks to education, such as physical, social, emotional, cognitive, communication, etc.

Despite the large-scale destruction of the educational infrastructure, the Ukrainian education system faced new challenges in the management sphere, including the need to quickly adapt school management to the conditions of war. An analysis of management decisions made in the first months of the full-scale invasion showed the emergence of new models of response that included both government policy and initiatives by civil society and local educational communities [3]. The new reality required a focus on combining regulatory and legal mechanisms with operational management actions that ensured the continuity of education in the conditions of life threats, loss of teaching staff, and limited funding [4]. The implementation of digital learning formats, the development of security algorithms, and the development of psycho-emotional support systems are considered in these conditions not only as a response to the crisis, but also as a basis for the strategic renewal of educational policy [5]. A comprehensive analysis of the risks faced by the educational management system in wartime shows the need to rethink both short-term and strategic approaches to security, resource provision and psychological resilience of participants in the educational process [6]. In this context, it becomes important to rethink the scientific and methodological basis of management decisions, including the introduction of integrated approaches that can ensure the flexibility and sustainability of educational systems in crisis conditions.

As the analysis of management approaches to overcoming uncertainty shows, an effective response is possible through the implementation of two complementary strategies: evolutionary, based on the gradual mobilization of adaptive resources, and revolutionary, which involves profound transformations in the system of interaction and decision-making.

Given these challenges and transformations, it is important to consider the theoretical foundations and previous studies that outline the nature of management practices under conditions of uncertainty.

2. Literature Review

The ability of an educational institution to identify and solve the problems of its educational organization is an urgent need for management activities, which should be aimed not only at maintaining stable operation, but also at efficiency and development [7]. In the context of uncertainty, management in educational institutions, as a process of planning, organizing, motivating, controlling [8] and achieving educational goals, should be aimed primarily at making management decisions to create a safe educational environment that supports communication

between teachers, students and their families and ensures quality learning [9]. In this context, the development of leadership among educational institution principals becomes particularly important, as they tactically manage resources and ensure effective communication to maintain order, stability, and safety [10]. After all, effective leadership in the conditions of uncertainty is based on the ability to adapt, maintain the psychological well-being of the team and restore the functioning of the institution after crisis events [11].

In the scientific literature, the phenomenon of "uncertainty" is considered in different contexts and is most often interpreted as *indeterminacy* – non-determinism, lack of clarity and structure that allows for multiple interpretations [12]; *uncertainty* – a state of incompleteness or inaccuracy of information that creates uncertainty (indecision, uncertainty, doubt) in decision-making [13]; *ambiguity* – multiplicity or the possibility of different interpretations of information [14]. These concepts are widely used in philosophical, managerial and social studies to describe complex social phenomena and decision-making processes in conditions of instability. In the context of a habitual crisis, the automatic or conscious reaction of the biopsychosocial system is aimed at restoring stability and emotional balance, which implies an integrated approach to restoring physical, psychological, and social well-being [15, 16]. Thus, in the case of a habitual crisis, support for the three main spheres – biological, psychological, and social – is the key to restoring systemic integrity and internal equilibrium.

An individual attitude toward uncertainty is considered a personal trait associated with other personality characteristics [17]; with patterns of decision-making under uncertainty; with the formation of corporate culture and identity under conditions of uncertainty [18]; and with individual behavioral strategies in uncertain situations [19]. Recent studies confirm that intolerance of uncertainty is a fundamental factor playing a key role in mental disorders and is significantly associated with personality traits and emotion regulation [20, 21]. Psychological research shows that a high tolerance for uncertainty and resilience to ambivalence indicate personal maturity, ego stability, and the ability to act effectively under risk and instability [22, 23].

A revolutionary or crisis-driven response to uncertainty involves making significant bifurcation choices characterized by variability, unpredictability, irreversibility, and random influences. In particular, the transformation of value orientations, the loss of clear future prospects, situational instability, and increased anxiety have a negative impact on the behavior, relationships, and communication of teachers, learners, and the overall state of the education system [24].

Thus, the phenomenon of uncertainty requires an in-depth socio-psychological analysis of decision-making processes under complex conditions. Modern unstable societies create a challenging environment of social and cultural risks that directly affect the educational sphere, including managerial strategies and decision-making under uncertainty [25]. The analysis of professional activity in such conditions shows that situations of uncertainty have different nature and typology depending on the context of activity, which requires a deep understanding of their essential characteristics and adaptive response mechanisms [26].

Such approaches allow for a more comprehensive description of the impact of uncertainty on the behavior of managers and participants in the educational process.

Leadership teams of educational institutions play a crucial role in ensuring the sustainable functioning of schools under conditions of uncertainty. Their efforts are aimed at creating a safe environment, ensuring the implementation of the educational process both in the educational institution and in distance learning [2, 9]. Studies show that in crisis situations, principals of educational institutions are able to form a community around the school, strengthen coherence and equality in access to education, building relationships based on trust [10, 27]. Effective management in such conditions requires tactical use of resources, clear communication, and the establishment of order and stability as the foundation for creating a safe educational environment.

Thus, the functioning of general secondary education institutions in Ukraine is characterized by high uncertainty due to global educational transformations and socio-political challenges. War, economic instability, educational reforms, legislative changes, digitalization, and Ukraine's integration into the European educational space pose significant challenges for education leaders. These factors require school principals to quickly adjust managerial strategies, implement innovations and make effective decisions to ensure the quality of education.

