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HUMAN CAPITAL DEVELOPMENT AND ORGANIZATIONAL RESILIENCE IN CRISIS CONDITIONS AS A FRAMEWORK FOR UKRAINE AND EUROPEAN INTEGRATION

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РОЗВИТОК ЛЮДСЬКОГО КАПІТАЛУ ТА ОРГАНІЗАЦІЙНА СТІЙКІСТЬ В УМОВАХ КРИЗИ ЯК ОСНОВА ІНТЕГРАЦІЇ УКРАЇНИ ДО ЄВРОПИ

Human capital development during crisis periods represents a critical challenge for contemporary human resource management. The war in Ukraine, global economic instability, and mass forced migration create unprecedented challenges for organizations in both Ukraine and EU member states. These circumstances necessitate rethinking traditional HR management approaches and understanding the role of socio-psychological factors in organizational resilience. This study aims to develop an assessment model examining the impact of socio-psychological factors on human resource management effectiveness under crisis conditions, employing an integrated methodological framework applicable to Ukrainian and European contexts.

The study employed a mixed-methods approach. Data were collected through a structured survey of 189 HR managers from Ukrainian enterprises located in conflict-affected regions (N=189). An adapted Cobb-Douglas production function was utilized to model the relationship between socio-psychological factors and HR management effectiveness. Socio-psychological factors were operationalized as the differential between positive motivators and negative demotivators, with their relative significance assessed through elasticity coefficients. The model's parametric flexibility enables recalibration for alternative organizational contexts, including EU member states, subject to context-specific data collection and validation.

The findings indicate that positive motivational factors marginally outweighed negative ones by 2.5%, revealing significant vulnerabilities in the organizational support system during crisis periods. Statistical analysis identified professional integrity, peer support, and psychological resilience as the strongest positive predictors of HR effectiveness. Conversely, impulsivity, excessive multitasking, and narrow focus on monetary incentives demonstrated significant negative correlations with performance outcomes. Cross-national comparative analysis of Ukrainian and European cases highlights critical success factors for workforce integration, including structured social support programs, intercultural communication frameworks, and adaptive organizational capacity. These findings suggest that organizations operating in crisis contexts require balanced attention to both material and psychosocial dimensions of employee motivation.

Therefore, the proposed model provides a quantitative evaluation of the socio-psychological factors affecting human capital in crisis situations, underscores their strategic relevance, and supports the adaptation of management practices to varying national and organizational contexts.

Формування інноваційного людського капіталу в умовах кризи є ключовим завданням сучасного управління персоналом. Війна в Україні, глобальні економічні потрясіння та вимушена міграція створюють суттєві виклики для підприємств як в Україні, так і в країнах ЄС. Метою дослідження є розробка моделі оцінки впливу соціально-психологічних чинників на ефективність управління персоналом у кризових умовах із використанням комплементарного підходу, релевантного для українського та європейського контекстів.

Методологія передбачала анкетування 189 HR-менеджерів українських підприємств поблизу зон активних бойових дій та адаптацію виробничої функції Кобба–Дугласа для оцінки стимулюючих і дестимулюючих факторів персоналу. Соціально-психологічні чинники моделювалися як різниця між позитивними й негативними впливами, а їхня значущість оцінювалася через коефіцієнти еластичності. Модель дозволяє адаптувати коефіцієнти для оцінки впливу цих чинників у інших контекстах, включно з країнами ЄС.

Результати показали, що стимулюючі чинники перевищують дестимулюючі лише на 2,5%, свідчачи про вразливість системи комплементарних активів. Найважливішими стимулюючими характеристиками виявилися професійна чесність, взаємодопомога та психологічна стійкість, тоді як дестимулюючий вплив мали імпульсивність, багатозадачність і орієнтація лише на фінансові стимули. Порівняльний аналіз українського та європейського досвіду дозволяє виділити уроки інтеграції, зокрема важливість програм соціальної підтримки, міжкультурних комунікацій і гнучкості організаційних активів.

