

Wartime Enterprise Resilience in Ukraine: Anti-Crisis Strategies under Military and Economic Risk

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Abstract

This study examines anti-crisis strategies adopted by Ukrainian enterprises during the full-scale war (2022–2026). Using a mixed-source secondary-data design, it integrates surveys from the Institute for Economic Research and Policy Consulting (500+ enterprises) and the American Chamber of Commerce in Ukraine (N=137) with corporate reports, case studies, and policy documents. Chi-square tests, logistic regression, and panel trend analysis assess associations between adaptation strategies and business continuity. Despite 47% of enterprises reporting asset damage, 90% remain fully operational. Four core strategies emerge: diversification (43% of exporters diversified markets; 35% of frontline enterprises relocated), digitalisation (67% adopted new technologies; 72% remote work), supply-chain restructuring (56% modified suppliers; 62% alternative logistics; 82% energy resilience), and HR innovations (84% flexible work; 78% financial assistance; 64% veteran employment). Strategies vary by enterprise size and location. The findings advance understanding of organisational resilience under armed conflict and provide practical insights for Ukraine's reconstruction.

Keywords: wartime economy, enterprise resilience, crisis management, supply-chain resilience.

JEL Classification: D22; L25; M21; H56; O33.

Introduction

The full-scale invasion of Ukraine by the Russian Federation on 24 February 2022 precipitated not only a profound humanitarian catastrophe but also an economic shock of a scale and nature unprecedented in modern European history (Markuts and Roberto, 2025). For Ukrainian enterprises, the onset of hostilities marked an abrupt transition from a functioning, albeit challenging, peacetime economy to a wartime reality of physical destruction, occupation of the territory, division of supply chains, mass displacement of the labour force, and uncertainty about the most basic terms of survival in the business (Polishchuk et al., 2024). In contrast to other economic crises, the war in Ukraine caused existential risks, and unlike other crises, including the 2008 global financial crisis or the COVID-19 pandemic, this crisis functioned within predictable boundaries of market forces and business continuity frameworks (Pustulka et al., 2024).

The scale of economic devastation is staggering. As of late 2025, the total losses to the agricultural sector of Ukraine alone reached more than USD 80 billion, including USD 10.3 billion of direct physical destruction of machinery, storage facilities, and infrastructure and USD 69.8 billion of indirect economic losses due to blockage of export routes, internal price imbalances, and occupied productive land (Zaichenko, 2025). The parallel problems of the manufacturing and extractive sectors have been the challenges of the energy infrastructure being attacked: about 60% of the gas production capacity has been closed, causing a ripple effect on the industrial activity and worsening the trade imbalances (KSE Institute, 2025b). By the first nine months of 2025, the state budget deficit reached UAH 0.9 trillion (about USD 22.1 billion), in spite of signs of moderate recovery, and the expenditure related to the war raised by 31.8% per year (KSE Institute, 2025b).

The labour market has been equally transformed. There was a primary increase in unemployment to 35% in 2023 but by mid-2025, the rates had gone down to about 12%, and there were still major structural problems (Cabinet of Ministers of Ukraine 2025). More than 6 million internally displaced persons (IDPs) and the imminent integration of some 500,000 veterans into the civilian labour force is a humanitarian necessity and an important economic prospect (Cabinet of Ministers of Ukraine, 2025). Labour shortages have emerged as a persistent constraint, and business leaders mention it as one of the main obstacles to investment and operational sustainability (European Business Association, 2025).

Nevertheless, Ukrainian businesses have proven to be very resilient despite these obstacles. In the study of Ukrainian companies in a war economy, it is found that there are several resilience pathways, and organisations have organisational adaptability, resourcefulness, and innovation to reduce risks and continue to function in the circumstances of an active armed conflict (de Waal et al. 2025; Pimenow et al., 2025). Research on Ukrainian exporting small and medium-sized firms shows that the flexibility of the firms to adapt to cross-border demands has been enhanced by the relational capital to foreign partners, allowing the firms to navigate through the cross-border pressures, adjust their business models, and remain competitive in the presence of hostilities (Kantaruk Pierre et al., 2025). Moreover, the studies of Ukrainian business environments in the wartime reveal that organisations have shown the ability to restructure their ways of operation and remain functional in the face of extreme disruption, which is a fundamental shift in the organisation strategy in the conditions of a continuous existential threat (Orel et al., 2025). These developments suggest a complex adaptation process that merits systematic investigation.

When applied to wartime economics, the idea of anti-crisis strategies takes a radically different form than either business continuity or risk management constructs in peacetime. According to the traditional methods whereby the fundamental crisis management literature assigns the term, such as the works by Burnett (1998), crises are understood as discrete events, a manifestation of which has an onset and resolution stage. The work by Pearson and Clair (1998) highlighted the psychological aspect and systemic aspects of responding to organisational crisis. Their framework assumed a level of organisational stability and institutional operation that the war in Ukraine has systematically destroyed. Likewise, the vast body of organisational resilience literature that has since emerged has been preoccupied with adaptability in market-based systems in which basic infrastructure, supply chains, and legal frameworks are unharmed (Dahmen, 2023). The case of Ukrainian needs to redefine resilience as the ability to restructure operational paradigms fundamentally in the face of unremitting existential pressures to go beyond merely bouncing back to an earlier form. Full-scale war, as Olishenska et al. (2025) illustrate, turns crisis into a momentary deviation into a permanent pattern of organisational operation, which needs adaptive management models oriented at strategic sustainability in the face of uncertainty.

These adaptive strategies are not solely important in the performance of individual firms. The stability of the enterprise sector is a vital factor of macroeconomic stability, employment, taxation, and the ability to reconstruct the country after the war (OECD, 2026). Deep and efficient financial markets and a corporate sector which operates are essential to make sure that reconstruction funds, whether local or foreign, are used to the most productive purposes (OECD, 2026). In addition, the capacity of Ukrainian businesses to continue functioning in the conditions of the war directly influences the social structure of communities, the preservation of a job, the maintenance of local economies, and the basis of recovery that is not limited to material rebuilding.