The author's experience shows that the management of general secondary education institutions under conditions of uncertainty is based on the use of such basic practices as adaptive management, crisis management, leadership, and innovation. At the same time, internal challenges such as staff shortages, teacher burnout, limited resources, and low levels of institutional autonomy significantly complicate the activities of principals. The lack of comprehensive research on this issue emphasizes the relevance and necessity of a systematic analysis of management models aimed at increasing the adaptability and resilience of general secondary education institutions under conditions of uncertainty.

***Purpose*.** To research and systematize the management practices of general secondary school principals in Ukraine under conditions of uncertainty, and to identify the key features of a new managerial culture in the field of education.

3. Methodology

The theoretical foundation of the study is based on modern approaches to leadership and management under conditions of uncertainty. In particular, the provisions of the theory of adaptive leadership [28], the model of servant leadership focused on team and community development [29], the concept of ethical and inclusive management [30, 31], as well as approaches to strategic management in crisis conditions [32] are used. These theories allow us to consider the management activities of heads of educational institutions as a complex system aimed at ensuring the sustainability and development of educational institutions under conditions of constant change and challenges.

The empirical basis of the study is the data of a questionnaire survey conducted among 205 heads of general secondary education institutions in Kyiv. The sample is stratified by the criterion of managerial experience (from 1 to more than 20 years), which allowed us to identify both general

trends and specifics of management strategies in different groups. The total size of the general population is 665 general secondary education institutions, so the coverage of about 30% ensures sufficient representativeness to draw conclusions.

The questionnaire consisted of seven content sections covering key aspects of managing under uncertainty (Appendix A):

1. Respondents' profile (position, experience, type of institution, gender);

2. Managerial challenges and reactions under conditions of uncertainty (types of threats, typical solutions);

3. Physical dimension, resource provision, and security infrastructure (physical security conditions, security);

4. Psychological support, inclusiveness, and barrier-free environment (forms of support, barrier-free environment);

5. Social dimension of security, non-discrimination policy, and community participation (non-discrimination, communication with the community);

6. Information security, digital literacy, and personal data protection (data protection policies, digital competence);

7. Leadership in crisis, management style, and key management competencies (effective models, management styles, values).

The data was collected by sending electronic forms to the official addresses of educational institutions. This format ensured high involvement of respondents and reliability of the data source.

8. Economic and mathematical modeling has become a tool for formalizing the results of the questionnaire and quantifying management efficiency under conditions of uncertainty. The method is based on building a system of indices that aggregate discrete management characteristics into dimensionless generalized indicators. The initial empirical data are transformed into binary and normalized variables to ensure comparability of heterogeneous parameters.

The model has a hierarchical structure and contains three partial indices: the management style index, the management decisions index, and the leadership models index. Each index is calculated as a weighted sum of the corresponding variables, taking into account their organizational and functional significance. Aggregation is performed through a linear weighted function, which forms an integral indicator of management efficiency. The method provides transparency of calculations, reproducibility of results, and the ability to analyze the contribution of individual management components to the overall level of efficiency.

4. Results

4.1 Structural characteristics of management practices in general secondary education institutions under conditions of uncertainty

The results of the empirical study of management practices in secondary education institutions were obtained based on a questionnaire survey of managers. The analysis focuses on quantitatively recording management characteristics, without normative interpretations and without preliminary assessments of effectiveness. Appendix B contains a summary statistical table of the distribution of respondents' responses by key research variables. The sample includes 205 managers, among whom directors of educational institutions prevail with a share of 71.71%. The significant representation of managers with over 20 years of experience, which is 39.02%, forms the basis for analyzing management decisions in the long-term mode of functioning of the education system. The gender structure of the sample is characterized by a high share of women in management positions, which reaches 87.8%, which reflects the real personnel configuration of the educational sphere.

The assessment of the research results is carried out using nominal, ordinal and binary scales. Nominal scales were used to record positions, leadership models, management styles and types of management decisions. Ordinal scales were used to measure management experience, level of resource availability and condition of infrastructure elements. Binary scales were used to record the presence or absence of policies, practices and procedures related to security, inclusion and digital transformation [33].

Empirical analysis revealed a complex, multi-vector configuration of management decisions, styles and leadership orientations, which is formed under the influence of prolonged uncertainty. The results obtained do not demonstrate a unified or standardized management model. Instead, the coexistence of different approaches was revealed, which are combined depending on management experience, institutional constraints, the resource status of the institution and the intensity of external threats.

The actual distribution of management styles indicates the dominance of collegial and adaptive approaches, but without achieving absolute superiority of any of them. The data demonstrate an internal asymmetry of choices, which reflects not only individual management preferences, but also situational constraints within which heads of educational institutions operate. Table 1 shows the distribution of management styles by management experience groups.

Table 1. Distribution of management styles of heads of secondary education institutions depending on management experience, persons

Management experience	**Democratic**	**Situational**	**Transformational**	**Authoritarian**	**Liberal**
Up to 5 years	17	14	7	8	3
6–10 years	16	13	9	6	2
11–20 years old	22	12	11	4	1
Over 20 years	28	16	14	4	1

Source: built by the authors

The above distribution shows that with increasing managerial experience, the share of authoritarian decisions decreases and the frequency of using transformational approaches increases. At the same time, the situational style maintains a stable presence in all groups, which indicates a constant need for prompt adjustment of managerial actions. The liberal style remains marginal, which confirms its limited functionality in conditions of increased risk.