Отже, запропонована модель дозволяє кількісно оцінювати соціально-психологічні чинники людського капіталу у кризових умовах, підкреслює їх

стратегічне значення та дає змогу адаптувати управлінські практики для різних національних і організаційних контекстів.

Keywords: *human capital, HRM in crisis, socio-psychological factors, war in Ukraine, integration into the EU.*

Ключові слова: *людський капітал, HRM у кризі, соціально-психологічні чинники, війна в Україні, інтеграція в ЄС.*

Problem statement and its relation to significantscientific or practical tasks. Developing innovative human capital in times of crisis represents a critical challenge for contemporary human resource management. The war in Ukraine, global economic disruptions, and migration flows have created significant pressures on businesses and governments across Ukraine and the European Union. Labor markets in the EU have undergone substantial transformations due to forced migration, workforce imbalances, and the necessity to adapt HRM practices to multicultural teams. These developments call for novel approaches to human capital that promote both economic efficiency and socio-psychological resilience.

***Analysis of recent researchandpublications*.** Previous studies demonstrate that traditional HRM tools were insufficient during the pandemic and related crises, with psychological support, targeted interventions, and social cohesion emerging as essential resources [27;21]. Nevertheless, as noted by X. Zhou and Löfferta R.M. and Diehl M.R., quantitative models capable of evaluating the impact of socio-psychological factors as a distinct and complementary asset remain scarce [30;17].

From a European perspective, Atamanenko A. and Avhustiuk M. and Vintse O. underscore that the war in Ukraine has prompted large-scale forced migration, substantially influencing HRM strategies in EU countries [2;29]. However, systematic research integrating Ukraine’s crisis human capital management experience with the challenges facing the European Union remains scarce.

This study aims to develop a model for evaluating the impact of socio-psychological factors on human resource management effectiveness in crisis conditions, using a complementary approach relevant to both Ukrainian and European contexts.

Presentation of the main research material. Systematic reviews of HRM in crisis contexts emphasize that traditional human resource management tools are insufficient during sudden disruptions. As demonstrated by the meta-analysis of Newman A., Ferrer J., Yue Y., and Zhu J., the effectiveness of HRM in such situations largely depends on organizations' capacity to integrate psychological support, digital solutions, and flexible practices [21]. This approach enables human capital to be recognized not merely as a resource but as the cornerstone of organizational resilience.

Detailed empirical studies conducted during the COVID-19 pandemic have confirmed that the quality of HRM practices directly influences employee well-being and engagement. Straus E., in a longitudinal diary study of remote workers, demonstrated that it is the combination of resources that accounts for fluctuations in staff productivity and motivation [25]. Subsequent studies have produced similar findings, showing that employee resilience is enhanced through innovative HRM practices focused on technological adaptation and competence development [6].

An important area of research concerns psychological contracts in crisis situations. Qualitative studies in the aviation sector have identified new categories-psychological contract credit and contract inactivation—that describe the temporary "crediting" of trust to the employer and the "suspension" of employee expectations during peak phases of a crisis [17]. These insights are particularly relevant in wartime conditions, where the expectations of both parties shift even more rapidly.

From a broader perspective, attention has been given to how HRM systems mobilize during crises. Sanders et al. demonstrated that system strength increases in periods of acute crisis, but outcomes are influenced by cultural and contextual moderators [24]. This finding is crucial for understanding variations in crisis responses across European countries. Contemporary research also extends the

analysis beyond economic indicators. Robinson RNS, Yan H. & Jiang Y. highlight that resilience encompasses both a “can-do” component, related to resources and skills, and a “reason-to” component, linked to motivation and sense of purpose [24].

In summary, the experience of the pandemic and related crises demonstrates that HRM during turbulent periods should not only sustain productivity but also foster trust, psychological safety, and a sense of purpose. Additional factors, such as the innovativeness of HRM practices, underscore that human capital can function as a complementary asset, enhancing organizational resilience in increasingly volatile environments [19].