The purpose of this article is to examine the anti-crisis strategies used in Ukrainian businesses between 2022 and 2026 systematically. This is an era that extends to the full-scale invasion up to the current phase of the sustained wartime operations and emerging reconstruction efforts. The analysis aims at examining the business adaptation of the complex challenges of physical destruction, supply chain disruption, energy insecurity, labour market transformation and regulatory uncertainty in the light of the continuous hostilities.

The targeted research objectives are:

- To identify and classify key anti-crisis strategies adopted by Ukrainian enterprises, including diversification, digitalisation, supply chain restructuring, and HR innovations.
- To assess their effectiveness in supporting business continuity and competitive advantage under wartime conditions.
- To examine how government policies, international support, and stakeholder initiatives interact with firm-level adaptation.
- To develop a framework for understanding organisational resilience and economic adaptation during armed conflict.

To guide the empirical analysis, the following research questions are formulated:

RQ1: Which anti-crisis strategies are most widely adopted by Ukrainian enterprises during wartime?

RQ2: How does the adoption of anti-crisis strategies vary by enterprise size, sector, and geographic location?

RQ3: Which combinations of diversification, digitalisation, supply-chain restructuring, and human-resource practices are associated with continued business operation?

Based on the theoretical framework and literature review, the following testable hypotheses are proposed:

H1: Enterprises that adopt a higher number of anti-crisis strategies (diversification, digitalisation, supply chain restructuring, and HRM innovations) have a significantly higher probability of remaining fully operational.

H2: The adoption of anti-crisis strategies varies significantly by enterprise size, with large enterprises showing higher adoption rates than small and medium enterprises.

H3: Digitalisation and supply chain restructuring are positively associated with business continuity, while energy resilience investments moderate the negative effects of power outages on operational status.

This analysis has considered wide range of organisations of different size and different industries, but especially agriculture. It is a vital export business, and one of the industries that have been hit directly by the war in the country. It also takes into account manufacturing, information technology sector and small and medium-sized enterprises (SMEs). The identified time frame can be used to analyse not only the immediate crisis response mechanisms but also the long-term adaptation mechanisms that can emerge as businesses adapt to the reality of the prolonged conflict.

This research paper has some unique contributions. First, it fills a great empirical gap: although the macroeconomic consequences of the war in Ukraine have been studied extensively (OECD, 2026; KSE Institute, 2025b), there is little systematic research on the topic of enterprise-level adaptation strategies. The literature on crisis management that exists has been largely created during peacetime conditions and there has been under-theorisation regarding its applicability to active armed conflict. Second, it promotes a reconsideration of the resilience of wartime.

This research views resilience as being more than a capacity to survive shocks but as a structural re-arrangement of activity following the long-term existential challenges. So, it provides other conflict-impacted settings with insights. Third, it adds to the literature on digitalisation as a resiliency facilitator, analysing the notion of accelerated digitalisation and the Resilient Business Hubs (UNDP, 2025) initiative that introduces the digital transformation into the wartime adaptation process. Fourth, it discusses human capital management in conflict zones examining the Human Capital Resilience Charter (Cabinet of Ministers of Ukraine, 2025) and enterprise initiatives to reintegrate veterans, provide flexible working hours, and mental health. Finally, it provides practical information to policymakers and other international partners as Ukraine leaves the state of war resilience and enters the phase of massive reconstruction.

The rest of this article is structured in the following way. Section 2 provides the review of the pertinent literature and creates a theoretical framework. Section 3 outlines the methodology, data collection and analysis. Section 4 presents findings and discusses them. Section 5 ends with major conclusions and suggests practical recommendations and future research directions.

1. Literature Review

Scholarly research into crisis management began to take shape in the 1980s and 1990s, and a strategic typology of crises was developed by Burnett (1998) that allows distinguishing between gradual crises, which occur over a long period of time, and sudden crises, which require immediate action. Pearson and Clair (1998) provided a psychologically inclined framework of the capacity to control meaning, legitimacy and stakeholder trust. Although effective, the frameworks rely on institutional continuity, that is, operating markets, enforceable contracts, and operational infrastructure that are systematically invalidated in full-scale war (OECD, 2026). In addition, the classical theory approaches the crisis as a one-time occurrence, but the conflict in Ukraine is a prolonged state of existential danger that requires long-term organisational competence instead of limited crisis management. Historically, in the post-Soviet setting, Ukrainian businesses have been working in an environment of institutional weakness and regulatory insecurity (Melnykovska, 2026). Nykytiuk et al. (2024) studied the competitive potential diagnostics of agricultural companies in the conditions of war, and Biliavska et al. (2025) reported on the practices of adaptation of Ukrainian farms under martial law, with security risks, disruption of logistics, and lack of labour being found to be the key challenges. Nonetheless, these researches deal with localized situations within certain areas instead of the economy-wide change needed to establish full scale invasion adaptation and thus cannot directly apply to the overall restructuring of competitiveness.

The foundational ecological definition of resilience, the capacity to absorb disturbance and reorganize while retaining core function, has been extensively adapted to organisational contexts (Barasa et al., 2018) with Denyer (2017) defining organisational resilience as the ability to anticipate, prepare for, respond to, and adapt to disruptions in order to survive and prosper. Capabilities-based approaches emphasize the integration of cognitive, behavioural, and contextual capabilities (Lengnick-Hall et al., 2011), while Williams et al. (2017) identify four resilience streams, engineering, ecological, psychological, and socio-ecological, suggesting resilience as a multi-level construct spanning individual, organisational, and inter-organisational analysis.

Recent empirical research compares resilience strategies between 114 Ukrainian and EU business owners using PLS-SEM analysis. Findings reveal that Ukrainian firms relies on improvisation, informal networks, and short-term coping mechanisms, whereas EU firms adopt structured, anticipatory approaches leveraging institutional frameworks; leadership competence influences resilience in both contexts, but anticipation capabilities do not directly translate into adaptation for Ukrainian firms as they do for EU firms (Lunhu et al., 2026).

