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Self-Efficacy and Innovation Leadership in the Wartime: Education Leaders of UkraineOlga Banit^{1,*}, Olena Bohdan², Mykhailo Sahaidak¹, Diana Sabol³, Olena Shkirenko⁴¹Department of Management, Kyiv National Economic University named after Vadym Hetman, 03057 Kyiv, Ukraine²Department of Psychology of Mass Communication and Media Education, Institute for Social and Political Psychology of the National Academy of Educational Sciences of Ukraine, 04070 Kyiv, Ukraine³Department of Educational Leadership, Institute of In-Service Training, Borys Grinchenko Kyiv Metropolitan University, 04053 Kyiv, Ukraine⁴Department of Language and Literature, Institute of In-Service Training, Borys Grinchenko Kyiv Metropolitan University, 04053 Kyiv, Ukraine*Correspondence: olgabanit@gmail.com (Olga Banit)

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Abstract

The aim of this study was to determine the level of self-efficacy and readiness to introduce innovations among secondary school leaders before and during the war, as well as to identify correlations between these factors. The following tools were used to collect and process statistical data: observations, survey and interview results, the “Self-Efficacy Scale” by Schwarzer, and the author’s questionnaire, created in accordance with Rogers’s theory of the “Diffusion of Innovations”. The interaction between the self-efficacy of secondary school leaders and their readiness to implement innovations during wartime was found to be complex and dynamic, and their mutual influence was confirmed using theoretical models and quantitative analysis methods. The results of the study in the context of the war showed that this was a new and challenging experience directly related to military issues, requiring educational managers to make managerial decisions under crisis conditions. The innovative readiness of educational leaders was associated not only with their self-efficacy but also with other psychological characteristics, such as personality traits, professional motivation, and the ability to lead in situations of increased risk and global uncertainty. Overall, the indicators demonstrated an inverted U-shaped pattern: growth was observed at the beginning of the war (autumn 2022) compared with the pre-war period in 2020, followed by a decline by the end of 2023. This situation is a prerequisite for the development of an effective crisis management program.

Keywords: educational leaders; self-efficacy; innovation; crisis management; war conditions**JEL:** O31, M12, H12, I28, O35**1. Introduction**

In recent years, the world has been experiencing a complex, turbulent, and unstable period: economic crises, political instability, pandemics, total uncertainty, constant stress, etc. In connection with the war that the Russian Federation started on the territory of Ukraine, the number of complex challenges for the Ukrainian people in general and for education in particular has significantly increased. Educational management has faced conflicts, among which the most acute and tangible are: large-scale destruction of educational infrastructure, lack of necessary documents, recommendations, training courses, and training for educational leaders and teachers on actions in wartime conditions, in addition to loss of administrative and educational control in territories that have fallen under temporary occupation or are in the zone of active military operations.

Migration processes associated with moving participants in the educational process within the country, lack of a strategy for compensating educational expenses of students due to interruptions in the educational process during military operations, and the need to conduct educational activities during air alarms and bombings are added to the con-

flicts mentioned. Ultimately, the constant presence of all participants in the educational process in a state of stress from the loss of property, housing, and the death of loved ones ([Koshelieva et al., 2023](#), p. 66; [MES of Ukraine, 2023](#), p. 5; [Voznyuk and Dobrohorskyi, 2022](#), p. 50).

At the same time, during harsh conditions of war in a difficult period, Ukrainian students have to receive the proper quality of education at the level of European and world educational standards. After all, education has been and remains the leading sector of society’s development and stability. This period has catalyzed long-awaited modernization changes in the Ukrainian education system, a stimulus that opens a window of new opportunities. In such realities and under such forced circumstances, there is a rapid change in the role of educational leaders. For them, it is now vital to adopt quick, non-standard and essentially innovative solutions to solve problems they have experienced or encountered ([Shkarlet, 2022](#)).

Previous systems and logical models have been destroyed, and educational leaders are now creating new supports and solutions for moving forward, gaining new experience, and forming new perspectives at all levels: personal, organizational, state, and global. The effectiveness



of solving these complex tasks depends primarily on the self-efficacy of the leader, particularly his personal qualities, attitude to leadership, and readiness to introduce innovations (Gyria, 2017, pp. 149–150; Plaiasu et al., 2020). The introduction of innovations also largely depends on the personal qualities of educational leaders, which help them effectively manage an educational institution in emergencies (Marshavin et al., 2023, p. 72). In the face of new challenges, war, overload, and exhaustion, all participants in the educational process need a new set of internal forces.

Innovations in the educational sphere should be considered as effective and productive innovations in the content, methods, means and forms of education and personal development, in the management of the education system, in the organization of the educational process, and in the structure of educational institutions (Shkarlet, 2022, p. 7). In particular, the following innovations can be distinguished: the search for new approaches to organizing education in wartime conditions (alarm signals, bombing, destruction of educational institutions and residential buildings, and arrangement of shelters), the transition to new forms of education (distance and hybrid), the introduction of effective pedagogical and information technologies taking into account the preservation of the life and health of participants in the educational process, and rapid decision-making in extreme conditions.

In view of this, the urgent task is to form an innovative type of educational leader who is able to realize the need for change from the system of personal values to the formation of new models of thinking and social behavior.

This study aims to identify the self-efficacy levels and readiness to implement innovations in educational leaders before war and during wartime and to reveal their correlations.

2. Literature Review and Hypothesis

2.1 Educational Leaders in Wartime

Modern research confirms that educational management is a natural result of the evolution of management that has occurred over the past century in the context of crises, military threats, and conflicts. Scholars have shown that this particular experience of extreme conditions has influenced educational management around the world, contributing to the personal growth of educational leaders, enhancing their self-efficacy, leadership development, and readiness to innovate in crisis, emergency, extreme, and uncertain conditions (Marshavin et al., 2023; Teufl, 2022).

Willink and Babin (2015), in their book “Extreme Ownership: How U.S. Navy SEALs Lead and Win”, argue that combat operations mirror ordinary life, only on a more intense scale. The book’s authors share their own experiences of managing a team and overcoming stressful situations and give examples of what civilian leaders can learn from the military and vice versa. The central leader-

ship principle—responsibility—is not limited to the battlefield. Responsibility is the main characteristic of any high-performance team in a state organization, sports, or business. In such a period, the correct and balanced response is the main task of every leader (Willink and Babin, 2015).

But due to extreme circumstances, leaders often become forced during crisis situations. The works of researchers studying crisis situations in schools are mainly caused by several external forces, such as terrorist attacks, school shootings, and natural disasters such as hurricanes, tornadoes, and forest fires acting on the school system (Grissom and Condon, 2021; Röhl et al., 2022). Researchers often cite the classification that includes five types of crisis situations in schools, presented by Smith and Riley (2012): short-term crises, cathartic crises, long-term crises, intermittent crises, and infectious crises. According to a broader definition, crises comprise five components: threat, uncertainty, urgency, multi-stakeholder impacts, and little or no warning (Reyes-Guerra et al., 2021). These classifications do not explicitly refer to a war-related crisis. However, this is precisely the experience that educational leaders in Ukraine are currently experiencing.

The works of Ukrainian scholars show how thousands of Ukrainians, regardless of their gender, age, political, religious, professional affiliation, or identification, are faced with forced leadership and extreme responsibility every day (Koshelieva et al., 2023; Reshmedilova, 2023; Sheremeta, 2023; Trenina, 2023; Voznyuk and Dobrohorskyi, 2022). These circumstances are common challenges for the country, forcing Ukrainians to increase their self-efficacy and become leaders. Every conscious Ukrainian is forced to take on additional responsibility and act accordingly. Educational leaders have changed their ties for comfortable clothes, left their offices, and work side by side with the school staff and the entire country to overcome difficulties, demonstrating self-efficacy in making innovative decisions in real time (Poliak, 2022).

The essence of the concept of “extreme leadership” was presented by the founder of the Institute for New Leaders at Rice University, Kolditz (2010), in his concept of leadership behavior during danger and stress. It is based on five fundamental principles and characteristics for extreme leadership. According to Kolditz, leaders must have these unique features that are important during dangerous crisis periods: be confident, calm, modest, focus primarily on external tasks, on solving critically important issues, share risks, and experience them together with their team, demonstrate humanity and closeness to the team, build trust based on competence and dedication (Kolditz, 2010).