However, most studies focus on short-term shocks, such as pandemics or sectoral crises, while the context of protracted military operations and their implications for HRM remains largely unexplored. In particular, there is a lack of models that integrate personnel's socio-psychological characteristics as complementary assets and quantify their impact on enterprise performance under crisis conditions.

Forced migration resulting from the war in Ukraine has significantly reshaped EU labor markets, leading to labor shortages in several sectors and challenges in the recognition of qualifications [2]. Countries such as Poland, Germany, and Italy have faced an urgent need to adapt their recruitment, integration, and retention procedures. European companies are increasingly implementing psychological support programs, intercultural training, and flexible work arrangements to effectively integrate displaced workers [29].

Although Ukrainian companies operate under direct military conditions, European organizations also experience indirect consequences of the crisis, including labor shortages, challenges in qualification recognition, and cultural adaptation. This comparison highlights that socially and psychologically resilient personnel constitute a transferable asset: approaches to enhancing motivation, adaptability, and cooperation in Ukraine can inform HRM practices in EU countries, particularly in sectors employing migrant workers.

Key lessons for HRM in the EU include the following: the early implementation of social support and mental health programs enhances staff engagement; intercultural communication skills are essential for the effective integration of diverse employees; and flexibility in organizational and technological resources can mitigate the destabilizing effects of external shocks. Incorporating these insights into the Ukrainian context enables the formulation of policy and management recommendations that address both local crisis conditions and lessons applicable to integration into the EU labor market [29].

The distinct area of the literature addresses the socio-psychological aspects of personnel management during crises. For instance, in the aviation industry, the concept of "psychological contract credit" has been identified as a mechanism to sustain relationships during periods of instability [17]. However, questions remain regarding which personnel characteristics most significantly influence management effectiveness under emergency conditions. Systematizing these factors and incorporating them into quantitative models constitutes a primary objective of this article.

To achieve this goal, a complementary approach was employed, allowing human capital to be evaluated as a set of interrelated assets: socio-psychological, organizational, professional, and technological. The model is designed to assess the impact of socio-psychological factors not only in Ukrainian contexts but also in other settings, such as European ones, by adjusting elasticity coefficients (α) for different respondent groups or cultural conditions.

The study is based on a quantitative analysis combining HR manager surveys and statistical modeling. The research followed a three-stage approach:

Identifying the structure of socio-psychological components within the complementary asset (CA) function "Personnel."

Collecting primary data through questionnaires.

Constructing and adapting the Cobb-Douglas production function to evaluate the impact of motivating and demotivating factors.

The survey was conducted in 2024 among 189 HR managers from companies situated near active combat zones in Ukraine. This group was selected

due to the high level of crisis-related challenges, providing an opportunity to test the model under the most extreme conditions.

Respondent selection criteria:

Minimum of five years of professional experience in HRM.

Higher education in economics or management.

Direct involvement in the development or implementation of anti-crisis HR strategies.

Respondents completed a standardized questionnaire consisting of closed-ended questions with response options “1” (stimulating effect) and “0” (deterrent effect). This approach enabled the transformation of qualitative characteristics into quantitative indicators.

For the quantitative analysis, the Cobb-Douglas production function was employed to capture the dependence of outcomes on multiple factors:

$$Y = A * (X_1)^{a_1} \times (X_2)^{a_2} \ldots . (X_n)^{a_n} \quad (1)$$

where Y represents the business effect, A is a scaling constant, X_i are factor indicators, and α_i are elasticity coefficients.

In our model, the business effect depends on five complementary assets:

$$BE = f\{M, C, P, O, IT\} \quad (2)$$

where M – methodology, C – communication, P – personnel, O – organization, and IT – information technologies.

The personnel component (P) was expanded to include:

$$P = \{Q, Mp, Ql, SP\} \quad (3)$$

where Q – number of employees, M_p – motivation, Ql – qualifications, SP – socio-psychological components.