Traditional wartime economics focused on macro-level phenomena, fiscal costs, capital destruction, and long-term development consequences (Collier, 1999). Blattman and Miguel (2010) note that while conflict negatively affects economic aggregates, firm-level heterogeneity remains underexplored. Oetzel and Getz (2012) distinguish reactive strategies (retrenchment, relocation) from proactive strategies (collaboration, social investment), finding that firms with greater resources and networks employ proactive approaches. In conflict-affected contexts, Polishchuk et al (2024) using an expert survey of 58 relocated micro, small, and medium enterprises in Ukraine, finds that security is the main driver of relocation, yet relocated businesses face declining self-financing capacity alongside increased demand for external funding; while host regional authorities and foreign donors play crucial adaptation roles, businesses demonstrate greater openness to foreign donors than local sponsors, contributing to host regions through taxes, employment, and product quality improvements. The Kyiv School of Economics documents economic losses and enterprise adaptation (KSE Institute 2025b). Zaichenko (2025) examines agricultural adaptation through market diversification, logistics investment, and digital technology (DT) adoption. The OECD (2026) provides macro-institutional analysis of financial markets for recovery.

Adaptation strategies in the agricultural sector include market diversification toward Europe, which received 57% of Ukrainian ag exports in 2024, alternative logistics via Danube ports and rail, and crop switching, with soybean acreage doubling as corn production declined due to lower profitability (Pyvovar et al., 2024). The energy challenges in manufacturing are unique, as organized assaults on energy infrastructure are pushing an investment in backup generation and decentralized power. One of the international supports is Resilient Business Hubs of the UNDP that offers co-working facilities with power backup and communication, as well as digitalisation support to micro, small, and medium businesses (UNDP, 2025). IT industry has shown an impressive resilience in terms of cloud migration, distributed work patterns, and mobilisation towards defence technology development, and the digital sector of Ukraine remains open to investment as part of the Diia.Special legal regime of cities (Sii Poland, 2026).

The literature identifies four interconnected streams shaping wartime enterprise adaptation. Crisis management theory explains how organisations respond to severe disruptions (Burnett, 1998; Pearson & Clair, 1998), but requires extension to prolonged armed conflict. Organisational resilience research provides frameworks for understanding how firms absorb, adapt to, and recover from shocks (Holling, 1973; Denyer, 2017; Williams et al., 2017), while wartime-specific mechanisms such as logistics mobility, energy autonomy, and technological adaptability remain insufficiently explored (Zaichenko, 2025). Wartime economics establishes the broader macroeconomic context (Collier, 1999; Blattman & Miguel, 2010), but gives limited attention to firm-level heterogeneity. Recent Ukrainian studies provide emerging evidence on enterprise adaptation (de Waal et al., 2025; Lunhu et al., 2026), yet lack an integrated framework linking diversification, digitalisation, supply chain restructuring, and human resource management as complementary dimensions of organisational resilience.

This work addresses this gap by integrating these four streams through a theoretical framework that captures both the strategic responses of enterprises and the moderating conditions, firm size, sector, geographic location, and institutional support, that define adaptation outcomes. This integration moves beyond sequential presentation of separate literature streams toward a synthetic understanding of wartime enterprise resilience as a dynamic, multi-dimensional capability.

Based on the existing literature, the proposed research designates an integrated theoretical framework that highlights four fundamental dimensions of wartime enterprise adaptation: diversification lessens the susceptibility to certain shocks in the product lines, markets, and geography (Zaichenko, 2025); innovation and digitalisation facilitates the so-called virtual continuity, which is the capacity to sustain core functions in the face of physical disruption due to cloud computing and artificial intelligence (Furman et al., 2025; Nesterenko et al., 2024); supply chain restructuring addresses disrupted material flows through localisation, alternative logistics, inventory holding, and vertical integration (Sii Poland, 2026); and human resource management addresses workforce displacement, mobilisation, and trauma through flexible arrangements, mental health support, and veteran reintegration (Cabinet of Ministers of Ukraine, 2025; Nemyrovska, 2025). The strategies are also moderated by the size of the firm, industry features, geographic position, and institutional support and the framework accepts the idea of adaptation as an iterative process through which firms constantly learn and change strategies according to changing circumstances.

Three gaps are identified in the literature. To begin with, there is a lack of systematic empirical research on the adaptation strategies at the enterprise level in wartime Ukraine. Second, the theories of crisis management and resilience designed under peacetime settings should be applied to the active armed conflict settings. Third, there is a lack of an integrated framework that would synthesize the crisis management, resilience, and wartime economics viewpoints. This paper fills these gaps with the systematic records of enterprise strategies in different sectors, analysing the conditions of effectiveness and producing policy and practice insights.

2. Research Methodology

Research Design and Approach

This study employs a mixed-source secondary-data research design, combining quantitative descriptive and inferential analysis of existing survey data with qualitative document analysis of corporate reports, case studies, and policy documents. The mixed-source approach enables triangulation of findings from multiple secondary data sources, enhancing the validity and richness of the analysis (Creswell & Creswell, 2009). This integrated approach is necessary to capture both the prevalence and mechanisms of adaptation strategies, due to the complexity of wartime economic adaptation and enterprise's experience diversity across sector/region.

The research design has three streams of related data, namely: Secondary quantitative data from existing enterprise surveys; Qualitative data from corporate reports and case studies; and Secondary analysis of official statistics, policy documents and reports from international organisations to provide context for the findings within the broader macro-economic and policy context.

Quantitative Data Sources and Sampling

The primary quantitative data are drawn from the Institute for Economic Research and Policy Consulting (IER) “Ukrainian Business in Wartime” monthly enterprise survey. This survey represents the most comprehensive longitudinal data collection effort on enterprise conditions in Ukraine during the full-scale war, employing a panel sample of over 500 enterprises located in 21 of Ukraine’s 27 regions, including Vinnytsia, Volyn, Dnipro, Zhytomyr, Zakarpattia, Zaporizhzhia, Ivano-Frankivsk, Kyiv, Kropyvnytskyi, Lviv, Odesa, Poltava, Rivne, Sumy, Ternopil, Kharkiv, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv regions, and the city of Kyiv (IER, 2026). The sampling frame designed to be representative within the classes of size of enterprises, sectors, and geographical areas except the temporarily occupied territories where data collection is not possible.

The survey is done every month since the start of the full-scale invasion, and the 45th wave was finished in January 2026, which allows examining the temporal trends during the war period. Each wave of the survey will require enterprise managers to report about the current performance indicators in comparison to the last month, analyse the business environment and significant challenges in the operations, predict the next two to six months, and, in some of the waves, make retrospective comparisons between the situation in the country before the war (February, 2022). The panel system makes it possible to monitor the changes at the single enterprise level through time.