As challenges become increasingly complex, educational leaders are expected to be able to cope with this complexity and achieve results despite uncertainty, ambiguity, and fluidity of conditions. Practice shows that solving complex problems in administrative, economic, educational, and other spheres is not just a skill of Ukrainian ed-

educational leaders but is a way of life that demonstrates their self-efficacy.

2.2 Concept of Self-Efficacy

Self-efficacy as a concept is the subject of research by many modern scientists: Versland (2016); Röhl et al. (2022); Marsh et al. (2023); Luo et al. (2024); Syvertsen et al. (2025), etc. An analysis of these scientific works shows that most authors rely on the social cognitive theory of action of Bandura (1986). This theory is based on two principles: self-regulation and self-reflection. Bandura found that when people control or regulate their own behavior, they also reflect on their thoughts and actions. Through self-reflection, people analyze past events and determine future actions, acting based on their beliefs about what they can do and the outcomes of their actions.

According to Bandura, there are four directions of self-efficacy development: (1) the experience of one's own mastery, (2) the experience of others, (3) social persuasion (feedback), and (4) physiological and emotional state (Bandura, 1977, p. 195). Each direction is directly or indirectly developed in modern scientists' research. Various international studies of school leadership emphasize the unique role of both one's own professional experience and learning from the experience of others (Gümüş and Bellibaş, 2020; Syvertsen et al., 2025; Yada and Savolainen, 2023). The authors confirm that experience is a key factor in the formation of self-efficacy of educational leaders. Leaders with extensive experience are likely to demonstrate confidence in solving various situations. This confidence stems from their successful experience in overcoming educational problems in the past.

The results of studies by scholars such as Luo et al. (2024), Marsh et al. (2023), Röhl et al. (2022), and Versland (2016) demonstrate the value of social persuasion in developing the self-efficacy of educational leaders. This positive reinforcement confirms the crucial influence of self-efficacy in promoting educational innovations and reforms. The studies of the scholars above-mentioned indicate that educational leaders with high self-efficacy are more likely to set challenging goals, show perseverance in the face of difficulties, and, ultimately, implement innovative strategies to manage an educational institution effectively. Because of this, Bandura defines self-efficacy as a belief/judgment or degree of belief in people's ability to mobilize cognitive resources to adequately perform actions to achieve set goals, function, and be productive successfully (Bandura, 1977).

In research on educational leaders, scientists understand Bandura's concept as a productive process of integrating cognitive, social, and behavioral components to choose optimal strategies in various situations (Syvertsen et al., 2025). The self-efficacy of educational leaders is developed by the need to make informed management decisions and actions in educational institutions that align with today's re-

alities. The main signs of self-efficacy are the readiness to introduce innovations, the ability to see something new in the existing environment, the ability to offer a fundamentally new solution to the problem, and the ability to cope with new or complex situations based on one's own competence (Schwarzer and Warner, 2013). These and several other signs became the basis for the self-efficacy measurement scale proposed by Schwarzer and Jerusalem (2010). This methodology is key in our study. The self-efficacy of educational leaders depends heavily on their attitude towards innovation, which determines the level of innovative thinking.

2.3 The Theory of "Diffusion of Innovations" by Rogers

In the process of innovation perception, Rogers distinguishes five categories of innovation consumers:

- (1) innovators are the first to adopt innovations;
- (2) early adopters;
- (3) early majority;
- (4) late majority;

(5) laggards—they adhere to traditional views and do not accept changes (Rogers, 2003, pp. 282–284).

These five categories of innovation consumers (adopter categories) are distributed according to Rogers in a certain percentage ratio: innovators—2.50%, early adopters—13.50%, early and late majority—34.00% each, and laggards—16.00% (Fig. 1).

This diffusion curve shows how consumers gradually perceive innovations, illustrating the progress of technological innovations from development to adoption and implementation. The author's methodology was developed based on this theory, and the quantitative and qualitative results are presented.

2.4 Innovation Theory

Innovation Theory expands and complements our research. This theory's basis is the diffusion of innovation concept by Rogers (2003). In the book "Diffusion of Innovations" the fifth edition published in 2003, Rogers notes that: innovation is an idea, practice, or object that is perceived as new by a person or other unit of adoption; diffusion is the process by which an innovation is transmitted through specific channels over time between members of a social system; diffusion of innovation is the spread of an innovation that has already been mastered and implemented in new conditions (Rogers, 2003; Rogers et al., 2019, p. 418). The diffusion speed of innovations determines the level of development of innovative thinking—this is the degree to which a person accepts new ideas earlier than other system members (Rogers, 2003).

As psychologists note and life practice confirms, during war, stress, and overload, several tasks arise—to learn to stabilize one's psycho-emotional state, expand one's vision of the present, and develop a willingness to make difficult decisions and implement innovations. Empirical re-

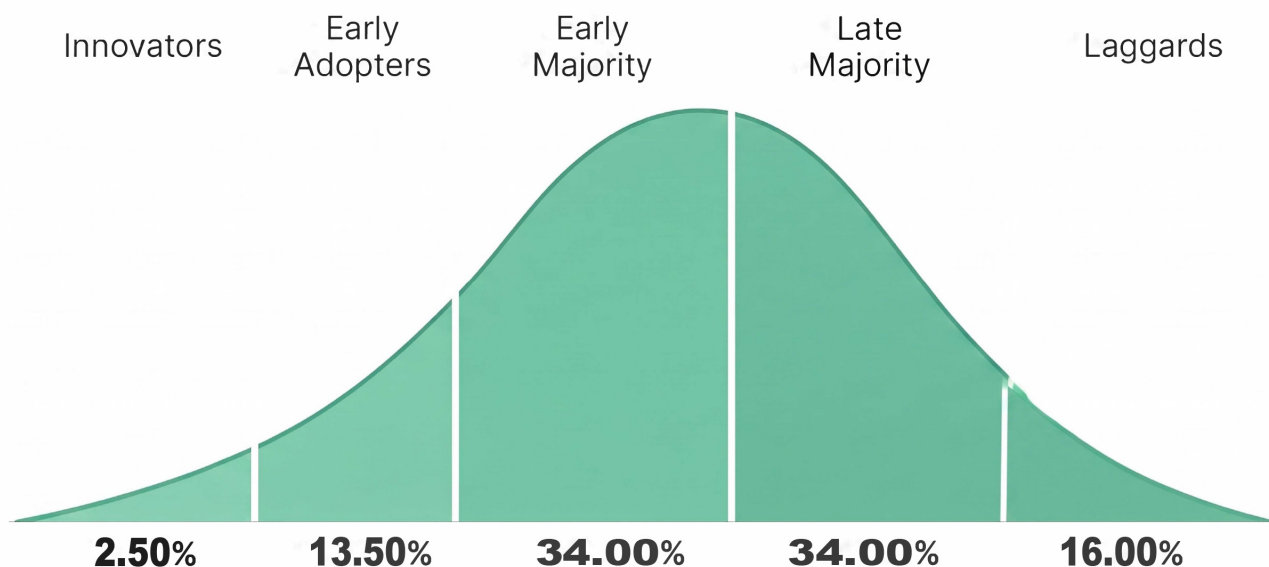


Fig. 1. Percentage distribution of innovation consumers (adopter categories) (Rogers, 2003).

search demonstrates that these skills are not innate; they develop over time as a leader comprehends power and authority, learns to see different perspectives, develops relationships, and distinguishes “shades where there used to be only black and white...” (Trenina, 2023, p. 59). That is why serious attention is paid to the skills of presence, attentiveness, emotional maturity, and cooperation when talking about innovative leadership—in essence, the importance of conscious, adult, mature leadership, which requires innovative thinking.

In war conditions, the transition from reactive to mature leadership is based on meaning, mindfulness, development, and collaboration. Therefore, it is important for educational leaders to be attentive to people’s challenges. At a critical level of thinking, an educational leader needs to see the big picture, be able to support themselves and others and shape solutions for the future (Sheremeta, 2023).