The influence of socio-psychological components was captured through a differential model:

$$SP = Ys - Yd \quad (4)$$

where Y_s represents stimulating factors and Y_d represents de-stimulating factors. Elasticity coefficients (α_s, α_d) were estimated for each indicator to reflect its relative weight in personnel efficiency.

The collected data were analyzed using descriptive statistics and regression analysis. To evaluate the significance of individual characteristics influencing HRM effectiveness, a t-test and elasticity analysis were applied. All calculations were performed using the Excel software environment.

The questionnaire was pilot-tested with a group of 20 HR managers to verify the clarity of the wording. The reliability of the scales was confirmed by a Cronbach's alpha coefficient of 0.82, indicating a high level of internal consistency.

The survey results demonstrate that socio-psychological components play a dual role in shaping the efficiency of the complementary asset "Personnel." Respondents identified a range of professional and personal qualities that either stimulate or de-stimulate human capital development under wartime conditions.

Table 1 presents the distribution of professional qualities considered most influential. The left column reflects factors stimulating personnel efficiency, while the right column summarizes those that hinder performance.

Table 1. The list of evaluative professional qualities that stimulate/de-stimulate the state of the KA "Personnel" component

Professional qualities that stimulate the state of KA "Personnel"	Professional qualities that de-stimulate the state of KA "Personnel"
1	2
1. Independence and the ability to make quick decisions	1. Constant need for external motivation, lack of focus on assigned tasks
2. Organization and self-organization	2. Critical attitude towards others
3. Emotional intelligence	3. Inability to articulate thoughts clearly
4. Work experience	4. Dramatization of events, making empty promises
5. Adaptability to changes	5. Procrastination
6. Willingness to work overtime	6. Striving to please everyone
7. Aspiration for self-improvement and personal growth in professional qualities	7. Prioritization of financial incentives in work
8. Ability to work with large amounts of information	8. Impulsiveness and lack of thoughtful decision-making
9. Professional honesty, integrity, and mutual assistance	9. Inability to concentrate on the main task
10. Psychological resilience, perseverance, focus on results, and solution-oriented approach	10. Multitasking and handling too many tasks simultaneously

Source: compiled by the authors

To evaluate the quantitative impact of these qualities, respondents (n = 89 HR managers) were asked to assess each criterion under conditions of high stress and uncertainty. The responses were coded and processed according to the methodology described in Section 1.

Table 2 summarizes the distribution of responses for stimulating qualities, showing the proportion of employees able to demonstrate resilience, motivation, and adaptability. High levels of professional honesty (80.9%) and mutual assistance (93.1%) confirm that ethical factors remain critical under wartime conditions. However, readiness for self-development was assessed as low (30.3%).

Table 2. Stimulating professional qualities of KA "Personnel" and their distribution under wartime conditions

Stimulating professional quality	% high	% medium	% low	Elasticity (αs)
1	2	3	4	5
Independence and quick decision-making	34.8	28.0	2.0	3.16
Organization and self-management	33.7	22.5	5.0	3.06
Emotional intelligence	32.6	28.1	6.7	2.96
Work experience	32.6	21.3	4.5	2.96
Adaptability to changes	34.8	29.2	7.9	3.16
Readiness for self-improvement	30.3	24.0	7.9	2.75
Ability to process large amounts of information	34.8	32.6	12.4	3.16
Professional honesty	80.9	60.2	0.0	7.35
Mutual assistance	93.1	75.6	4.1	8.46
Psychological resilience	38.2	32.6	12.4	3.47
Focus on results	41.6	24.7	5.6	3.78

Source: compiled by the authors

Table 3 presents the results for de-stimulating components. The most significant negative influences included impulsive decision-making (31.5%), difficulties concentrating on core tasks (4.5%), and excessive multitasking (9%). At the same time, 39.3% of respondents demonstrated strong self-motivation, suggesting resilience in conditions of limited supervision.