In order to supplement the IER survey and offer more views on larger businesses and foreign-invested corporations, this study relies on the American Chamber of Commerce in Ukraine (AmCham Ukraine, 2026) survey, *Doing Business in Wartime Ukraine*, as a joint effort with Citi Ukraine in January 2026. This survey collected answers of 137 CEOs and top managers who were the representatives of the member companies in various industries, 72% of them were CEOs of member companies, and the remaining 28% were other top managers (AmCham Ukraine, 2026). The survey offers information about business operational condition and survival, asset destruction and repair condition, workforce effects, business performance and expectancy of growth, critical challenges and policy priorities, and adaptation practices.

In order to cover the small and medium enterprise (SME) sector, this paper uses the statistics of the United Nations Development Programme, which assesses how the war affects micro-, small-, and medium-sized businesses in Ukraine (UNDP, 2024), since it gives a systematized data on SME adaptation issues and solutions such as business relocation, digitalisation, and access to finance.

Sampling Procedure

The IER survey, from which the secondary data were obtained, employed a stratified random sampling design. The sampling frame was stratified by three dimensions: enterprise size (small, medium, large), sector (agriculture, manufacturing, IT, trade, services), and geographic region (21 regions of Ukraine). Within each stratum, enterprises were randomly selected to ensure representativeness. The exclusion criterion was location in temporarily occupied territories where data collection was impossible. For the AmCham survey, from which the secondary data were obtained, a purposive sampling strategy was used, targeting CEOs and top managers of member companies to ensure senior-level perspectives. All 137 member companies that responded to the invitation were included (census of willing participants). For qualitative case studies, secondary data from purposively selected cases were analysed to capture variation across sector, enterprise size, geographic location, and adaptation strategy.

Data Collection Process

The authors did not collect primary survey data. Instead, all quantitative and qualitative data analysed in this study are secondary data obtained from the sources described below. Quantitative data were collected as follows. For the IER survey, data were obtained through monthly computer-assisted telephone interviews conducted between February 2022 and January 2026. For the AmCham survey, data were collected via an online questionnaire distributed in January 2026, with responses anonymized prior to analysis. Qualitative data were collected by downloading corporate sustainability reports, annual reports, case studies, and policy documents from official organisational websites between January and March 2026.

Qualitative Data Sources and Case Study Selection

In order to obtain qualitative evidence of enterprise adaptation strategies in detail, this research is based on the analysis of corporate sustainability reports, annual reports, and public disclosures of large Ukrainian businesses. These records give enterprise-created reports on the adaptation strategies, including justifications, implementation process, and actual results.

The discussion is based on reports published in 2022–2026, and specifically on disclosures that were made on the topic of wartime adaptation. The main corporate reports under analysis are:

- Astarta Holding's Annual Report 2024, documenting the agricultural holding's adaptation strategies including logistics diversification and employee support programs (Astarta Holding, 2025);
- Metinvest's Annual Report 2023, detailing the steel and mining group's response to wartime challenges including relocation, employee support, and community engagement (Metinvest, 2023);
- DTEK's "Standing with Ukraine" reports, documenting the energy company's efforts to maintain operations despite systematic attacks on energy infrastructure (Interfax-Ukraine, 2025);
- SoftServe's Sustainability Report 2024, providing insights into the IT sector's adaptation strategies including remote work implementation and employee well-being initiatives (SoftServe, 2024);
- EPAM's "700 Days of Resilience" report, documenting the technology company's support for Ukraine during the full-scale war (EPAM, 2023).

To complement the analysis of large corporate reports with insights from smaller enterprises, this study incorporates documented case studies from international organisations, following a purposive sampling strategy designed to capture variation across sector, enterprise size, geographic location, and adaptation strategy. Key case studies analysed include:

- Metal Comfort of Life, a metalworking enterprise that relocated from Kharkiv to Poltava region and rebuilt operations with support from the international labour Organisation's Start and Improve Your Business program (ILO, 2025);
- MHP, a large agricultural holding whose adaptation strategies during the early months of the invasion were documented by Forbes Ukraine, including the relocation of top management to production facilities (MHP, 2024);
- Multiple enterprise cases documented by the KSE Institute's educational platform on business financing, providing insights into SME adaptation and access to finance (KSE Institute, 2025a).

This study analyses key policy documents and institutional initiatives for the analysis of the enterprise-level adaptation strategies within the broader policy environment. Those includes Human Capital Resilience Charter (Cabinet of Ministers of Ukraine, 2025), the Ukraine Facility (European Parliament, 2024), and reports from international financial institutions (OECD, 2026; World Bank, 2025).

Data Analysis Procedure

The analysis of the quantitative data available in the IER and AmCham surveys is carried out with the help of descriptive statistics. The distribution of the enterprise conditions, challenges, and adaptation strategies among the sample is characterized with the help of descriptive statistics, such as frequencies and percentages. Temporal dynamics in the IER panel data are examined with the help of comparing key indicators within the survey waves in order to identify trends of change throughout the 2022-2026 period. The variation in adaptation strategies in terms of enterprise size (large, medium, small), sector (agriculture, manufacturing, IT, trade, services), and geographic location (frontline, western, central regions) is studied using cross-tabulations in which sufficient sample sizes allow making meaningful comparisons. All quantitative analyses, descriptive statistics and inferential tests, were performed using Stata 18.0 (StataCorp, College Station, TX). Stata was used for computing descriptive statistics (frequencies, percentages, means, and standard deviations), conducting chi-square tests of independence, estimating binary and ordered logistic regression models, performing paired t-tests for panel trend analysis, and generating cross-tabulations by enterprise size, sector, and geographic location.

To test the research hypotheses, chi-square tests examine differences in strategy adoption across enterprise size, sector, and geographic location; binary logistic regression models the probability of remaining fully operational as a function of diversification, digitalisation, supply chain restructuring, human resource management innovations, enterprise size, sector, and geographic location, with results reported as odds ratios and p-values; and paired t-tests assess changes in key indicators, pessimistic expectations and labour shortages, across the 45 monthly IER survey waves.

