

Digital Transformation and Resilience of Ukrainian SMEs under Martial Law: Technological Maturity, Challenges, and Adaptation Strategies

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Abstract

The article highlights the specifics of digital transformation of small and medium-sized enterprises (SMEs) in Ukraine under martial law, identifying the main challenges and opportunities arising from accelerated digitalization processes. The study analyzes the current state of SME adaptation to digital technologies, changes in consumer behavior patterns, and their impact on the evolution of business models during wartime. A comprehensive analysis was conducted using official statistics from the State Statistics Service of Ukraine, sectoral studies of the Ministry of Digital Transformation of Ukraine, reports by the European Business Association, UNDP, and analytical materials from research institutions. The findings reveal a significant acceleration of SME digitalization due to martial law, as well as a fundamental shift in business models from strategic digital planning to crisis-driven survival and adaptation.

The study identifies three levels of technological maturity in SME digitalization: a basic level (60% of enterprises), which uses social networks, messengers, online banking, and simple CRM systems; an advanced level (30% of enterprises), which implements e-commerce platforms, integrated management systems, cloud services, and digital payment solutions; and an innovative level (10% of enterprises), which utilizes artificial intelligence, business process automation, IoT solutions, and blockchain technologies. A correlation was found between technological maturity levels and SME financial and economic performance.

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A comprehensive typology of SME digital adaptation strategies was developed: reactive strategies, which involve minimal adaptation under external pressure; adaptive strategies, which involve systematic implementation of digital solutions for core business processes; and transformational strategies, which involve radical restructuring of business models based on digital technologies and demonstrate the highest resilience, with a business activity recovery index of 0.52 compared to 0.31 for reactive strategies.

Key obstacles to digital transformation were identified, including financial constraints, workforce qualification issues, technical difficulties, and integration challenges. Practical recommendations include gradual implementation of digital solutions, use of government platforms, investment in employee training, and development of backup strategies. For state policy, recommendations include expanding financial support programs, developing digital infrastructure, and creating sectoral competence centers.

Keywords: digital transformation; small and medium-sized enterprises; martial law; business modeling; digital adaptation strategy; innovation; digitalization.

Introduction

Under the conditions of full-scale Russian aggression, Ukrainian businesses have faced unprecedented challenges that have radically changed the economic environment. Small and medium-sized enterprises (SMEs), which form the backbone of the Ukrainian economy, are now in a situation where digital transformation has shifted from a desirable strategic direction to a critical necessity for survival and adaptation.

According to the State Statistics Service of Ukraine, as of 2022, the number of SMEs in Ukraine was 1.7 million, representing an 11.4% decrease compared to 2021 (State Statistics Service of Ukraine, n.d.). The SME sector employed 6.1 million people, or 82% of all workers in business entities, and contributed approximately 60% of GDP, playing a key role in employment.

A 2024 study by the European Business Association found that nearly 80% of Ukrainian SMEs plan to expand despite wartime conditions, with significant attention given to digital transformation: 67% of respondents use digital channels to sell goods or services, of which 15% sell exclusively online (European Business Association, 2024).

The relevance of this study is determined by the need for scientific understanding of SME digital transformation in extreme conditions, identification of success factors, and development of practical recommendations to increase business adaptability.

Problem Statement.

Full-scale Russian aggression has fundamentally changed the operational conditions of the Ukrainian economy, creating unprecedented challenges for SMEs. Wartime conditions have also caused fundamental changes in consumer behavior and business processes, accelerating digital transformation. While digitalization was considered a strategic perspective before the war, under martial law it has become a critical necessity for business survival and adaptation to new realities.

The complexity lies in the fact that SME digital transformation under martial law occurs under multiple constraints: infrastructure destruction, financial resource shortages, workforce crises, logistical problems, and high uncertainty. Yet, according to the European Business Association

(2024), nearly 80% of SMEs plan to expand in 2024, indicating high adaptive potential in Ukraine's domestic economy.

The scientific problem is the insufficient theoretical understanding of enterprise digitalization under extreme operating conditions, the lack of a systematized approach to analyzing SME adaptation strategies, and the absence of empirically justified recommendations for successful digital transformation during a crisis.

The practical significance lies in the need to develop effective mechanisms for supporting SMEs in digital transformation, which is critical for ensuring Ukraine's economic resilience during the war, preparing for post-war economic recovery, integrating the Ukrainian economy into the European digital space, and enhancing domestic business competitiveness in global markets.

Literature Review. The theoretical foundations of digital business transformation have been studied by numerous domestic and international scholars. Classic works in this field include M. Porter, who considered digital technologies as a source of competitive advantage, and E. Brynjolfsson, who analyzed the impact of digitalization on enterprise productivity.