Modern Ukrainian researchers identify the following main behavioral indicators of readiness to implement innovations in war conditions: creating conditions for generating new ideas, making non-standard decisions in problem situations, searching for new alternative approaches to work, optimizing the workflow, experimenting, strategic thinking, adapting to changes, being interested in trends in the development of one’s professional field, and using the innovative experience of others (Reshmedilova, 2023; Berezova, 2021).

They echo the analysis above self-efficacy and diffusion of innovations theories. Recognizing the multidimensional influence of cognitive, emotional, and social factors and integrating these theoretical perspectives, it is possible to understand the complexity of the relationship in greater depth between educational leaders’ self-efficacy and willingness to innovate during wartime on this model (Fig. 2):

2.5 The Study Hypothesizes

The study puts forward a number of hypotheses:

H1. Leaders with high self-efficacy are better prepared to introduce innovations in their educational institutions in wartime.

H2. The level of self-efficacy and readiness to introduce innovations should increase with age and their managerial and pedagogical experience.

H3. The impact of self-efficacy and readiness to introduce innovations among educational leaders may differ significantly (increase/decrease) between peacetime and wartime.

H4. The self-efficacy of educational leaders and their willingness to implement innovations steadily increases during the war compared to the pre-war period.

3. Methodology

To test the above hypotheses, an empirical study was conducted in 2020, 2022, and 2023. In 2023, the survey covered 304 educational leaders (school principals and their deputies) from 120 secondary schools in Kyiv and the Kyiv region. The following tools were used to collect and process statistical data: survey (n = 304) and interview results (n = 126). The questionnaire was developed using the “Self-Efficacy Scale” methodology by Schwarzer and Jerusalem (2010), the author’s “Diffusion of Innovations” methodology that was created according to the theory of Rogers (2003), and a follow-up survey of respondents regarding their attitude towards innovations on a 5-point scale. SPSS 27 (IBM Corp., Armonk, NY, USA) was used to process the data using Pearson’s correlation coefficients (Pearson’s r). The results of the research were verified by our own observations during meetings in 62 secondary schools where the

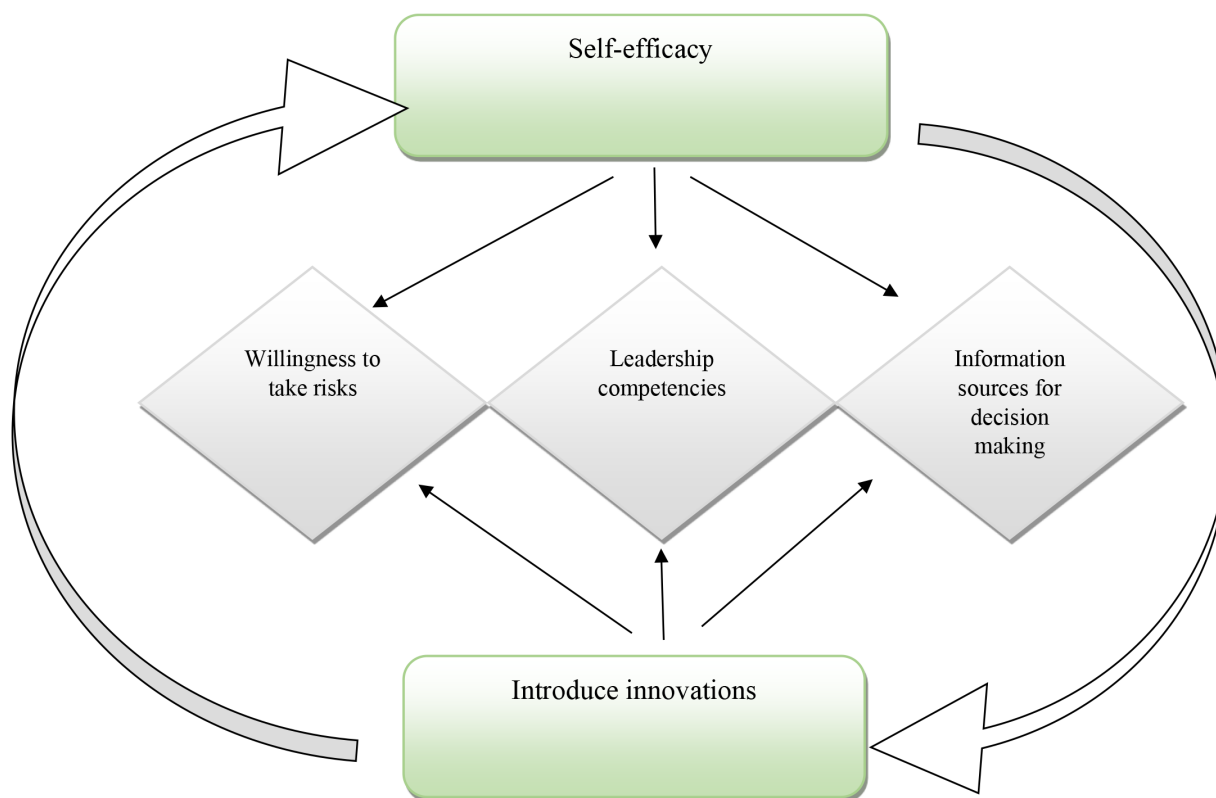


Fig. 2. Conceptual model of the relationship between educational leaders' self-efficacy and willingness to innovate during wartime.

authors interviewed secondary school principals and their deputies.

Methodology "Self-Efficacy Scale" Schwarzer, Jerusalem

The methodology is used to study self-efficacy. It is a person's confidence (beliefs) in their potential ability to organize and conduct their own activities necessary to achieve a particular goal. The self-efficacy scale consists of 10 statements that the respondent is asked to correlate with the effectiveness of their activities (10 statements are presented in Table 1 in the following subsection, "Research results"). Each respondent chooses one of 4 scores for each statement: absolutely false, somewhat false, rather true, absolutely true, which correlates with the number of points. The respondent's choice of the answer "absolutely false" gets 1 point, "rather false" gets 2 points, "rather true" gets 3 points, and "absolutely true" gets 4 points. The final result is calculated by adding up the scores for all 10 statements. The results obtained are interpreted as follows: 36–40 points mean high self-efficacy, 30–35 points mean above average self-efficacy, 25–29 points mean average self-efficacy, 20–24 points mean below average self-efficacy, and 19 or fewer points mean low self-efficacy (Schwarzer and Jerusalem, 2010).

The questions were included to the questionnaire focused on three components of managerial activity: willingness to take risks, the leadership position of the manager, and personal preferences regarding the use of information sources while making decisions. Each of the above components is divided into five possible strategies depending on Rogers' classification, from innovation strategies, which imply primacy in implementing innovations, to conservative strategies of traditional approaches in managing an educational institution. Depending on the selected answer options, respondents can be more or less likely to be attributed to a specific category of innovation consumers according to Rogers's theory: innovators, pioneers, or early adopters, early majority, late majority, conservatives, or laggards (Rogers, 2003) by the comprehensive indicator of innovation readiness.

4. Results

4.1 Descriptive and Correlative Analysis

The empirical data from the conducted research in wartime (2023), systematically described in tables and visualized in figures and diagrams, served as a reliable basis for descriptive and correlative analysis. Let us begin this analysis by presenting the quantitative results of the "Self-Efficacy Scale" methodology (Table 1) and their interpretation.

Table 1. Distribution of educational leaders' responses to questions of the methodology "Self-Efficacy Scale" in 2023.

Nº	Assertion	Absolutely wrong	Probably wrong	Rather true	Absolutely true
1	If I try my best, I will always find a solution to even complex problems	0	1.0	19.2	79.8
2	If something stops me, I still find ways to achieve my goal	0	1.4	37.0	61.5
3	It is quite easy for me to achieve my goals	0.5	18.3	66.8	14.4
4	In unexpected situations, I always know how to behave	0.5	19.7	66.8	13.0
5	I believe I can handle unexpected challenges	0	7.2	51.0	41.8
6	If I put in enough effort, I can handle most problems	0	1.9	28.8	69.2
7	I am ready for any difficulties because I rely on my own abilities	0	7.7	45.7	46.6
8	If I have a problem, I usually find several solutions	0.5	6.7	45.2	47.6
9	I can come up with something even in a seemingly hopeless situation	0	9.6	54.8	35.6
10	I am usually able to keep the situation under control	0	2.9	58.2	38.9
	Average value	0.1	7.9	48.0	44.0

Note: n = 304. Data are presented as percentages (%).