The qualitative analysis unfolds in five phases: (1) familiarisation – all documents are read to gain an overall understanding and to identify initial patterns; (2) coding – text segments relevant to adaptation strategies are systematically coded using descriptive codes and linked to the theoretical framework (diversification, digitalisation, restructuring of the value chain and HRM); (3) theme development, codes are aggregated to create broader themes, representing patterns of adaptation strategies and underlying mechanisms; (4) theme review and refinement – to ensure themes reflect the coded data; (5) synthesis – themes are synthesised to develop an integrated understanding of enterprise adaptation strategies and their effectiveness. Qualitative data were analysed using thematic analysis, following the procedures outlined by Braun and Clarke (2006), supported by NVivo 14 (QSR International). NVivo facilitated systematic coding of text segments from corporate reports and policy documents, organizing and retrieving coded segments by theme, tracking theme development across multiple documents, and generating summary reports of coded content for each theme.

The combination of quantitative and qualitative results is made in the form of triangulation when the results of various sources of data are compared and contrasted with each other to detect convergent and divergent trends. The quantitative survey data are evidence of the prevalence and distribution of adaptation strategies in the population of the enterprise, and the

qualitative case data are evidence of the processes, mechanisms, and contextual factors that form adaptation outcomes. At the intersection of quantitative and qualitative results, the reliability of the results is increased; at the intersection of the results, the difference is explored to determine the source of variation or the shortcoming of each data source.

There are a few limitations that should be admitted. To begin with, enterprises located in temporarily occupied territories and where data collection is not possible are not covered by IER survey; the experiences of enterprises operating under occupation or not operating at all are not reflected. Second, the sample of AmCham is skewed towards bigger enterprises and foreign-invested business, which restricts its representativeness to the larger population of enterprises, especially the small and micro-enterprise categories. Third, corporate sustainability reports and public disclosures can provide idealized views of enterprise adjustment, and may underreport difficulties and failures; to address this, the analysis uses a variety of sources where feasible to each enterprise and cross-checks corporate reports with survey data and third-party reports. Fourth, the fast-changing wartime situation implies that results represent the situation at particular times and might not be applicable to any other situation in the future; the analysis highlights the account of time-based trends when it is possible and the dynamical nature of the situation.

3. Empirical Results

The analysis reveals remarkable operational resilience among Ukrainian enterprises despite four years of full-scale war. According to the AmCham Ukraine survey conducted in January 2026, 90% of enterprises remain fully operational, with the IT and agriculture sectors showing the highest rates at 96% and 94% respectively (AmCham Ukraine 2026). The IER monthly survey corroborates these findings, showing that complete operational cessation has stabilized at approximately 5-7% throughout 2025 (IER 2026). Despite this continuity, the war has imposed significant costs. Table 1 summarizes war-related damages and workforce impacts.

Table 1: War-Related Damages and Workforce Impacts

Impact category	Percentage (%)
Asset Damage Reported	47
Among Damaged: Facilities Unrepaired	19
Employees Injured	57
Employees Killed	35
Employees in Armed Forces	85
Currently Employ Veterans	64

Source: AmCham Ukraine (2026). N = 137 enterprises

As shown in Table 1, 47% of businesses reported asset damage, while 20% were unable to complete repairs. Workforce impacts were substantial, with 53% reporting injuries and 34% fatalities. Moreover, 85% employ personnel serving in the military and 64% employ veterans. Despite these challenges, business activity has stabilized: 79% reported growth in 2025 and 61% expected growth in 2026 (AmCham Ukraine, 2026). IER data also show that pessimistic expectations declined from 68% in March 2022 to 22% in January 2026, while labour shortages (68%), security concerns (62%), and power outages (58%) remain key challenges (IER, 2026).

Adaptation has focused on diversification, relocation, and digital transformation (DT). Among exporters, 43% diversified markets, up from 28% in 2023, led by agriculture (58%) and a shift toward EU markets. Product diversification was strongest in technology, where 52% introduced new products, compared with 28% overall. Among frontline enterprises, 35% relocated, rising to 42% in manufacturing, mainly toward western Ukraine. DT also accelerated, with 67% adopting new digital technologies since February 2022; Table 2 details adoption by technology type.

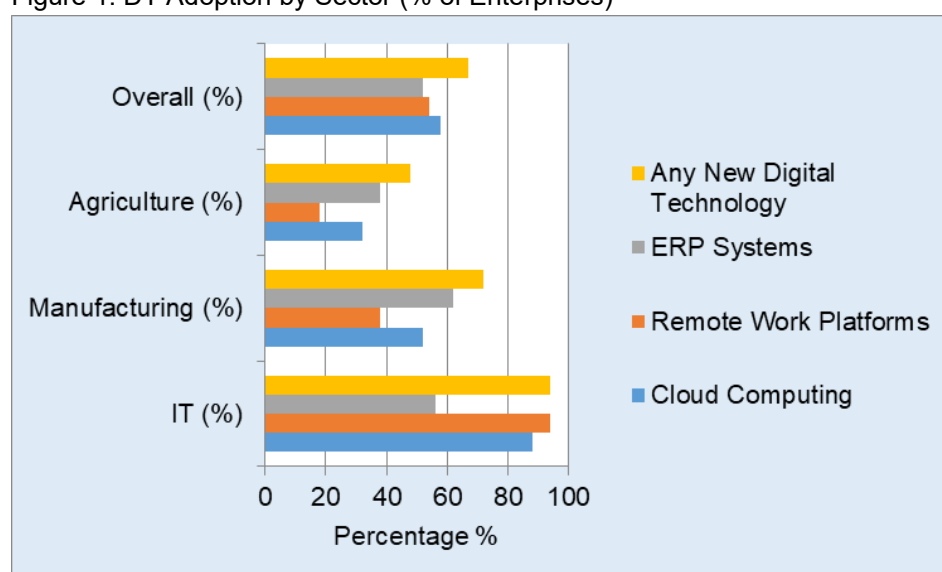
Table 2: DT Adoption by Sector

Technology	IT (%)	Manufacturing (%)	Agriculture (%)	Overall (%)
Cloud Computing	88	52	32	58
Remote Work Platforms	94	38	18	54
ERP Systems	56	62	38	52
Any New Digital Tech	94	72	48	67

Source: IER (2026). N = 500+ enterprises

The IT sector leads all categories, particularly in remote work platforms (94%) and any new DT (94%). Manufacturing shows moderate adoption (72% for any new DT), while agriculture lags significantly at 48%, highlighting a digital divide across sectors. Cloud computing is the most widely adopted technology overall (58%), followed by remote work platforms (54%) and ERP systems (52%). While 18% of workers were working remotely in February 2022, this increased to 68% in January 2026, with the IT industry at 90% (IER 2026). Institutional support comprises Resilient Business Hubs set up by UNDP, which offer digital infrastructure and training (UNDP 2025). The adoption of DT by sectors is represented in Figure 1. Figure 1 shows the level of adoption of four digital technologies in four industries (IT, manufacturing, agriculture and the general average). Digital divide is evident with the IT sector in the first position in all categories, and agriculture at the lowest.