The second component of the empirical analysis was the actually implemented management decisions. The data do not form a symmetrical picture and demonstrate a significant differentiation between decisions at the operational and strategic levels. The highest concentration was received by actions aimed at immediate risk reduction and ensuring the continuity of the educational process. Table 2 shows the uneven nature of management responses, within which basic security decisions are implemented much more often than structural or regulatory changes.

Table 2. Actual managerial decisions of heads of general secondary education institutions in response to conditions of uncertainty, number of elections

Type of management decision	Up to 5 years	6–10 years	11–20 years	Over 20 years
Algorithms of actions during alarms	30	27	39	63
Psychological support	26	29	41	60
Communication with parents	28	26	34	55
Changing the training format	9	12	17	29
Updating internal documents	5	7	12	24

Source: built by the authors

The results obtained demonstrate a clear hierarchy of managerial actions. Decisions related to response algorithms and psychological support are universal in nature and almost do not depend on management experience. However, adaptation of the training format and revision of internal documentation demonstrate an increase in the frequency of implementation with increasing managerial experience. This indicates a higher complexity of such decisions and their dependence on the institutional maturity of the manager. The third block of empirical analysis concerns leadership models that managers consider effective in conditions of uncertainty. The results obtained demonstrate a clear shift from hierarchical models to forms of collective and adaptive interaction. Table 3 reflects the structure of the choice of leadership models and demonstrates the dominance of situational, distributed, and transformational leadership.

Table 3. Leadership models that educational leaders identify as effective in conditions of uncertainty, number of elections

Leadership model	Up to 5 years	6–10 years	11–20 years old	Over 20 years
Situational	26	24	35	50
Distributed	25	21	32	44
Transformational	24	22	33	45
Adaptive	19	17	25	34
Ethical	22	20	29	41
Service	13	12	15	23
Instructional	10	9	13	16
Authoritarian	6	5	6	7

Source: built by the authors

The structure of the table demonstrates the absence of a rigid dominance of one model. At the same time, a steady advantage of models focused on flexibility, division of responsibility and moral legitimacy of management decisions is recorded. Authoritarian and prescriptive models have a low frequency of choice in all groups, which indicates their limited relevance in situations where efficiency depends on trust and horizontal coordination. The uneven distributions and the absence of idealized symmetries confirm that management under uncertainty is formed as a process of constant balancing between stabilization and change.

4.2 Economic and mathematical model of integrated assessment of managerial efficiency under conditions of uncertainty

Quantitative analysis of management practices in secondary education institutions is carried out by formalizing empirical characteristics of management in the form of an integral mathematical model. This approach allows moving from a fragmentary description of management actions to a systematic measurement of their cumulative impact on the effectiveness of the institution's functioning under conditions of uncertainty. The key task of this stage of the study is to identify the internal structure of management effectiveness, as well as quantitatively distinguish the contribution of stylistic, operational and leadership components of management.

The model for assessing managerial effectiveness is based on the assumption that management effectiveness in crisis conditions cannot be adequately described by a single parameter. Managerial effectiveness is formed as an aggregate result of a combination of management style, a set of actually implemented management decisions and dominant leadership models. A vector of managerial characteristics is formed for each manager:

$$X_i = (S_i, D_i, L_i), \qquad (1)$$

where:

S_i – reflects the stylistic component;

D_i – intensity and complexity of management decisions;

L_i – leadership configuration.

The integral indicator of managerial efficiency is defined as a weighted linear combination of these components:

$$IE_i = w_S S_i + w_D D_i + w_L L_i, \quad (2)$$

where $w_S + w_D + w_L = 1$.

The choice of weighting coefficients is based on empirical observations and reflects the increased role of managerial decisions in crisis conditions. The model assumes $w_S = 0.3$, $w_D = 0.40$, $w_L = 0.30$.

The management style index S_i reflects the set of stylistic orientations that the manager actually applies in the management process. Given the possibility of combining styles, each style is considered as a binary variable. The index itself is defined as:

$$S_i = \sum_{k=1}^{K} \alpha_k s_{ik}, \quad (3)$$

where:

$s_{ik} = 1$ if the manager uses style k, and 0 otherwise:

α_k – weighting factor of style.

Before presenting the calculations, it is worth noting that the weights of the styles are not symmetrical. They reflect the different functional capabilities of the styles in a situation of uncertainty. Democratic, situational and transformational styles received higher weights due to their ability to ensure adaptability and staff involvement. Authoritarian and liberal styles have limited effectiveness and, accordingly, lower coefficients. Table 4 summarizes the parameters of the stylistic block of the model, including weights, frequency of application of styles, and their weighted contribution to the average index.

Table 4. Parameters of management styles and their contribution to the formation of the S_i index

Management style	Marking	Weight αk	Share of managers, %	Weighted contribution
Democratic	s1	0.30	54.6	0.164
Situational	s2	0.25	47.3	0.118
Transformational	s3	0.25	20.1	0.050
Authoritarian	s4	0.10	10.7	0.011
Liberal	s5	0.10	4.3	0.004

Source: built by the authors

The data presented demonstrate that the main contribution to the stylistic component of effectiveness is formed by the democratic and situational styles. The transformational style, although it has a high weight, is characterized by a lower frequency of application, which reduces its aggregated contribution. The average value of the management style index for the sample is: $\overline{S} = 0.347$, which indicates a moderate level of stylistic balance. The variance $S_i = 0.021$ indicates the presence of inter-individual differences, but without excessive polarization of management approaches.