4.2 Interpretation of the Results

As demonstrated in Table 1, "Rather true" and "Absolutely true" constitute most of the responses in percent. In general, we can state that 92% of educational leaders (the sum of the average values of the answers of the "Rather true" (48.0%) and "Absolutely true" (44.0%) categories) show a sufficient and high level of self-efficacy according to the arithmetic mean of these 10 statements.

At the same time, an analysis of the questions reveals that educational institution leaders primarily rely on high motivation for professional activity and personal perseverance in wartime (points 1, 2, 6), while simultaneously feeling less confident in unconventional situations and those involving elevated risks (points 4, 9). This aligns with the results of previous studies, which identified a lack of adaptability in non-standard situations, a reluctance to make bold decisions involving risk, and a low level of tolerance for uncertainty among leaders (Lynov et al., 2022; Lynov et al., 2023).

In-depth interviews and observations showed that the self-efficacy indicators of educational leaders are overestimated in wartime due to (a) the social desirability and subjectivity of the answers provided and (b) the situation of high turbulence and uncertainty in Ukraine, which also covers the education system.

It was important for our study to find out how the self-efficacy of educational leaders is related to their attitude toward innovations in wartime. To accomplish this, respondents were asked to record their personal attitude towards innovations in education on a 5-point scale, where 1 is a "Extremely negative attitude", 2 is "Rather negative", 3 is "Rather positive", 4 is "Positive", and 5 is "Extremely positive". Table 2 presents the distribution of respondents regarding different attitudes towards innovation processes in the educational sector. It shows the relationship of such attitudes with educational leaders' self-assessment of their self-efficacy (Table 2).

Table 2 demonstrates that most educational leaders position themselves as supporters of innovative changes. No

one noted an extremely negative attitude; only 2 respondents recorded their attitude towards innovations as more negative than positive. Most respondents noted their own attitude towards innovations as positive. At the same time, a more positive attitude of educational leaders toward innovations is accompanied by an increase in the effectiveness of self-assessment.

To verify this trend, we conducted a correlation analysis of the complex indicator of readiness for innovation obtained by using the author's methodology that was created based on Rogers' theory of "Diffusion of Innovations" and the average indicators of the self-efficacy scale of respondents already mentioned. There was a direct correlation between these two variables, where the r-value of the Pearson coefficient is $r = 0.329^{**}$ (significance at the 0.01 level).

To visualize this trend, we reflected the interaction of the complex indicator of innovation readiness of educational leaders with the five levels of self-efficacy they identified. The complex indicator of innovation readiness, according to the author's methodology, based on the theory of Rogers, "Diffusion of Innovations", has a distribution from low to high levels of readiness on a 5-point scale (where 1 is low, 5 is high) with indicators of their self-assessment of their own self-efficacy. The respondents' self-efficacy scores for data structuring were also divided into 5 levels according to the z-values of the normal distribution, where the low level contains indicators less than 21 points, the level below the average 22–24 points, the average 25–29 points; above the average 30–35 points, and high 36–40 points. This relationship is demonstrated in Table 3.

Table 3 demonstrates that most of the respondents position themselves as having above-average and high levels of self-efficacy (161 and 108 respondents).

The graphically revealed relationship between levels of self-efficacy and the complex indicator of readiness for innovation is shown in Fig. 3.

Therefore, educational leaders often position themselves as the most effective leaders interested in innova-

Table 2. Relationship between the scale of educational leaders' attitudes towards innovation and the average self-efficacy indicators of respondents in 2023.

Attitude towards innovation	Average	n	Standard deviation
Extremely negative	-	0	-
Rather negative	35.00	2	4.24
Rather positive	30.67	27	3.60
Positive	33.79	251	3.53
Extremely positive	36.79	24	2.12

Note: n = 304. Scale scores range from 10 to 40 (min = 10, max = 40).

Table 3. Relationship between the comprehensive indicator of readiness for innovation and levels of self-efficacy of educational leaders in 2023.

Levels of the self-efficacy scale	Readiness for innovation	n	Average deviation
Low	-	0	-
Below average	3.20	5	0.183
Average	3.43	30	0.464
Above average	3.57	161	0.462
High	3.74	108	0.535

Note: n = 304. Scale scores range from 1 to 5 (min = 1, max = 5).

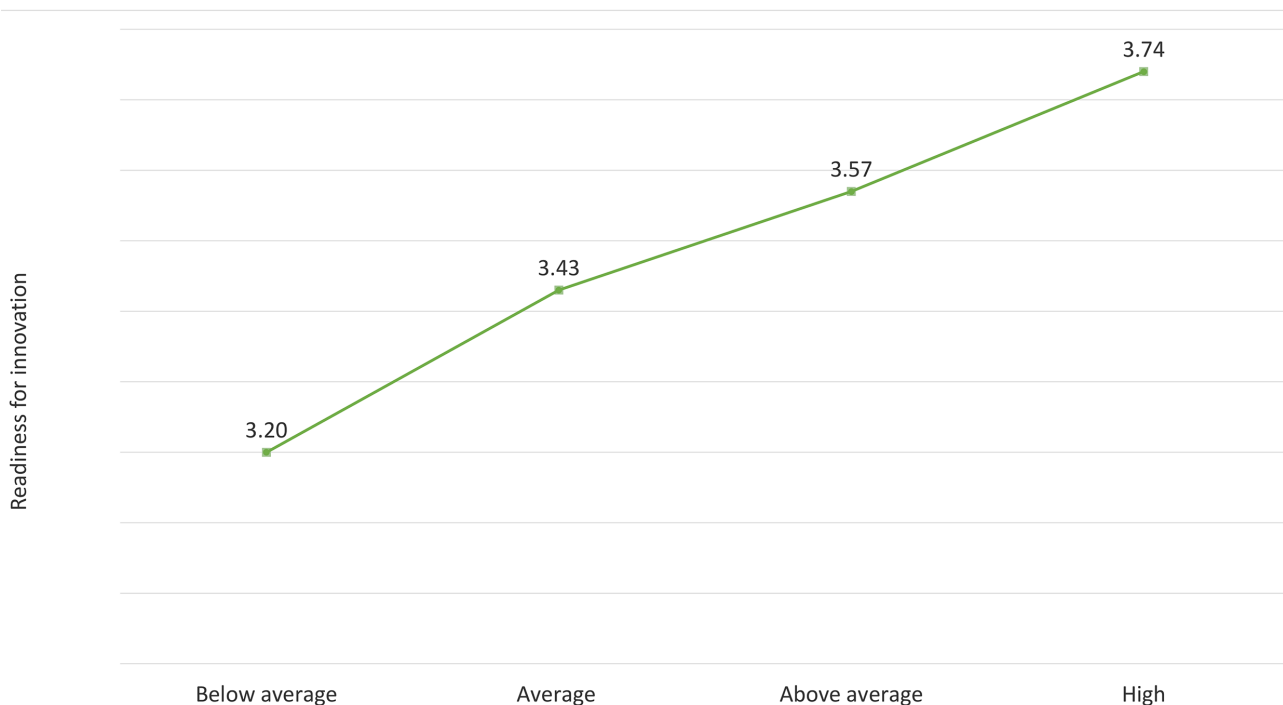


Fig. 3. Relationship between levels of self-efficacy and readiness for innovation.

tions, and the relationship is directly correlated with a significance level of 0.01.

To study the readiness of educational leaders to innovate based on their subjective assessment of self-efficacy in more detail, we conducted a clarifying study using the author's methodology, built on the theory of "Diffusion of Innovations" by Rogers.