Table 3. De-stimulating professional qualities of KA "Personnel" and their distribution under wartime conditions

De-stimulating professional quality	% high (negative impact)	% medium	% low	Elasticity (αd)
1	2	3	4	5
Constant need for external motivation	34.8	28.0	2.0	3.16
Lack of focus on assigned tasks	33.7	22.5	5.0	3.06
Negative reaction to criticism	32.6	28.1	6.7	2.96
Inability to articulate thoughts clearly	32.6	21.3	4.5	2.96
Tendency to dramatize events	34.8	29.2	7.9	3.16
Procrastination	30.3	24.0	7.9	2.75
Striving to please everyone	34.8	32.6	12.4	3.16
Prioritization of financial incentives	49.4	60.2	–	7.35
Impulsive and unbalanced decision-making	31.5	75.6	4.1	8.46
Difficulty concentrating on the main task	4.5	32.6	12.4	3.47
Multitasking under stress	9.0	24.7	5.6	3.78

Source: compiled by the authors

Using the Cobb–Douglas approach, indicator values and elasticity coefficients were calculated (Table 4).

Table 4. Calculated values of professional quality indicators and their elasticity

Indicator	Value	Indicator	Value
Xi	0.443	αs	4.028
Di	0.129	αd	2.150

The substitution into equations (4–8) produced the following relationship:

SP≈0.025ASP \approx. 0.025 ASP≈0.025A

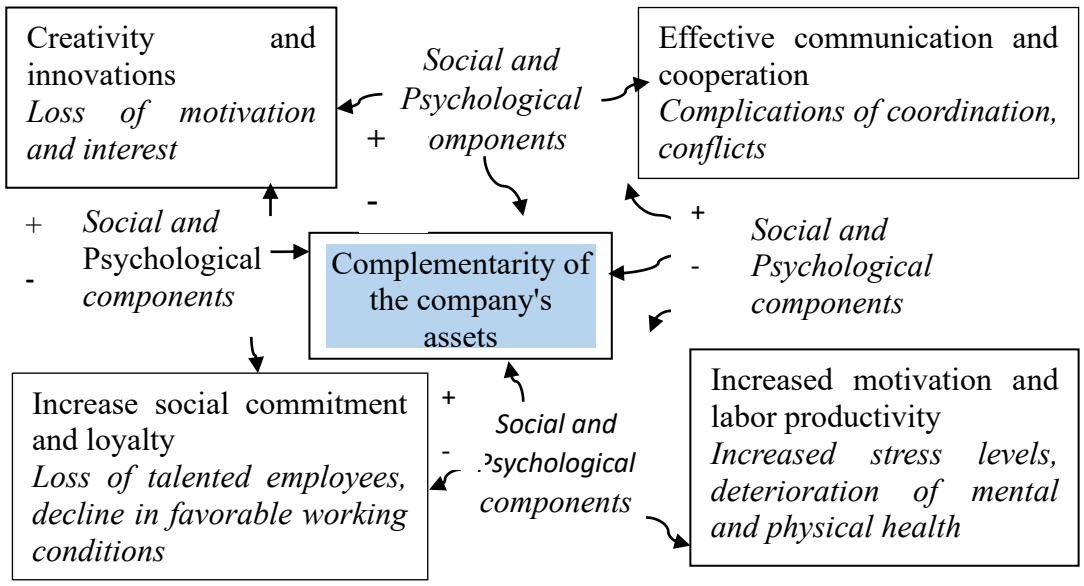
This means that the difference between stimulating and de-stimulating effects accounts for 2.5% of the overall stimulation level of personnel. In other words, while negative factors exist, their relative strength is considerably weaker compared to positive drivers.

Figure 1 illustrates the functions Y1Y_1Y1 and Y2Y_2Y2, reflecting the gap between stimulating and de-stimulating effects under conditions of crisis.