The index of management decisions D_i is aimed at measuring actual management activity, taking into account the complexity of the implemented actions. Formally, it is defined as a normalized weighted sum:

$$D_i = \frac{1}{\sum_{j=1}^{J} \beta_i} \cdot \sum_{j=1}^{J} \beta_i d_{ij}, \qquad (4)$$

where:

$d_{ij} = 1$ if the manager implemented decision j, and 0 otherwise;

β_i – coefficient of managerial complexity.

The decision weights reflect varying levels of institutional and organizational complexity. Operational decisions receive lower weights, while structural changes are weighted higher due to the need for coordination, regulatory enforcement, and strategic planning. Table 5 integrates the composition and parameters of management decisions, as well as their contribution to the average index D_i.

Table 5. Coefficients of complexity of management decisions and intermediate indicators of the D_i index

Management decision	Marking	βj	Sales share, %	Weighted contribution
Response algorithms	d1	0.20	77.6	0.155
Psychological support	d2	0.20	76.1	0.152
Communication with parents	d3	0.15	70.7	0.106
Changing the training format	d4	0.25	35.1	0.088
Documentation update	d5	0.20	23.4	0.047

Source: built by the authors

Analysis of the table shows that although decisions to change the training format and update documentation have a lower frequency of implementation, their contribution to the index is significant due to higher complexity coefficients. The average value of the management decisions index is $\overline{D} = 0.548$The coefficient of variation $D_i = 0.31$ indicates a high heterogeneity of management practices. This means that it is the block of management decisions that forms the main field of variability of management efficiency (Figure 1).

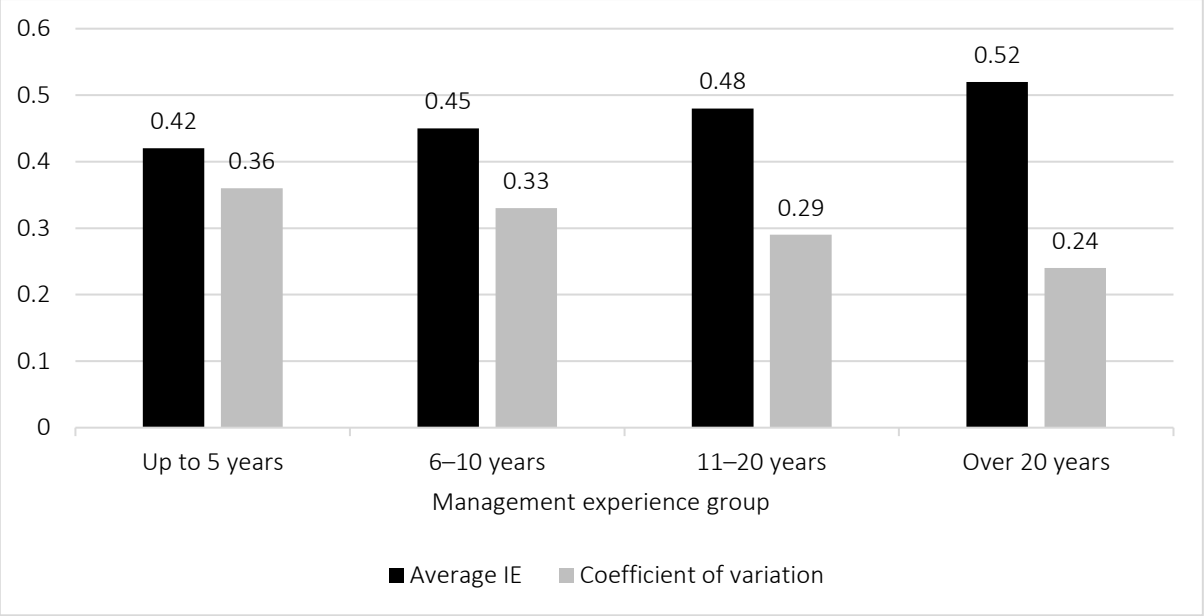

Fig. 1. Comparative structure partial indices management and integral indicator managerial efficiency in conditions uncertainties Source: built by the authors

The index of leadership models L_i reflects the prevailing approaches to organizing interaction in a team. Formally:

$$L_i = \sum_{m=1}^{M} \gamma_m l_{im}, \qquad (5)$$

where:

l_{im} – binary model selection variable;

γ_m is the efficiency coefficient.

The weights of the models reflect their ability to maintain collective coordination and trust. Table 6 summarizes the parameters of leadership bloc formation.

Table 6. Parameters of leadership models and their contribution to the L_i index

Leadership model	Marking	γ_m	Choice share, %	Weighted contribution
Distributed	l1	0.22	60.0	0.132
Situational	l2	0.22	54.2	0.119
Transformational	l3	0.20	53.7	0.107
Adaptive	l4	0.18	34.1	0.061
Ethical	l5	0.18	38.5	0.069

Source: built by the authors

The average value of L_i is $\overline{L} = 0.488$, which indicates a relatively high level of orientation towards collective and adaptive models. Substituting the average values of the components into the basic formula, we get:

$$IE = 0.30 \cdot 0.347 + 0.40 \cdot 0.548 + 0.30 \cdot 0.488 = 0.469.$$

The distribution *of* IE_i is asymmetric and concentrated in the middle range of values. Sensitivity analysis shows that the change in D_i has the greatest impact on the integral result, which confirms the determining role of actual management decisions in crisis conditions (Figure 2).