According to the description of Rogers' five categories of innovation consumers, we have selected five options for educational leaders' responses to innovations ac-

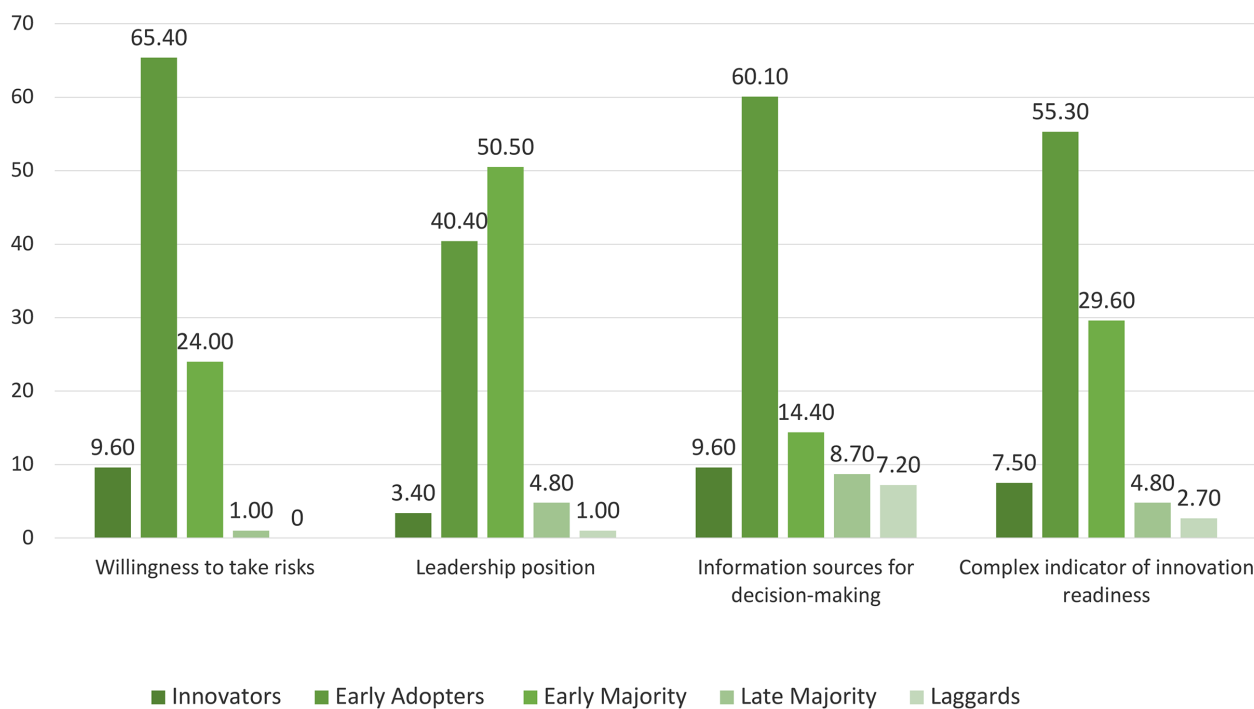
cording to the following key parameters: (1) leadership, (2) willingness to take risks, and (3) use of information sources. According to Rogers' theory, people who truly support innovative changes have developed leadership qualities, are willing to take risks, and rely more on their own information decisions than on the advice of the "expert environment".

To consider the above parameters and the possibilities of dividing the sample into a certain category of innovation consumers, respondents were asked three questions (one question for each parameter) with five answer options,

Table 4. Results of sample distribution regarding attitudes toward innovation in 2023.

Types of innovation consumers	Distribution according to Rogers' theory	Complex indicator of innovation	Willingness to take risks	Leadership position	Information sources
Innovators	2.5	7.5	9.6	3.4	9.6
Early adopters	13.5	55.3	65.4	40.4	60.1
Early majority	34	29.6	24	50.5	14.4
Late majority	34	4.8	1	4.8	8.7
Laggards	16	2.7	0	1	7.2

Note: n = 304. Values represent percentages of total responses (%).

**Fig. 4. Distribution of respondents (%) into types of innovation consumers according to Rogers' parameters.**

where each option corresponded to a particular category of innovation consumers. The generalized distribution according to the five categories is presented in Table 4, where the first column demonstrates the distribution according to different categories of innovation consumers according to the theory of Rogers, the second column shows the distribution obtained by us according to our sample, and the third to fifth columns show the distribution according to individual parameters—leadership, willingness to take risks and use of information sources.

For visualization, we offer diagrams of the percentage distribution of respondents according to the five types of innovation consumers according to Rogers and the parameters “Willingness to take risks”, “Leadership position”, “Information sources for decision-making”, and “Complex indicator of innovation readiness” (Fig. 4).

In Fig. 4 the distribution according to the parameter “Leadership position” is closest to the curve of the normal distribution of the sample, which was observed in Rogers’

studies (Fig. 1). Other parameters: “Willingness to take risks” and “Information sources for decision-making” tend to the pole of a high degree of innovation readiness, where “Early adopters” are represented to the greatest extent.

Summing up the results, we note that the studied sample has higher indicators for the categories of “Early adopters” and “Early majority” compared to the theoretical distribution of Rogers (Table 4). The most significant gap is seen in the parameter “Willingness to take risks”. Whether this is due to the subjective self-assessment of the respondent’s own settings or is given today’s Ukrainian realities in wartime, this issue requires in-depth study and rethinking. Such quality is a prerequisite for effective anti-crisis management by current educational leaders. Also, the “Early adopters” indicator for the parameter “Information sources for decision-making” significantly exceeds the average statistical values. This may indicate that educational leaders cannot rely on the previous experience of experts or trusted persons but must independently select the necessary infor-

mation from the available information field to them. It is arguable that in wartime conditions, Ukrainian educational leaders gain invaluable experience in crisis and flexible, adaptive, and proactive management of human and technological resources.

The diagram (Fig. 4) demonstrates that according to the parameter “Willingness to take risks”, most respondents (65.4%) consider themselves early adopters, and another quarter of respondents (24%) consider themselves an early majority. This has innovative potential because the indicators significantly exceed the distribution in groups according to the theory of Rogers. Regarding the awareness of one’s leadership role in promoting “Innovations”, the mentioned categories of “Early adopters” (40.4%) and “Early majority” (50.5%) are the dominant groups of the sample. As for the parameter “Information sources for decision-making”, the two mentioned groups are also represented by high percentages: 60.1% of “Early adopters” and 14.4% of the “Early majority”.

To find out in more detail the attitude of educational leaders to innovations in wartime, an analysis was conducted according to various parameters—managerial experience and functional position (head or deputy). We took either a comprehensive indicator of attitude to innovations (average value for all three parameters) or individual parameters: “Willingness to take risks”, “Leadership position”, “Information sources for decision-making”, if the dynamics were interesting. A direct correlation was found between the self-efficacy indicator of managers and their willingness to take risks ($r = 0.267$, significance level less than 0.01) and self-efficacy and leadership position ($r = 0.335$, significance level less than 0.01). Regarding the indicator “Information sources for decision-making”, its relationship with self-efficacy is not statistically significant.

Similarly, there were no statistically significant interactions of the components “Willingness to take risks”, “Leadership position”, “Information sources for decision-making” with the parameters of age and experience in teaching (“Pedagogical experience”) and management (“Management experience”) activities. However, individual graphs demonstrate the trend of such relationships, so we consider it appropriate to familiarize ourselves with them.

Leadership as a prerequisite for innovative changes has the highest indicator among respondents aged 30 to 40 (Fig. 5).

The “Willingness to take risks” increases sharply from 30 to 40 years and remains almost unchanged (Fig. 6).

On the contrary, the willingness to actively use comprehensive information sources drops sharply from 30 to 50 years (Fig. 7).

At the same time, the ability to use information sources for decision-making increases in parallel with the growth of managerial experience at the early stages of activity (up to 5 years) and already at the final stages of activity,

over 40 years of managerial experience (Fig. 8). Throughout the rest of the period, this indicator remains almost unchanged.

To understand and explain this dynamic, we divided the administrative staff sample by the work position parameter: manager or deputy. The results are contradictory and ambiguous. They set us up for additional reflection.

If managers prevail in the parameter “Willingness to take risks” (Fig. 9), then their deputies prevail in the indicator “Information sources for decision-making”.

We can assume that deputies actively collect information on possible innovations. The final decision on implementation, and therefore the associated risks, lies with the immediate managers. Therefore, the attitude toward innovations among the management team also depends to a greater extent on their position: managerial or dependent (deputies) than on other indicators, such as age or experience, pedagogical and managerial.

Since the study spanned 2020, 2022, and 2023, we can track the interaction of self-efficacy indicators and readiness for innovations of educational leaders during these years (Table 5).