Figure 1: DT Adoption by Sector (% of Enterprises)



Source: Author's compilation based on IER (2026).

Supply chain restructuring has been implemented by 56% of enterprises. Table 3 summarizes key modifications.

Table 3: Supply Chain Modifications by Sector

Modification	IT (%)	Manufacturing (%)	Agriculture (%)	Overall (%)
Shift to Domestic Suppliers	48	42	44	43
Diversified Supplier Base	42	38	38	38
Increased Inventory	52	44	48	48
Any Modification	68	58	56	56

Source: IER (2026), N = 500+ enterprises. Note: Percentages draw on IER (N=500+), AmCham (N=137), and UNDP SME data. As methodologies differ, comparisons are valid only where question wording and response categories are comparable.

The World Bank (2025) estimates domestically sourced agricultural inputs increased from 45% to 62%. Logistics route development reached 62% of exporters, with agriculture leading at 78% developing Danube ports and rail connections to the EU (IER, 2026). Danube ports processed 35 million tons in 2023, a tenfold increase. Energy resilience investments have been made by 82% of enterprises, with 68% acquiring diesel generators and 42% implementing efficiency upgrades (AmCham Ukraine, 2026). Power outages remain a leading obstacle following attacks that shut down 60% of gas production capacity (KSE Institute, 2025b). Workforce impacts are substantial: 85% of enterprises have employees serving in the Armed Forces, and 64% employ veterans. Table 4 presents details of employee support programs.

Table 4: Employee Support Programs by Enterprise Size

Program	Large (%)	Medium (%)	Small (%)	Overall (%)
Flexible Work	96	84	68	84
Financial Assistance	92	78	58	78
Relocation Support	88	72	48	72
Psychological Counselling	84	62	38	64

Source: AmCham Ukraine (2026). N = 137 enterprises

In July 2025, the Human Capital Resilience Charter was signed which provides nine principles of managing the workforce in wartime, backed by the EBRD, National Bank of Ukraine, and large business enterprises such as Metinvest and DTEK (Cabinet of Ministers of Ukraine, 2025). Metinvest provided over UAH 500 million in employee assistance (Metinvest, 2023); SoftServe established a \$5 million employee support fund (SoftServe, 2024).

Adaptation strategies vary systematically by enterprise size. Table 5 presents key differences.

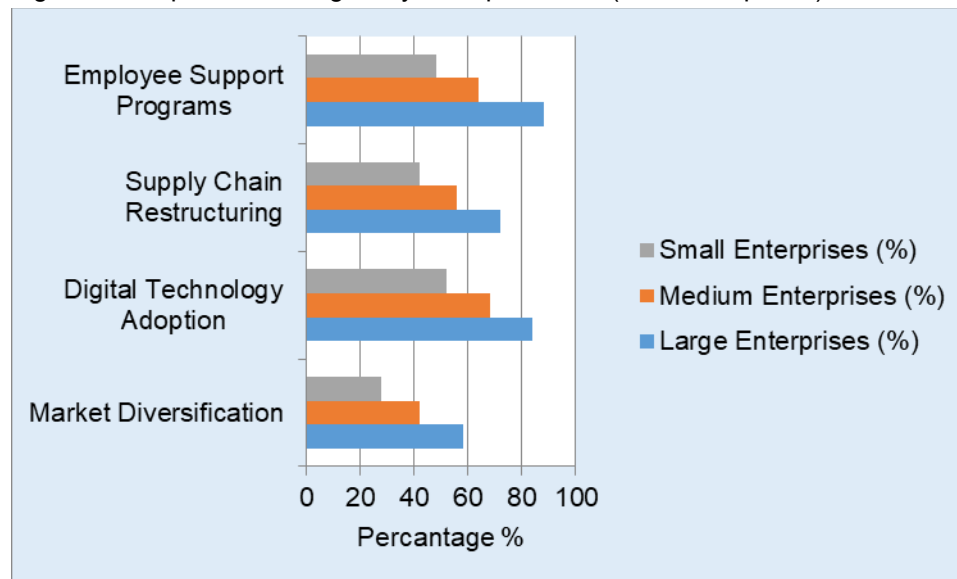
Table 5: Adaptation Strategies by Enterprise Size

Strategy	Large (%)	Medium (%)	Small (%)
Market Diversification	58	42	28
DT Adoption	84	68	52
Supply Chain Restructuring	72	56	42
Employee Support Programs	88	64	48

Source: IER (2026). N = 500+ enterprises

Geographic variation is equally pronounced. Frontline enterprises face higher security concerns (84% vs. 32% in western regions) and power outages (76% vs. 48%), and have been more likely to relocate (42% vs. 8%) (IER, 2026). Figure 2 shows adaption strategies in visual form.

Figure 2: Adaptation Strategies by Enterprise Size (% of Enterprises)



Source: Author's compilation based on IER (2026).

Figure 2 shows that there is a comparison of four adaptation strategies among large, medium and small enterprises. Resource differences are always observed in larger enterprises.

Chi-square tests reveal significant associations between enterprise size and the adoption of all four adaptation strategies ($p < 0.01$ for all). Digitalisation adoption shows the strongest association ($\chi^2 = 28.4$, $df = 2$, $p < 0.001$), with 84% of large enterprises adopting new digital technologies compared to 52% of small enterprises. Sectoral differences are also significant ($\chi^2 = 34.2$, $df = 4$, $p < 0.001$), with the IT sector (94%) showing substantially higher adoption than agriculture (48%). Geographic differences are significant for relocation ($\chi^2 = 18.6$, $df = 2$, $p < 0.001$), with frontline enterprises relocating at 42% compared to 8% in western regions.