Source: compiled by the authors

Figure 1. Graphical representation of functions Y1Y_1Y1 and Y2Y_2Y2 for KA "Personnel"

Figure 2 shows the directions of influence of socio-psychological components on other complementary assets, demonstrating how the personnel factor interacts with organizational, technological, and IT assets.



+ under wartime conditions, the strength of the impact +0,037;
- under wartime conditions, the strength of the impact -0,012

Figure 2. Influence of socio-psychological components on complementary assets

Source: compiled by the authors

Overall, the results indicate that Ukrainian employees demonstrate relatively high adaptability and resilience under extreme conditions. However, the impact of war reduces the effectiveness of previously strong motivating qualities, highlighting the need for enterprises to strengthen support systems and minimize de-stimulating influences.

This study aimed to quantitatively integrate socio-psychological factors into the structure of complementary assets using an adapted Cobb–Douglas function. Unlike most previous research, which has been limited to descriptive analyses of the influence of personnel or psychological characteristics, this study proposes a model that enables the assessment of the balance between stimulating and de-stimulating personnel factors. The results indicate that the advantage of stimulating factors is only about 2.5%, suggesting an unstable equilibrium and the vulnerability of the complementary assets system under crisis conditions.

Our findings are partly consistent with previous Ukrainian studies. Zerkal A. and Pavlenko M. highlight the importance of adaptive HR models that integrate human, organizational, and communication assets in crisis situations, while Irtyshcheva I. et al. stress that employees' psychological state influences the speed of management change integration [31;15]. Tsalko T. contends that anti-crisis personnel management during wartime is crucial for preserving the innovative potential of enterprises [28]. At the same time, it is important to note that crises and war are not identical phenomena: economic or organizational crises are typically driven by internal or global market imbalances, whereas war introduces a qualitatively different set of challenges, including physical danger, infrastructure destruction, and widespread psychological trauma. These conditions underscore the critical importance of personnel's socio-psychological characteristics as an integrative asset.

Foreign studies confirm that personnel play a central role in linking organizational assets. Bal P.M. et al. demonstrated that psychological contracts foster trust and enhance the interaction between organizational and communication resources [3]. De La Garzaet al. showed that employees' emotional stability and

social support are key determinants of organizational resilience during crises [10]. Kačmár P. et al. emphasize that the development of psychological capital mitigates the risk of a “crisis of action” and acts as a multiplier for other assets [16]. However, most of these studies focus on conventional crises-economic, organizational, or pandemic – whereas our research highlights the specific functioning of complementary assets during military operations, a context in which the socio-psychological characteristics of personnel become particularly critical. In a broader European context, Ambroziak A. examined how the COVID-19 pandemic transformed intra- and extra-European trade, concluding that crises within the EU primarily manifest as economic constraints rather than direct existential threats [1]. In contrast, Ukraine’s war economy has experienced sharper declines, highlighting the critical role of complementary assets, particularly human capital [5;13;26]. This comparison demonstrates that, although both crises and wars have destabilizing effects, their nature and consequences differ significantly: crises mainly complicate coordination and trade, whereas wars directly undermine human security, motivation, and resilience at the enterprise level.

A comparison of the Ukrainian and European contexts indicates that socially and psychologically resilient personnel constitute a transferable asset. The Ukrainian experience underscores the importance of sustaining motivation and psychological security, as well as developing adaptability and professional competencies during direct crises. The European experience highlights the critical role of intercultural communication, organizational and technological flexibility, and the early implementation of social support programs. Integrating these lessons can enhance HRM effectiveness in both military and crisis conditions, as well as in less extreme contexts within the EU.

Thus, the contribution of this study lies in integrating the complementary assets model with a quantitative analysis of socio-psychological factors, enabling the identification of the specific functioning of human capital during wartime and extracting lessons for integration into European labor markets.