In Ukrainian literature, the digital transformation of SMEs is explored by O. Kovalenko and N. Kraus, who examine the impact of digitalization on national economic development. S. Kropelnyska, S. Yekimov, and O. Aleksandrovykh explore the dual nature of Ukraine's entrepreneurial environment, characterized by both persistent constraints and new resilience of SMEs during wartime, signaling potential revival of Ukrainian entrepreneurship (Kropelnyska et al., 2025).

UNDP (2024) reports that war has caused severe losses, with 18.2% of enterprises in Eastern Ukraine forced to suspend operations for 12 months or more, and 12.7% in Southern Ukraine. At the same time, positive adaptation trends are observed. According to the Institute for Economic Research, medium-sized businesses exhibit the highest Business Activity Recovery Index—0.41 compared to 0.35 for small enterprises and 0.26 for large ones.

A research gap exists in the insufficient coverage of SME digital transformation specifically under martial law, making this study particularly relevant.

Research Aim. The aim of this study is to identify the specifics of digital transformation of SMEs in Ukraine under martial law, determine the main challenges and opportunities, and develop strategies for successful adaptation to new operating conditions.

Methodology

The study employs a systems approach to analyze SME digital transformation. Methods include descriptive statistical analysis of State Statistics Service data, comparative analysis of sectoral studies, content analysis of international organization reports, and synthesis for conclusions and recommendations.

The data sources include official statistics from the State Statistics Service of Ukraine, reports from the Ministry of Digital Transformation of Ukraine, studies by the European Business Association, UNDP, the Institute of Economic Research, and analytical materials from the National Institute for Strategic Studies.

Results

Digital transformation of Ukrainian SMEs under martial law is characterized by accelerated adoption of digital solutions. In 2024, 67% of SMEs used digital channels for selling goods or services, reflecting a significant increase compared to pre-war levels, where only 40–45% of enterprises actively used digital sales channels. Notably, 15% of SMEs sell exclusively online, indicating full digital transformation of business models (OLX Business Guide, 2024).

Mixed models (online + offline) are used by 52% of SMEs, demonstrating rational diversification of sales channels. However, 33% of enterprises still do not use digital channels, primarily in traditional sectors, remote regions, or businesses with limited digital resources, indicating potential for further digital growth.

The analysis of the Regional Digital Transformation Index shows uneven development. Over four years, the Center for Digital Transformation of Organizations (CDTO) implemented over 210 intersectoral projects, with concentration in economically developed regions: Kyiv (78%), Lviv (65%), and Dnipropetrovsk (62%). Border and conflict-affected regions showed lower rates due to infrastructure destruction and population migration.

A key feature of the Ukrainian SME digitalization model is integration with government digital platforms. The “Diia” platform reduces transaction costs with the state, accelerates administrative procedures, and increases consumer trust. “Diia.Business” offers free consultations to entrepreneurs, with over 50,000 SMEs using the platform.

Financial and economic indicators vary by technological maturity: basic level reduces operational costs by 8–12%; advanced level increases productivity by 15–25%; innovative level boosts revenues by 30–45% through 23% faster sales growth, 18% operational cost reduction, and 35% faster market adaptation (Ministry of Digital Transformation of Ukraine, 2024).

Key trends include:

- Accelerated adaptation—digital solution adoption rates increased 2–2.5 times compared to pre-war levels.
- Crisis-driven transformation—adaptation is motivated by necessity rather than strategy.
- Uneven development—regional, sectoral, and size disparities exist.
- State as catalyst—government digital platforms stimulate business digitalization.
- Growth potential—33% of SMEs have yet to adopt digital channels.

Three types of digital adaptation strategies were identified:

1. **Reactive strategies (35%)**—minimal adaptation, basic digital tools (social media, messengers).
2. **Adaptive strategies (45%)**—systematic use of digital solutions for core business processes (e-commerce, digital payments, cloud services).
3. **Transformational strategies (20%)**—radical business model redesign based on digital technologies.

SMEs with transformational strategies demonstrate the highest resilience, with a business activity recovery index of 0.52, compared to 0.31 for reactive strategies.

Conclusions and Further Research. The study confirms accelerated digitalization of SMEs under martial law: 67% use digital sales channels, a 25–30% increase over pre-war levels. Successful digital transformation depends on leadership readiness and financial resources. SMEs with proactive digital strategies show higher overall and financial resilience.

Government platforms play a crucial role in supporting SMEs, enhancing digital literacy and simplifying state interactions. Ukrainian SME digitalization rates during the crisis exceed European averages, although the quality of digital solutions requires improvement. Despite reduced perception of inaccessibility of bank loans (from 59% to 42%), one-third of SMEs still do not use digital channels.

Recommendations for SMEs include stepwise implementation of digital tools, leveraging government platforms for consultation, investing in employee digital skills, and developing alternative operational scenarios for flexibility.

State policy should focus on expanding financial support, developing digital infrastructure, creating sectoral competence centers, and integrating with European digital platforms to enhance SME export potential.