Logistic Regression Results

Table 6 presents the logistic regression results for the probability of remaining fully operational.

Table 6: Logistic Regression results for Operational Status

Strategy variable	Coefficient	Standard error	p-value	Odds ratio
Diversification (index)	0.42	0.12	0.001	1.52
Digitalisation Adoption	0.78	0.18	<0.001	2.18
Supply Chain Restructuring	0.35	0.14	0.012	1.42
HRM Innovations	0.51	0.15	<0.001	1.67
Enterprise Size (medium)	0.28	0.11	0.018	1.32
Enterprise Size (large)	0.63	0.16	<0.001	1.88

Strategy variable	Coefficient	Standard error	p-value	Odds ratio
Sector (manufacturing)	-0.19	0.13	0.144	0.83
Sector (agriculture)	-0.41	0.17	0.016	0.66
Geographic (frontline)	-0.52	0.15	<0.001	0.59
Constant	-1.24	0.23	<0.001	—

Source: Author's calculations based on IER (2026), N = 500+ enterprises; Pseudo R^2 = 0.28; Log-likelihood = -312.4.

The logistic regression results provide support for Hypotheses 1-3. Enterprises that adopt digitalisation have 2.18 times higher odds of remaining fully operational ($p < 0.001$). HRM innovations are associated with 1.67 times higher odds ($p < 0.001$). Large enterprises have 1.88 times higher odds of remaining operational compared to small enterprises ($p < 0.001$). Frontline enterprises have significantly lower odds of remaining operational (OR = 0.59, $p < 0.001$). Sectoral differences show that agricultural enterprises face significantly lower odds of remaining operational compared to the IT sector (OR = 0.66, $p = 0.016$).

Paired t-tests across the 45 IER waves reveal that pessimistic expectations declined significantly from March 2022 (68%) to January 2026 (22%), with a mean decrease of 46% ($t = 12.8$, $df = 44$, $p < 0.001$). Labour shortages emerged as the dominant challenge from mid-2023 onward, with a statistically significant increase from 42% in January 2023 to 68% in January 2026 ($t = 6.4$, $df = 44$, $p < 0.001$).

Table 6 and all inferential results are based on microdata available from the IER survey. Results are statistically significant at $p < 0.05$ unless otherwise noted.

4. Discussion

The findings reveal that Ukrainian enterprises have demonstrated resilience extending beyond conventional crisis management frameworks. Classical literature conceptualizes crises as discrete events presupposing institutional continuity (Burnett, 1998; Pearson & Clair, 1998). The Ukrainian experience challenges these assumptions. Enterprises have not returned to pre-crisis equilibrium as implied by engineering resilience models, but have fundamentally reorganized operational models in response to persistent existential threats. In line with Holling's (1973) ecological resilience view, it is the ability of systems to withstand disturbance and reorganise during the process.

The diversification strategies reported are not intended as a means of recovery but as basic, fundamental shifts in the nature of the business, such as market diversification and product diversification as well as geographic relocation of businesses. Astarta's development of alternative export channels through Danube ports (Astarta Holding, 2025) and Metal Comfort of Life's relocation from Kharkiv to Poltava (ILO, 2025) exemplifies this reorganisation. The conceptualisation of resilience as "the central concept of competitiveness" by Zaichenko (2025) has empirical support. The three areas he points to, logistics mobility, energy autonomy, and technological adaptability, are there: 62% of exporters introduced new logistics routes, 82% invested in energy resilience and 67% in the introduction of new digital technologies (IER, 2026; AmCham Ukraine, 2026).

The results of this research point to wartime resilience as a process of conscious investing and strategic adaptation. Lengnick-Hall et al. (2011) highlighted human aspects of resilience and they are also apparent. Workforce resilience is included in the Human Capital Resilience Charter (Cabinet of Ministers of Ukraine, 2025) as an integral part of the

organization's survival. The high percentage of companies providing flexible working, financial support and psychological counselling is indicative of what Hannah et al. (2009) describe as “adaptive leadership”, a leadership style that involves engaging stakeholders in developing new solutions where the existing ways of doing things are no longer working.

The inferential analysis confirms the statistical significance of these patterns. Chi-square tests validate that strategy adoption varies significantly by enterprise size, sector, and geography, with digitalisation showing the strongest size-based disparity. The chi-square results also support H2, confirming that strategy adoption varies significantly by enterprise size. Logistic regression identifies digitalisation as the most powerful predictor of operational continuity, followed by HRM innovations, supporting H1 and H3. Panel trend analysis further reveals significant shifts in business expectations and labour shortages over the observation period, reflecting the evolving wartime environment.

The results document an acceleration of digital transformation that merits theoretical attention. Accelerated digitalisation is fast adoption of technology that is in response to need and not efficiency. The finding that 67% of enterprises adopted new digital technologies since February 2022, with adoption reaching 94% in the IT sector, represents a pace of change that would likely have taken years under peacetime conditions. The fact that the technology industry has been able to operate without physical location, as evidenced by the cloud migration of SoftServe that allowed the company to support 95% remote work in a few weeks (SoftServe, 2024) shows that digitalisation can decouple operations and physical location. Businesses whose digital capabilities are internal might be in a better position to survive shocks that destroy physical infrastructure. The institutional support, such as Resilient Business Hubs (UNDP, 2025) and educational platform of the KSE Institute (KSE Institute, 2025a) imply that digitalisation is influenced by the broader institutional context, which is consistent with the observation of Williams et al. (2017) that resilience is a multi-level construct. Nonetheless, there is a considerable difference: agricultural enterprises have the lowest level of adoption at 48% in comparison with 94% in IT; small enterprises at 52% in comparison with 84% in large enterprises (IER, 2026). These disparities raise concerns about distributional consequences, as businesses that are less adopted can become more vulnerable in case digital capabilities become a survival requirement in wartime.