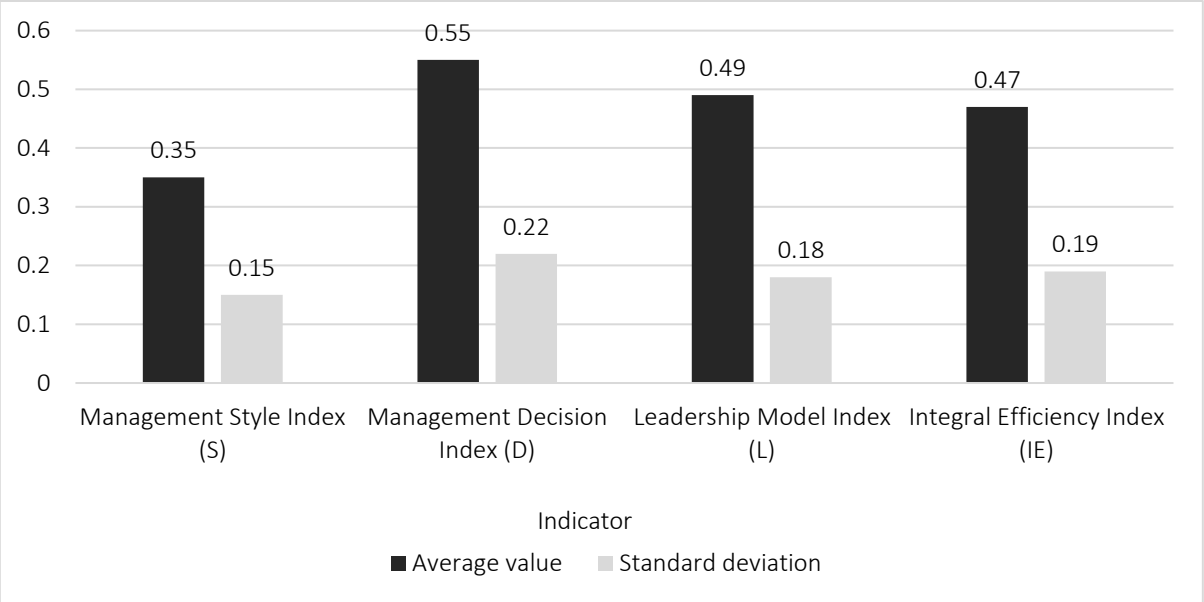

Fig. 2. Differentiation of the integral index of managerial efficiency and its variability depending from experience management leaders institutions general average education Source: built by the authors

The principle conclusion follows from the analysis of the average values of the model components and their weight coefficients. The obtained average value of the integral index of managerial efficiency $IE = 0.469$ characterizes management under uncertainty as being in the zone of average performance without achieving high optimal values. This indicates the presence of significant potential for increasing efficiency without a radical change in the institutional environment. It is advisable to introduce tools for self-diagnosis of managerial efficiency based on the integral index IE_i. Management policy in the field of education should focus on creating conditions for the implementation of complex managerial decisions, and not on regulating the management style. The model shows that without the appropriate space for managerial actions, high stylistic and leadership indicators are not transformed into high efficiency.

5. Discussion

The results of the survey allow us to draw a number of generalizations that have both practical and conceptual significance for understanding managerial dynamics in times of crisis and require further discussion and reflection.

First and foremost, the study confirmed the existence of stable managerial orientations among school principals, regardless of their professional experience, as supported by statistical analysis, which revealed no significant differences in key parameters – managerial style, implemented decisions, and leadership models. This demonstrates a certain consolidation within the management community around key values – safety, adaptability, trust, and partnership. Such orientations are a response to the multidimensional challenges of war and uncertainty, which are transforming the functional nature of managerial activity.

At the same time, the qualitative analysis of respondents' answers points to certain aspects: younger principals more often demonstrate innovativeness, openness to transformation, and communicative sensitivity, while experienced ones tend to show strategic thinking and a focus on strengthening the regulatory framework. This confirms the assumption that the complexity of managerial actions increases with experience [34, 35]. This differentiation of approaches, which does not evolve into polarization, may indicate the complementarity of different generations of principals in management.

In terms of managerial styles, democratic and situational approaches prevail, indicating a general acceptance of flexible, dialogic management as the standard. However, among managers with less experience, there is a small proportion of authoritarian styles, which is likely due to the desire for control in the absence of experience or structured delegation mechanisms.

The managerial competencies that received the highest support (flexibility, clear organization, emotional climate maintenance, transparent communication) have proven consistent regardless of experience, which suggests the formation of a new standard of professional identity for school principals in the context of war.

Notably, in the system of leadership model priorities, human-centered and partnership-oriented approaches dominate rather than authoritarian ones – distributed leadership (delegation of responsibility, team interaction), situational leadership (flexible response depending on circumstances), transformational leadership (motivation, vision, staff development), ethical leadership (moral responsibility, trust, honesty in decision-making), and adaptive leadership (the ability to lead in uncertainty, flexibility). Together, they form the profile of an educational leader under uncertainty, capable of operating in a context of rapid change, resource scarcity, and increased psychological pressure. These approaches – according to contemporary theories of educational leadership such as distributed leadership [36], adaptive leadership [28], and leadership for learning [37] – are considered the most effective in unstable environments.