Conclusion. The study confirmed that socio-psychological factors are critically important for the development of human capital under crisis conditions. The findings underscore that in periods of acute instability – whether driven by armed conflict, economic disruption, or mass displacement – the psychological and motivational dimensions of workforce management acquire strategic significance that extends well beyond their traditionally subordinate role in organizational theory. Calculations using the adapted Cobb–Douglas function indicated that the stimulating characteristics of personnel exceed the disincentive ones by only 2.5%, highlighting the vulnerability of the complementary asset system in emergency situations. This marginal differential is particularly revealing, as it suggests that the organizational support infrastructure operates near a critical threshold, where even modest deterioration in motivational conditions could tip the balance toward systemic underperformance. Such findings call for urgent reconsideration of conventional HRM priorities, particularly in contexts where external shocks continuously erode the psychological and professional stability of employees.

During wartime, the key factors for effective HRM include psychological resilience, motivation, readiness for adaptation and professional development, as well as the support of organizational and communication assets. The empirical data collected from HR managers operating in conflict-affected regions of Ukraine reveal that organizations capable of sustaining structured internal support mechanisms demonstrate significantly higher levels of personnel retention and productivity under duress. The capacity for psychological self-regulation, combined with a sense of professional purpose and peer solidarity, emerged as the most robust predictors of individual and collective performance in adverse conditions. Recommendations for Ukrainian enterprises include enhancing psychological support programs, improving internal communication, and implementing flexible HRM practices. More specifically, organizations are advised to institutionalize mental health support as a core component of HR strategy rather than treating it as an ancillary benefit, to establish transparent and consistent internal communication channels that counteract informational uncertainty, and to

adopt adaptive scheduling and task distribution models that accommodate the fluctuating capacity of employees under chronic stress. These measures are not merely welfare-oriented; they constitute evidence-based investments in organizational resilience with measurable returns in human capital efficiency.

The model enables the assessment of socio-psychological factors on HRM effectiveness in EU countries by adjusting elasticity coefficients (α) according to cultural and organizational characteristics. This parametric flexibility constitutes one of the model's principal methodological contributions, as it allows the framework to transcend its original empirical context and serve as a comparative analytical instrument applicable across diverse national and institutional environments. Practical implications for European companies include the early implementation of social support and mental health programs, the development of intercultural communication skills to integrate diverse employees, and the flexibility of organizational and technological resources to mitigate the destabilizing effects of external shocks. The influx of Ukrainian displaced workers into EU labor markets has further accentuated the need for culturally sensitive onboarding practices, psychological first-response mechanisms within organizational settings, and supervisory competencies oriented toward managing trauma-affected personnel. European organizations that proactively embed these capacities into their HRM frameworks are better positioned not only to facilitate the productive integration of migrant workers but also to strengthen their overall adaptive capacity in the face of future systemic disruptions.

The comparative approach demonstrates that socially and psychologically resilient personnel constitute a transferable asset. This insight carries significant implications for both policy and practice, suggesting that investments in psychosocial workforce development yield value that is not organizationally or nationally bounded but can be leveraged across different institutional contexts as labor mobility increases. The methodology and model proposed in this study enable not only the quantitative assessment of the balance between motivating and demotivating factors in Ukrainian contexts but also adaptation to European HRM

practices, thereby supporting the effective integration of displaced workers and enhancing organizational stability. The model's dual applicability — as both a diagnostic and a comparative tool — positions it as a viable instrument for cross-national HRM research and policy benchmarking, particularly in the context of the ongoing convergence between Ukrainian and European labor market institutions.

This study contributes a universal model for assessing the socio-psychological components of human capital, combining Ukrainian wartime experience with insights from European labor market integration, and offering directions for future international HRM research. Prospective research agendas may productively extend the current framework by incorporating longitudinal data to track the evolution of motivational dynamics across crisis phases, expanding the sample to include EU-based enterprises employing displaced Ukrainian workers, and exploring sector-specific variations in the elasticity of socio-psychological factors. Furthermore, the integration of the proposed model with established frameworks of organizational psychology and institutional economics may yield a more comprehensive theoretical synthesis, capable of informing both scholarly discourse and evidence-based HRM policy at the national and supranational levels.

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