The findings reveal a complex interplay between enterprise-level adaptation strategies and government support. The Human Capital Resilience Charter is a charity, sponsored by the EBRD and the National Bank of Ukraine (Cabinet of Ministers of Ukraine, 2025) and is an example of public-private collaboration breaking the boundaries between firms and policy. The Ukraine Facility offers institutional structures through which adaptation financing is accessed. In its report, OECD (2026) highlights the importance of deep financial markets in the process of channelling reconstruction resources. Businesses have acted: 82% have invested in energy resilience (AmCham Ukraine, 2026), which implies that funding has made adaptation possible. This is consistent with findings on EU agriculture, where CAP eco-schemes have demonstrated potential in reducing energy intensity and enhancing economic resilience through targeted energy-use interventions (Pimenow et al., 2026b). But there are still unrelenting problems. Such aspects of risk enterprise strategies are labour shortages and security concerns (IER, 2026) that cannot be mitigated entirely.

The geographic difference: frontline enterprises have much greater security concerns (84% vs. 32% in western regions) and power outage (76% vs. 48%) implies that government support should be regionally differentiated. This trend of frontline enterprises moving at an increased rate (42% vs. 8%) (IER 2026) can have some undesired effects on the economic development of the region unless specific efforts are made to support the staying enterprises. The role of EU policy instruments in promoting circular economy pathways for critical raw materials further underscores the importance of institutional frameworks in building enterprise resilience (Pimenow et al., 2026a).

Several limitations should be acknowledged. First, the IER survey excludes enterprises in temporarily occupied territories, potentially biasing findings toward more resilient enterprises. Second, the AmCham sample is biased toward larger enterprises and foreign-invested firms, limiting representativeness for micro-enterprises and small businesses. Third, corporate sustainability reports may present idealized accounts; triangulation with survey data and third-party documentation partially mitigates this. Fourth, the rapidly evolving wartime context limits generalizability to future conditions. Fifth, the study's focus on enterprise-level strategies abstracts from broader macroeconomic and geopolitical factors warranting further investigation. Two methodological constraints warrant discussion. First, survivor bias is inherent: the IER survey captures only operating enterprises, potentially overestimating adaptation effectiveness. Second, source heterogeneity limits comparability across datasets, as the IER and AmCham surveys use different sampling frames and indicators. To mitigate these issues, the analysis triangulates findings across sources and focuses on consistent patterns rather than any single dataset.

There are various implications based on the findings. To begin with, there must be policy to facilitate the development of digital capability. Policy can increase this by making investments in digital infrastructure, building skills, and initiatives to support small businesses and agricultural enterprises to adopt new digital technologies (IER 2026, 67% adoption). Second, strategic priorities should include energy resilience. As power outages are the greatest challenge with 82% investing in energy resilience (AmCham Ukraine, 2026), policy must be in favour of distributed generation and grid hardening and encourage sustainable options such as solar and battery storage over diesel generators. Third, human capital policies should face the workforce issues in times of war. The Human capital resilience Charter is a framework that needs long-term support in implementation. Veteran reintegration, which applies to 64 per cent of the businesses that employ a veteran, requires a systematic program that uses military experience to map the experience to civilian skills. Mental health support, mentioned by 47% of enterprises, needs available services to trauma-affected employees. Fourth, policy coordination is needed in supply chain resilience. The development of alternative logistics routes even though it was a venture of the enterprise, had institutional support of the customs procedures and investment in infrastructure. The Danube ports case of tenfold capacity increment demonstrates the prospect of collaborating between the government and business. Fifth, policy should deal with geographic inequalities. The concentration of relocation in western and central areas implies that the frontline areas stand the risk of economic marginalisation. Specific assistance to businesses that will still be in the frontline areas is needed to ensure that economic activities and jobs continue in the impacted communities.

Conclusion

This study has examined the anti-crisis strategies employed by Ukrainian enterprises during the war, which found four fundamental adaptive processes, including diversification, digitalisation, restructuring the supply chain, and human resource management innovation, which have made the operations of these enterprises remarkably resilient despite human and physical losses. Ukrainian enterprises have demonstrated that survival under persistent existential threat requires fundamentally restructuring operational patterns, not merely returning to a pre-crisis equilibrium. Rapid digitalisation is one of the key facilitators of decoupling the functions of business and location. Institutional support, such as public-private partnerships and international mechanisms, has been crucial to the interplay between enterprise-level strategies and institutional support, but in the face of ongoing problems, including labour shortages, security issues, and power outages, the constraints of firm-level action are brought to light.

As per findings, a number of policy recommendations are provided. Policymakers must increase digital support services, and barriers to technology uptake among small businesses should be cut, the shift to diesel generators towards sustainable energy sources like solar and battery storage should be rewarded and grid hardening should be invested in. The Human Capital Resilience Charter principles must be converted into quantifiable goals with the focus on reintegrating veterans and providing mental health care. The institutional assistance should be aimed at the facilitation of customs, investment of infrastructure in Danube ports and rail network, and further international support of energy infrastructure, digitalisation, and human capital development.

There are few future research recommendations. The longitudinal analysis that follows the enterprises during rebuilding after the war would be an analysis of how the strategies adopted in war translate into recovery patterns. Every conflict-based situation would be compared to find generalizable variables that influence the resilience of wartime. The distributional impact of digitalisation should be studied more thoroughly, as should be research into the distributional impact of wartime work arrangements in the long term. Also, the reconceptualisation of resilience as the ability to essentially restructure in the face of unrelenting existential threats deserves further theoretical elaboration. Future research could also examine the role of cognitive biases in shaping risk management and strategic decision-making under wartime conditions, as recent studies suggest such biases significantly influence enterprise behaviour in high-uncertainty environments (Shkarupa et al., 2025).

CRedit Authorship Contribution Statement

Abernikhina, I.: Conceptualization, Methodology, Writing – Original Draft; Mushnykova, S.: Supervision, Project Administration, Validation; Klochkov, O.: Data Curation, Formal Analysis; Shalenyi, V.: Investigation, Visualization; Khalipova, N.: Review and Editing, Validation.

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Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from publicly accessible sources. IER and AmCham survey data are available from the respective organisations upon request. Corporate reports, case studies, and policy documents cited in this study are publicly available from the organisations' official websites as listed in the references.

Ethical Approval Statement

Ethical approval was waived for this study due to the use of anonymized secondary data from publicly available sources and the retrospective nature of the study. No primary data collection involving human participants was conducted.

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