Table 5 demonstrates the dynamics of the “Willingness to take risk” indicators: 3.84 (2020) → 3.86 (2022) → 3.67 (2023). The “Leadership position” indicator has similar dynamics: 3.40 (2020) → 3.49 (2022) → 3.30 (2023). In particular, risk propensity decreased by 0.19 points, and leadership position fell by 0.19 points. Self-rated self-efficacy of educational leaders increased significantly with the outbreak of the war and then fell even below the pre-war level: 33.69 (2020) → 34.12 (2022) → 33.67 (2023).

This indicates a potential nonlinear relationship between the variables and time. The indicator of “Information sources for decision-making”, reflecting the willingness to make innovative decisions independently, increased compared to the pre-war period from 3.56 in 2020 to 3.84 in 2022 and slightly decreased to 3.78 in 2023, maintaining a higher level compared to the pre-war period. Subjectively, this can be explained by the increased internal concentration of educational leaders at the beginning of the full-scale war and the gradual fatigue from military actions and their consequences. Objectively, these findings indicate that educational leaders cannot rely solely on experience or prior knowledge of experts/trusted advisors but must independently obtain the necessary information from an accessible source to solve current problems. At the same time, low tolerance levels for uncertainty, adaptability, courage, and optimism were identified. This trend was observed both before the full-scale invasion (2020–2021) and after it (2022–2023) (Lynov et al., 2022; Lynov et al., 2023).

5. Discussion

In the context of our study, the innovative thinking of educational leaders and their readiness to implement innovations acquire particular importance because the system

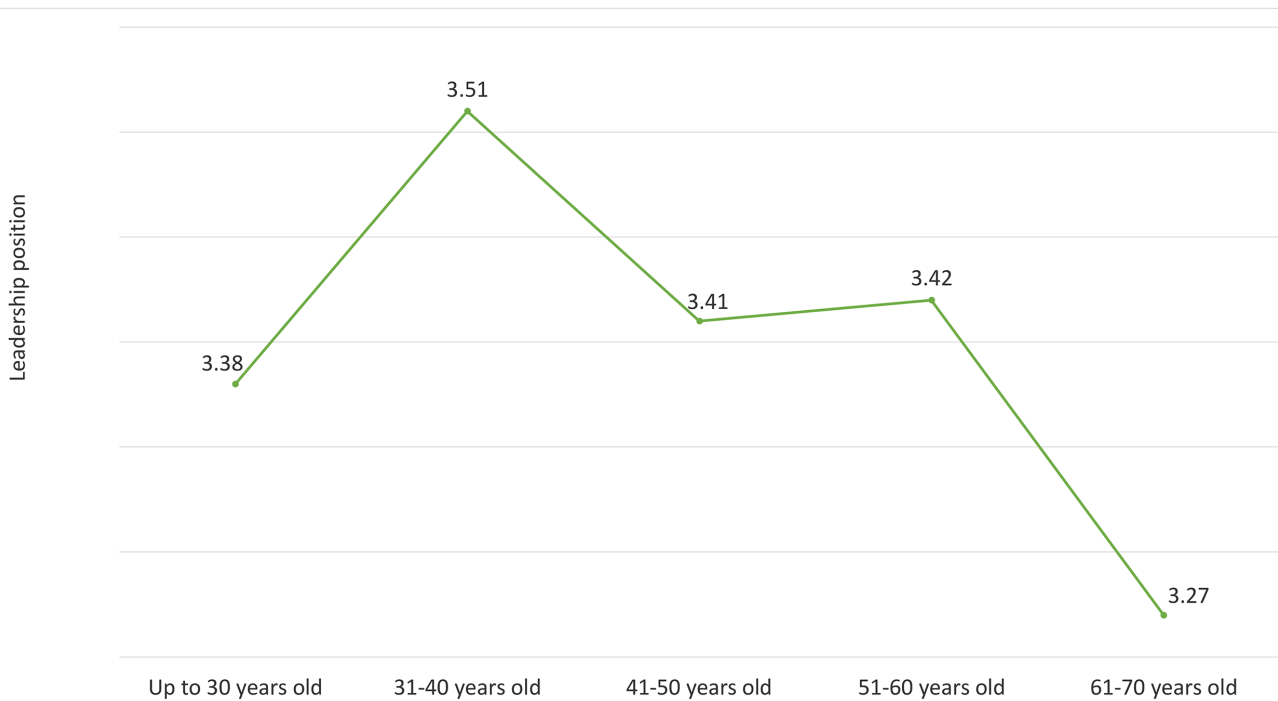


Fig. 5. Relationship between the component “Leadership position” (min – 1, max – 5) and “Age”.

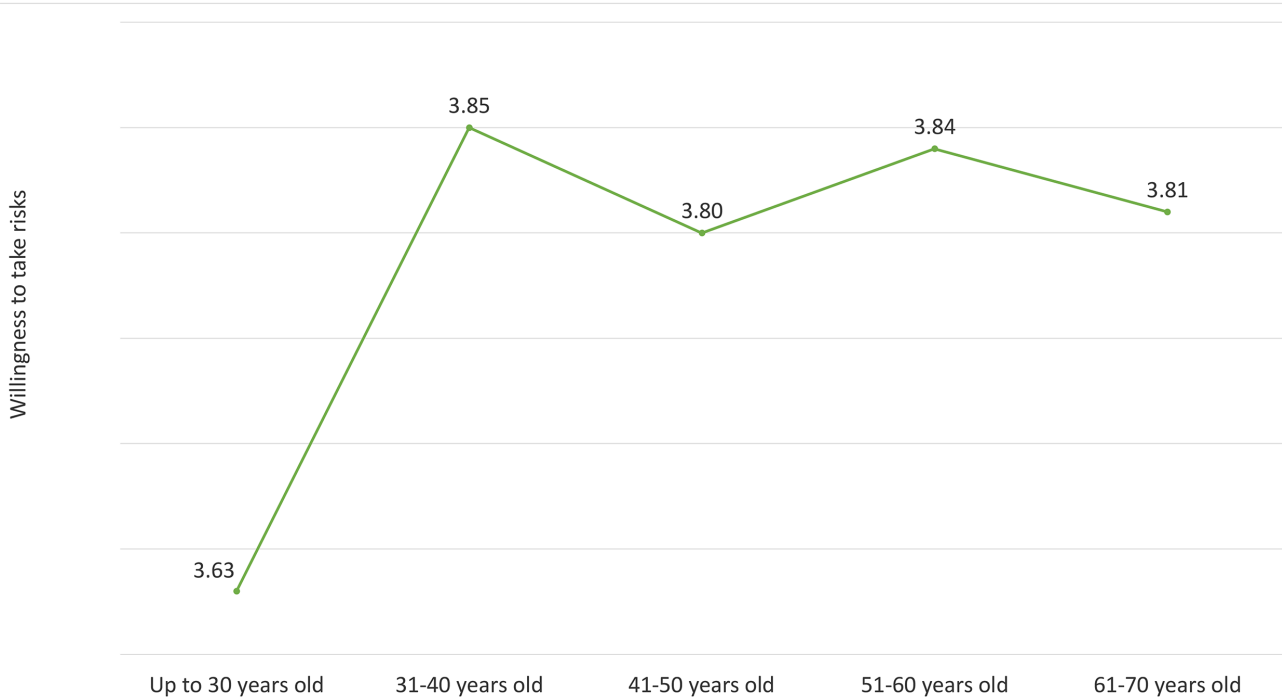


Fig. 6. Relationship between the “Willingness to take risks” component (min – 1, max – 5) and “Age”.

cannot operate at a critical level than the thinking of its leaders. However, the question arises from another perspective: How does innovative thinking change in stressful crises, particularly in war conditions?