It should be noted that distributed leadership is not interpreted as a delegation of formal authority, but as a rethinking of the essence of leadership as a collective practice. According to Harris [36], distributed leadership involves the active engagement of the teaching staff in decision-making processes, which contributes to increased responsibility, professional growth, and the strengthening of a culture of trust. The effectiveness of distributed leadership largely depends on the context and the existence of a shared vision for the development of the educational institution, as well as the leader's ability to support teachers' initiative and autonomy without compromising managerial

integrity. Thus, it is not an automatic delegation of authority, but a conscious creation of space for leadership actions at different levels. We can talk about the creation of a new educational community, which is referred to as an educational community – a large association of participants in the educational process and the public, whose activities are aimed not only at achieving positive educational results, but primarily at forming a team of like-minded people capable of making collegial and effective management decisions.

In situations of high turbulence and uncertainty caused by both external (military actions, humanitarian crises) and internal factors (educational reforms, staff turnover), the principals of Ukrainian educational institutions increasingly demonstrate traits of adaptive leadership. As noted by Heifetz al. [28], adaptive leadership lies in the ability to mobilize a community to rethink established approaches, confront complex challenges, and collectively seek new solutions when traditional instructions no longer work.

Unlike classical management, which relies on applying ready-made algorithms, adaptive leadership is focused on shared learning, reflection, and the development of resilience – all of which are critically important for school principals in the context of war. Adaptive leadership practices enable educational leaders to balance the stabilization of the system with the simultaneous implementation of changes that meet the evolving needs of educational stakeholders.

The concept of *Leadership for Learning,* proposed by MacBeath, emphasizes the integration of pedagogical and managerial dimensions in school leadership. Unlike traditional instructional leadership, this model involves reflective collaboration among principals, teachers, and students, contributing to the sustainable development of the educational environment. Effective leadership for learning, according to MacBeath, is based on five key principles: shared vision, dialogical engagement, accountability, transparency, and continuous professional development [37]. These ideas are particularly relevant in the context of educational transformation, where leadership decisions need to be not only reactive but also developmental.

This choice confirms that the challenges of uncertainty stimulate managerial renewal, promote the development of new leadership practices, and require a flexible, values-oriented approach to the management of educational institutions.

In a context of social tension and polarization, school principals are not only fulfilling an administrative but also an integrative mission aimed at maintaining community cohesion [38].

In the Ukrainian context, this paradigm shift is manifested in a combination of strategic thinking, psychological sensitivity, and value-based leadership that allows educational leaders to act as agents of social cohesion under conditions of uncertainty.

At the same time, the research results make it possible to identify the main characteristics of effective educational management practices in conditions of instability:

- sensitivity to the needs of participants in the educational process;
- speed, flexibility, and collegiality in decision-making;

- the presence of internal response algorithms;
- involvement of the community in management;
- developmental character of management strategies;
- delegation as a means of developing teachers' managerial competencies;
- access to resources and professional support for staff.

Such educational management practices make it possible not only to maintain the stability of the managed educational system (general secondary education institution) in conditions of uncertainty, but also to preserve the potential for growth despite existing constraints. Successful management practices occur where school principals combine regulatory clarity with openness to change, maintaining a balance between control, trust, and support.

Finally, the study results highlight the need for further strengthening of institutional support in the areas of inclusivity, digital security, and regulatory guidance. Uneven access to resources and the fragmented implementation of specific policies indicate a demand for systematic administrative support from public authorities and the development of peer learning and experience-sharing mechanisms among school principals.

Thus, the findings confirm that school principals are creating a new managerial culture based on flexible thinking, human-centered, ethical, and partnership-oriented leadership, and strategic responsiveness to uncertainty. This not only strengthens the resilience of separate institutions but also creates the prerequisites for a holistic modernization of educational management in Ukraine.

6. Conclusions

It was found that in the Ukrainian context, issues of safety have come to the forefront of managerial attention, particularly ensuring the psycho-emotional well-being and psychological support of all participants in the educational process.

It was clarified that, overall, regardless of work experience, the management community is dominated by the values of safety, adaptability, trust, and partnership, as well as the general acceptance of flexible, dialogical management as the standard, which indicates its unity in conditions of uncertainty. A slight differentiation of management approaches depending on experience was recorded: younger principals more often demonstrate innovativeness and communicative sensitivity, while experienced ones show strategic thinking and orientation toward regulatory stability. Such complementarity makes it possible to maintain a balance between innovation and stability, which is critically important in conditions of prolonged stress and instability. All respondent groups demonstrate a general orientation toward openness, inclusiveness, and strategic responsibility.

The profile of a modern educational leader has been outlined. Key characteristics include flexibility, the ability to lead in conditions of uncertainty, quick adaptability, flexible response depending on circumstances, clear organization of management processes, the ability to maintain a positive emotional climate within the team, motivation, vision, focus on staff development, delegation of responsibility, teamwork, moral responsibility, trust, and honesty in decision-making. The key

features of effective management practices have been summarized: sensitivity to the needs of participants in the educational process; speed, flexibility, and collegiality in decision-making; the presence of internal response algorithms; involvement of the community in management; delegation as a way of developing the managerial competencies of teaching staff; developmental character of managerial strategies; access to resources and professional support for personnel.