The results of the study confirmed hypothesis 1, a positive correlation was observed between leaders’ self-efficacy and their susceptibility to innovations (Pearson’s

$r = 0.357$), which indicates that these two variables are positively related: with the growth of one, the other also grows. A similar positive correlation was found for such parameters as “Willingness to take risks” ($r = 0.267$) and “Leadership” ($r = 0.335$). A significant proportion of respondents with high self-efficacy, when assessing their readiness to implement innovations, associate themselves with the

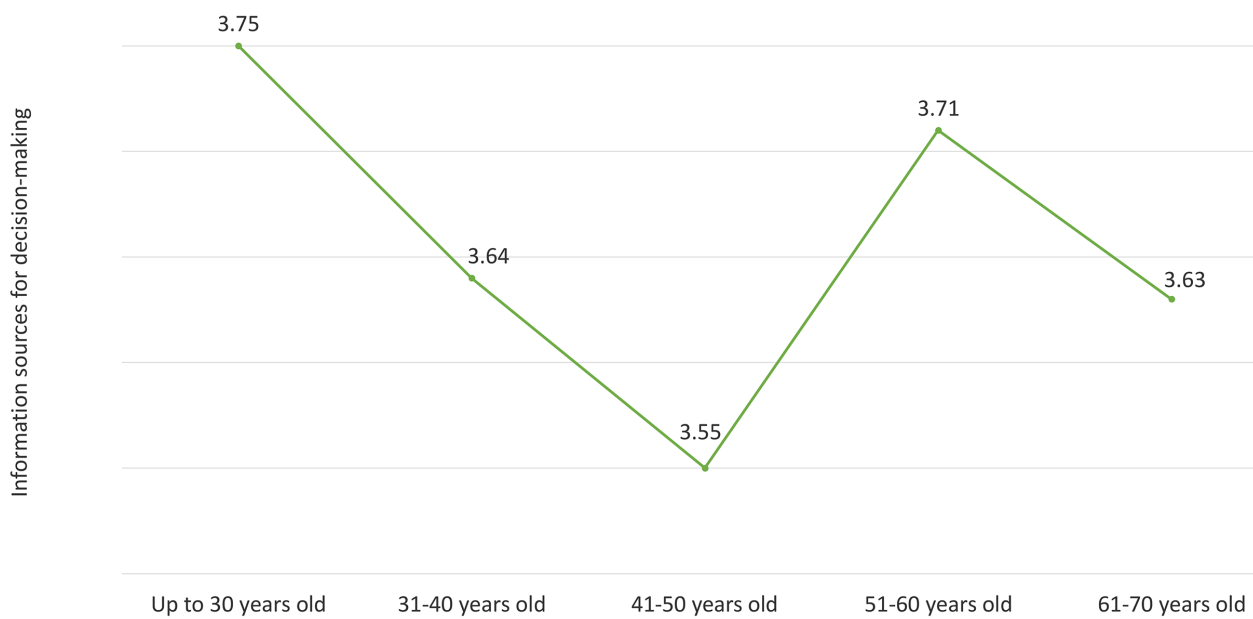


Fig. 7. The relationship between the “Information sources for decision-making” component (min – 1, max – 5) and “Age”.

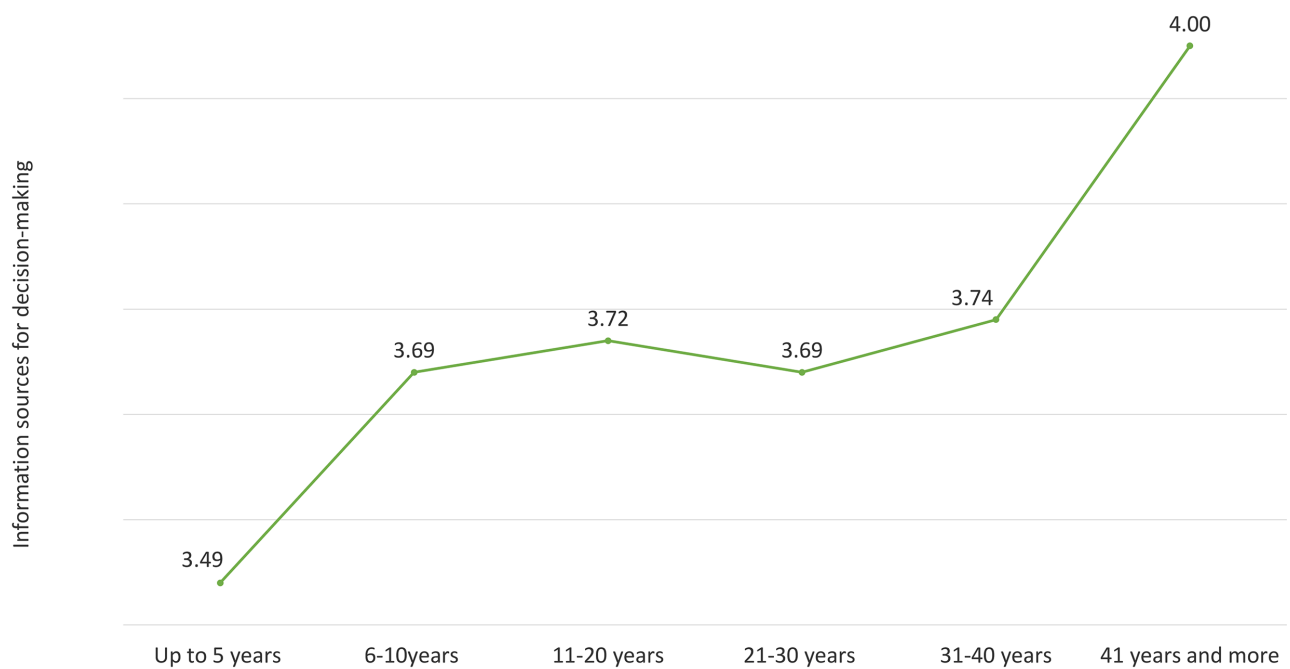


Fig. 8. Relationship between the “Information sources for decision-making” (min – 1, max – 5) and “Managerial experience”.

“Early adopters” (55.3%) or the “Early majority” (29.6%), according to Rogers’ theory of diffusion of innovations.

Based on the data obtained, innovation processes in the educational sector should be dynamic and not opposed by local protests, and have comprehensive support and understanding from the secondary school administration. Whether the real situation corresponds to the ideal picture

formed based on the data obtained during the study remains unanswered.

Our predictions according to hypothesis 2 failed. We believed that the level of self-efficacy and readiness to introduce innovations should increase with age and their managerial and pedagogical experience. However, an analysis of the interdependence of the self-efficacy of educational

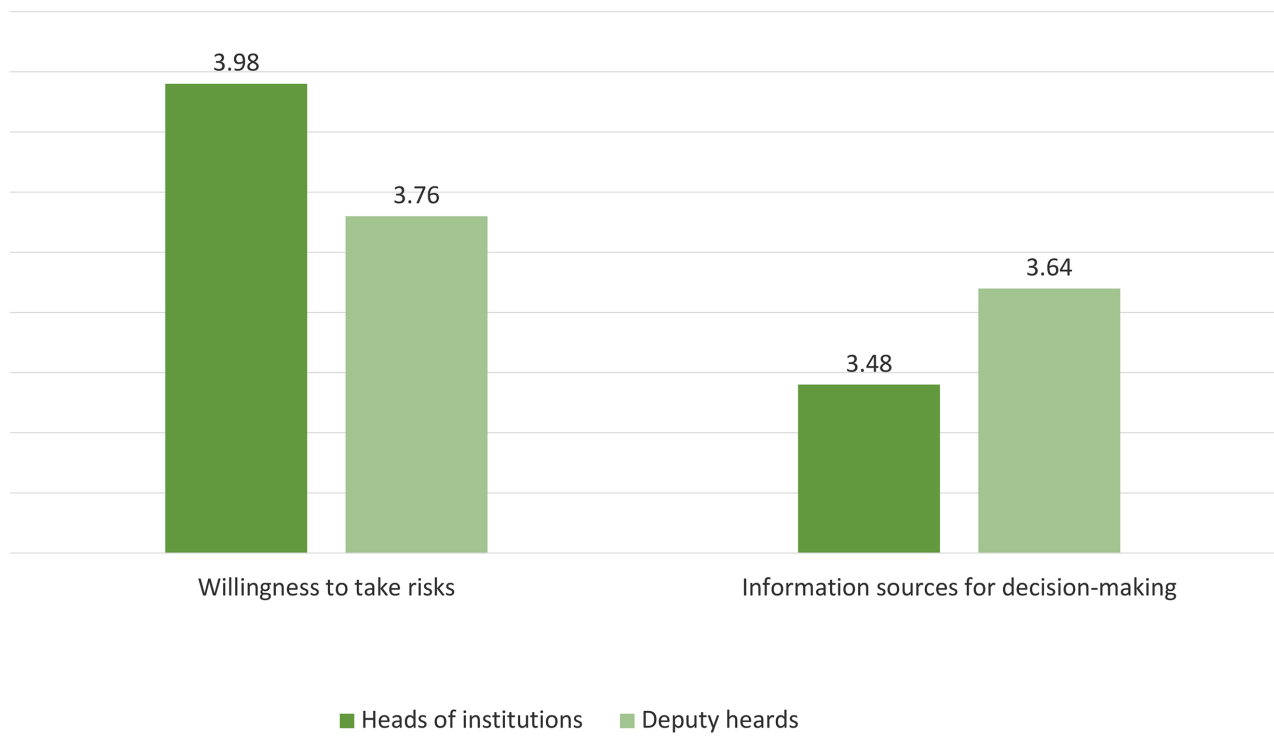


Fig. 9. Heads of institutions and deputy heads: “Willingness to take risks” and “Information sources for decision-making” (min – 1, max – 5).

Table 5. Interaction between self-efficacy and innovation readiness indicators of educational leaders during 2020, 2022, and 2023.

Year	Willingness for risk-taking (max. score 5)	Leadership (max. score 5)	Information sources (max. score 5)	Self-efficacy (max. score 40)
2020 arithmetic mean	3.84	3.40	3.56	33.69
2022 arithmetic mean	3.86	3.49	3.84	34.12
2023 arithmetic mean	3.67	3.30	3.78	33.67

Note: n = 304.

leaders and the experience of their teaching activity (“Pedagogical experience”) showed that the most effective are educational leaders with 30 to 40 years of pedagogical experience. With management experience, the self-efficacy of educational leaders gradually decreases, and only after 20 years of experience does it increase to 30 years. Educational leaders feel most effective from 40 to 50 years; a decrease in self-efficacy is observed in young and senior leaders. Perhaps this is the age of balance between one’s own professional confidence and a strong social position.

Additionally, the innovative readiness of educational leaders was related not only to their self-efficacy but also to other psychological characteristics such as personality traits, professional motivation, and the ability to manage in situations of increased risks and global uncertainty. According to our parallel studies on these factors influencing educational leaders’ readiness for innovation, a stable personal “psychological construct” of the secondary school

leaders was found based on their ingenuity, passion, and self-confidence.

The results regarding hypothesis 3 were interesting. It should be clarified that the formal introduction of martial law in Ukraine began in 2022. Before this, the country was experiencing the Anti-Terrorist Operation (ATO), which affected Kyiv’s educational institutions due to the increased migration of teachers and students. Ukrainians living in the country’s eastern regions were forced to seek refuge in safer areas, and one of the cities that attracted internally displaced persons was Kyiv. Kyiv has developed infrastructure and significant opportunities for children’s education and adult employment, which imposed additional crisis-related burdens on Kyiv’s educational institutions.

Like other countries worldwide at the same time, Ukraine was dealing with COVID-19 restrictions and the consequences of the pandemic. Kyiv’s educational institutions and other organizations that were not critically im-

portant and did not require physical presence in the workplace operated in a distance learning mode. This was a new and challenging experience unrelated directly to military issues, but it still required educational managers to make managerial decisions in crisis conditions. COVID restrictions in Ukraine began to be lifted only after the start of the full-scale invasion. Kyiv's educational institutions transitioned from one crisis—population migration due to the ATO, which was essentially an undeclared war—through the shared crisis of the pandemic and COVID-19 restrictions to the crisis of martial law. Thus, the challenges and risks were different, but turbulence in the activities of educational institutions was observed throughout the period covered by our research.

Hypothesis 4 was not confirmed. We believed that the self-efficacy of educational leaders and their willingness to implement innovations would steadily increase during the war compared to the pre-war period. The study results of these aspects showed that, compared to the pre-war period (2020), their growth was observed at the beginning of the war (autumn 2022) and then decreased again by the end of 2023. Thus, the risk propensity and leadership position indicators demonstrated an inverted U-shaped pattern during the study period.

6. Conclusion and Prospects for Further Research

The analysis of the data obtained in the conducted study outlines the dynamic interaction between the self-efficacy of heads of educational institutions and their readiness to introduce innovations in wartime. It is concluded that indeed leaders with high self-efficacy are better prepared to introduce innovations in their educational institutions in wartime. A more positive attitude of educational leaders towards innovations is accompanied by an increase in self-assessment of effectiveness.

At the same time, it was found that the self-efficacy of educational leaders is not fully correlated with their pedagogical experience, managerial experience, and age. Educational leaders feel most effective from 40 to 50 years; a lower level of self-efficacy is observed in young and older leaders. The attitude of educational leaders towards innovations depends more on their position: heads of institutions or deputy heads than on other indicators of "Age", "Pedagogical experience" and "Managerial experience". Deputies actively collect information about possible innovations. The final decision on implementation, and therefore the associated risks, lies with the immediate managers.

Overall, the indicators during the studied period demonstrated an inverted U-shaped pattern: growth was observed at the beginning of the war (autumn 2022), compared to the pre-war period 2020, and then decreased again by the end of 2023. This situation is a prerequisite for the development of an effective anti-crisis management program.

7. Practical Implications

The results of the conducted study have significant consequences for theory and practice, showing that educational leaders' self-efficacy and readiness to implement innovations mutually reinforce each other in wartime. At the same time, this study emphasizes the need to transform theoretical ideas into practical applications, suggesting the development and testing of appropriate programs, training, and courses. Given the decrease in the self-efficacy and innovative capacity of educational leaders in 2023 compared to 2022, we consider it necessary to implement a new training module, "Development of innovative management competence of educational leaders in crisis situations". This training will be the next module of our program, "Codes of Resilience: Psychological Support for Educators during the War". The training aims to integrate educational leaders' innovative potential, self-efficacy, and crisis management skills. The training program is designed to equip participants with practical skills in the following areas: "Self-assessment and assessment of managerial competencies", "Innovative leadership", "Strategic planning", "Anti-crisis management", "Coaching, mentoring, and self-management". Therefore, our future research should focus on improving and expanding the innovative management skills of educational leaders through training programs.

8. Limitations of the Study

The study presents several methodological and contextual limitations, such as small sample sizes, homogeneity of the cultural environment, reliance on data obtained from self-reports, etc. The study was conducted exclusively among educational leaders: heads and deputies in the pre-war period (a crisis due to the pandemic) and since the beginning of the war. Constant anxiety, signal of alarms, and bombing, the need to arrange shelters and organize the learning process in these shelters, the coverage of children who have gone abroad, flexible distribution of learning in classrooms and remotely, and, of course, this significantly limits the possibility of the result's broad generalization and practical applicability. To address these shortcomings, there is an urgent need to employ a broader range of empirical methods, such as longitudinal studies using mixed methods, to dynamically examine the interaction between educational leaders' self-efficacy and their willingness to innovate across time points and diverse environments. Therefore, addressing these limitations and pursuing the proposed research directions are crucial to deepening our understanding of the complex relationship between self-efficacy and the innovative potential of educational leaders. On the one hand, these efforts will enrich the knowledge base in the academic field and, on the other, have profound practical implications for improving educational practice.

Availability of Data and Materials

All data reported in this paper will be shared by the corresponding author upon reasonable request.

Author Contributions

OBan: conceptualization, development of the research idea and working hypotheses, methodology, theoretical framework, manuscript structuring, and overall editing of the manuscript. OBoh: theoretical analysis, survey design, bibliographic analysis, empirical validation of the research framework, project administration and supervision. MS: discussion section, interpretation of findings, conclusions, data processing and visualization. DS: contributed to research methodology, empirical analysis, survey implementation, and bibliographic analysis. OS: contextual data systematization, bibliographic analysis, and hypothesis testing. All authors contributed to the interpretation of the results and critical revision of the manuscript for important intellectual content. All authors read and approved the final version of the manuscript. All authors have participated sufficiently in the work and agreed to be responsible for all aspects of the work.

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Conflicts of Interest

The authors declare no conflicts of interest.

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