It has been identified that the priority leadership models in the field of education under conditions of uncertainty are distributed, situational, transformational, ethical, and adaptive leadership. These models enhance team collaboration and readiness for change. This allows us to talk about the formation of a new paradigm of educational management based on human-centeredness, partnership, and ethical responsibility.

Relevant directions for the further development of management practices in education under uncertainty have been identified, including: the need to strengthen institutional support for educational institutions in matters of inclusiveness, digital security, and regulatory guidance; the development of mechanisms for experience exchange among principals at different levels and types of educational institutions; and the promotion of the overall level of leadership culture among all members of the educational community.

The economic and mathematical model revealed typical sets of managerial characteristics that determine different levels of integral efficiency. The highest values *of* IE_i are achieved by managers with medium or high S_i, high D_i and medium or high L_i. The combination of high stylistic and leadership indices with low D_i does not provide high integral efficiency. These results indicate the secondary role of stylistic and leadership components compared to the operational management unit. Style and leadership form necessary, but insufficient conditions for efficiency. The intensity and complexity of managerial decisions constitute a sufficient condition.

The model results substantiate a number of proposals for increasing managerial efficiency in conditions of uncertainty. Advanced training programs for heads of educational institutions require a reorientation from theoretical models of leadership to the development of skills for implementing complex managerial decisions. The model demonstrates that increasing the D_i index provides the greatest increase in integral efficiency.

Author Contributions

Conceptualization, M.B. and L.K.; methodology, M.B.; software, V.B.; validation, L.K., V.B. and S.T.; formal analysis, L.K.; investigation, S.T.; resources, L.H.; data curation, S.T.; writing—original draft preparation, M.B.; writing—review and editing, V.B.; visualization, L.H.; supervision, M.B.; project administration, L.K.; funding acquisition, L.H. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Escotet, M. A. (1997). *Cultural & social foundations of education: An interdisciplinary approach*. Simon & Schuster. https://miguelescotet.com/portfolio-view/cultural-and-social-foundations-of-education-an-interdisciplinary-approach/

[2] Fernandez, A. A., & Shaw, G. P. (2020). Academic leadership in a time of crisis: The coronavirus and COVID-19. *Journal of Leadership Studies, 14*(1), 39–45. https://doi.org/10.1002/jls.21684

[3] Hrynevych, L. (2025). Emergency responses of the Ukrainian school education system on the Russian full-scale invasion. In M. Gutman (Ed.), *Challenges facing education leadership in the shadow of war: International and multicultural perspectives from zones of conflict* (pp. 64–74). Routledge. https://doi.org/10.4324/9781003571575-10

[4] Iliichuk, L. (2023). Ukrainian education in the conditions of war: New challenges, threats and vectors of changes in the context of ensuring the quality of education. *Mountain School of Ukrainian Carpaty, 28*, 16–21. https://doi.org/10.15330/msuc.2023.28.16-21

[5] Makedon, V., Budko, O., Salyga, K., Myachin, V., & Fisunenko, N. (2024). Improving strategic planning and ensuring the development of enterprises based on relational strategies. *Theoretical and Practical Research in Economic Fields, 15*(4), 798–811. https://doi.org/10.14505/tpref.v15.4(32).02

[6] Liashenko, O., & Nakonechna, O. (2024). Risks in the educational management of Ukraine during war and post-war development. *Empirio, 1*(1), 90–100. https://doi.org/10.18523/3041-1718.2024.1.90-100

[7] Bratko, M. V. (2016). Management of specialists' professional training in university college: Theoretical aspect. *ScienceRise: Pedagogical Education, 7*(3), 9–16. https://doi.org/10.15587/2519-4984.2016.74526

[8] Mescon, M. H., Albert, M., & Khedouri, F. (1988). *Management: Individual and organizational effectiveness* (3rd ed.). Harper & Row.

[9] Keravnos, N. (2022). School leadership in times of uncertainty: Hands-on trust! *Academy of Educational Leadership Journal, 26*(S4), 1–11. https://www.abacademies.org/articles/school-leadership-in-times-of-uncertainty-handson-trust-15252.html

[10] Dirks, K. T., & de Jong, B. (2022). Trust within the workplace: A review of two waves of research and a glimpse of the third. *Annual Review of Organizational Psychology and Organizational Behavior, 9*, 247–276. https://doi.org/10.1146/annurev-orgpsych-012420-083025

[11] Schechter, C., & Halevi, L. (2023). *Resilient leadership: School leaders thriving in adversity and crisis*. Emerald Group Publishing. https://doi.org/10.1108/9781837539086

[12] Best, J. (2008). Ambiguity, uncertainty, and risk: Rethinking indeterminacy. *International Political Sociology, 2*(4), 355–374. https://doi.org/10.1111/j.1749-5687.2008.00056.x

[13] Walker, W. E., Harremoës, P., Rotmans, J., van der Sluijs, J. P., van Asselt, M. B. A., Janssen, P., & Krayer von Krauss, M. P. (2003). Defining Uncertainty: A Conceptual Basis for Uncertainty Management in Model-Based Decision Support. *Integrated Assessment, 4*(1), 5–17. https://doi.org/10.1076/iaij.4.1.5.16466

[14] Stanford Encyclopedia of Philosophy. (2009). Ambiguity. https://plato.stanford.edu/entries/ambiguity/

[15] Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry, 137*(5), 535–544. https://doi.org/10.1176/ajp.137.5.535

[16] Borrell-Carrió, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine, 2*(6), 576–582. https://doi.org/10.1370/afm.245

[17] Bochner, S. (1982). The social psychology of cross-cultural relations. In S. Bochner (Ed.), *Cultures in contact: Studies in cross-cultural interaction* (pp. 5–44). Pergamon Press. https://doi.org/10.1016/B978-0-08-025805-8.50008-1

[18] Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Sage.

[19] Courtney, H., Kirkland, J., & Viguerie, P. (1997). Strategy under uncertainty. *Harvard Business Review, 75*(6), 67–79. https://hbr.org/1997/11/strategy-under-uncertainty

[20] Frenkel-Brunswik, E. (1949). Intolerance of ambiguity as an emotional and perceptual personality variable. *Journal of Personality, 18*, 108–143. https://doi.org/10.1111/j.1467-6494.1949.tb01236.x

[21] Carleton, R. N. (2012). The intolerance of uncertainty construct in the context of anxiety disorders: Theoretical and practical perspectives. *Expert Review of Neurotherapeutics, 12*(8), 937–947. https://doi.org/10.1586/ern.12.82

[22] Beck, A. T., Davis, D. D., & Freeman, A. (2024). *Cognitive psychotherapy of personality disorders (Teaching manual).* Naukovyi Svit.

[23] Beck, A. T., Freeman, A., & Davis, D. D. (2003). *Cognitive therapy of personality disorders* (2nd ed.). Guilford Press. https://books.google.com.ua/books/about/Cognitive_Therapy_of_Personality_Disorde.html?id=tNlM3Wdhy1YC&redir_esc=y

[24] Khoruzha, L. L. (2024). Ethics as an internal resource of personal and professional enrichment of the educator in the conditions of modern realities. *Pedagogical Sciences, 106*, 36–42. https://doi.org/10.32999/ksu2413-1865/2024-106-5

[25] Skokova, L. G. (2022). Systemic risks in an unstable society: Social and cultural-informational dimensions. *Visnyk of the National Academy of Sciences of Ukraine, 2*. https://doi.org/10.15407/visn2022.02.044

[26] Khilko, S. O. (2016). The essence and types of uncertainty situations in professional activity of psychologists. *Aktualni Problemy Psykholohii: Orhanizatsiina Psykholohiia. Ekonomichna Psykholohiia. Sotsialna Psykholohiia, 45*, 144–150. https://www.appsychology.org.ua/data/jrn/v1/i45/27.pdf

[27] Nzeka, N. P., & Kpee, G. G. (2023). Volatile and uncertain school environments management as a predictor of clientele continuous patronage of senior secondary schools in Rivers State. *International Journal of Innovative Education Research, 11*(4), 152–170. https://www.seahipublications.org/wp-content/uploads/2023/11/IJIER-D-15-2023.pdf

[28] Heifetz, R., Grashow, A., & Linsky, M. (2009). *The practice of adaptive leadership: Tools and tactics for changing your organization and the world*. Harvard Business Press.

[29] Greenleaf, R. K. (2002). *Servant leadership: A journey into the nature of legitimate power and greatness* (25th anniversary ed.). Paulist Press.

[30] Maak, T., & Pless, N. M. (2006). Responsible leadership in a stakeholder society: A relational perspective. *Journal of Business Ethics, 66*(1–2), 99–115. https://doi.org/10.1007/s10551-006-9047-z

[31] Bourke, J., & Dillon, B. (2018). The diversity and inclusion revolution: Eight powerful truths. *Deloitte Review, 22*, 82–95. https://www2.deloitte.com/content/dam/insights/us/articles/4209_Diversity-and-inclusion-revolution/DI_Diversity-and-inclusion-revolution.pdf

[32] Hamel, G., & Välikangas, L. (2003). The quest for resilience. *Harvard Business Review, 81*(9), 52–63. https://hbr.org/2003/09/the-quest-for-resilience

[33] Makedon, V., Myachin, V., Aloshyna, T., Cherniavska, I., & Karavan, N. (2025). Improving the readiness of enterprises to develop sustainable innovation strategies through fuzzy logic models. *Economic Studies (Ikonomicheski Izsledvania), 34*(5), 165–179. https://archive.econ-studies.iki.bas.bg/2025/2025_05/2025_05_09.pdf

[34] Bush, T., & Glover, D. (2014). School leadership models: What do we know? *School Leadership & Management, 34*(5), 553–571. https://doi.org/10.1080/13632434.2014.928680

[35] Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. *Educational Administration Quarterly, 52*(2), 221–258. https://doi.org/10.1177/0013161X15616863

[36] Harris, A. (2008). Distributed leadership: According to the evidence. *Journal of Educational Administration, 46*(2), 172–188. https://doi.org/10.1108/09578230810863253

[37] MacBeath, J. (2019). Leadership for learning. In T. Townsend (Ed.), *Instructional leadership and leadership for learning in schools* (pp. 49–73). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-23736-3_3

[38] Da'as, R. A., & Schechter, C. (2025). *Leadership for society: Leading education for social integration and mobility*. Bloomsbury Publishing. https://doi.org/10.5040/9781350337305