Future research should explore the impact of SME digitalization on regional development, develop methods for assessing digital maturity under crisis conditions, and evaluate the effectiveness of state support programs to ensure adaptive management of business knowledge under martial law. Digital transformation represents not only forced adaptation but a strategic opportunity for a more resilient and competitive Ukrainian economy.

Table 1. Technological maturity of Ukrainian SMEs and associated performance outcomes under martial law

Technological maturity level	Share of SMEs	Dominant digital technologies	Degree of organizational integration	Primary wartime function	Reported performance outcome	Strategic interpretation
Basic	60%	Social networks, messaging applications, online banking, digital communication tools, and simple CRM systems	Low and frequently fragmented; individual tools are adopted for specific operational tasks rather than integrated across the organization	Maintaining communication, receiving payments, sustaining customer contact, and preserving minimum operational continuity	8–12% reduction in operating costs	Represents an entry-level and predominantly defensive form of digitalization. It improves short-term continuity but provides limited support for data integration, automation,

						or business-model renewal.
Advanced	30%	E-commerce platforms, cloud services, integrated management systems, digital payment infrastructure, and coordinated customer-service tools	Medium to high; digital solutions are systematically connected with core functions such as sales, finance, logistics, customer service, and internal coordination	Stabilizing operations, diversifying sales channels, facilitating remote management, and reducing dependence on physical locations	15–25% increase in productivity	Indicates transition from isolated technology use to process-level digital transformation. The main source of value is cross-functional integration rather than the number of technologies adopted.
Innovative	10%	Artificial intelligence, business-process automation, Internet of Things solutions, blockchain technologies, advanced analytics, and data-driven decision-support tools	High; technologies are embedded in decision-making, value creation, process redesign, and the overall business model	Enabling rapid adaptation, automation, scalable digital delivery, new revenue streams, and entry into new markets	30–45% revenue growth, supported by 23% faster sales growth, 18% lower operating costs, and 35% faster market adaptation	Represents transformation at the business-model level. Although this group is comparatively small, it demonstrates the strongest capacity to convert digital investment into resilience and competitive renewal.

Note. Shares and performance ranges reproduce the evidence reported in the analyzed sources. The findings indicate an association between technological maturity and business performance; they should not be interpreted as establishing an isolated causal effect because financial capacity, managerial quality, sector, firm size, and regional conditions may also influence both technology adoption and outcomes.

Table 2. Comparative typology of SME digital adaptation strategies under martial law

Adaptation strategy	Share of SMEs	Strategic orientation	Typical digital response	Integration with core processes	Expected resilience mechanism	Business Activity Recovery Index	Principal limitation
Reactive	35%	Immediate survival and compliance with external pressure	Rapid adoption of basic communication, social-media, messaging, online-banking, and payment tools	Low; solutions remain isolated and are used primarily to address urgent disruptions	Prevents complete interruption of communication, sales, or payments and supports minimum business continuity	0.31	Short planning horizon, fragmented data, dependence on improvised solutions, and weak capacity for sustained recovery or organizational learning
Adaptive	45%	Operational stabilization and systematic adjustment of essential functions	E-commerce, cloud services, digital payments, remote-work systems, CRM applications, and digitally supported logistics	Medium; technologies are linked to several core business processes but do not necessarily redefine the entire business model	Improves flexibility, coordinates dispersed operations, diversifies channels, and reduces dependence on vulnerable physical infrastructure	Not separately reported	Benefits may plateau when technologies are added incrementally without deeper process redesign, advanced analytics, or organization-wide integration
Transformational	20%	Strategic renewal and	Automation, artificial intelligence	High; digital technology	Creates alternative revenue	0.52	Requires stronger financial

		fundamental redesign of value creation	, platform-based delivery, advanced analytics, integrated digital ecosystems , and digitally enabled products or services	gies shape strategy, structure , decision-making, customer relationships, and revenue generation	streams, accelerates market response, enables scalable operations, and strengthens capacity to reconfigure resources during disruption		resources , skilled personnel, cybersecurity capability , managerial commitment, and reliable digital infrastructure
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Note. The difference between the reported recovery indices for transformational and reactive strategies is **0.21 index points**, with the transformational value approximately **67.7% higher** than the reactive value. This is a descriptive comparison derived from the reported indices, not an inferential estimate of causal impact. No separate recovery index was provided for the adaptive group.

Table 3. Multilevel matrix of barriers, organizational consequences, and recommended interventions

Barrier domain	Wartime manifestation	Consequences for SME transformation	Firm-level managerial response	Recommended public-policy response	Relevant monitoring indicators
Financial constraints	Reduced liquidity, uncertain cash flows, high investment risk, limited access to affordable finance, and prioritization of immediate survival expenditure	Delayed acquisition of software and equipment; underinvestment in cybersecurity , integration, training, and professional support; continued reliance on fragmented low-cost tools	Introduce technologies in sequenced stages; prioritize solutions with clearly defined operational value; use scalable cloud subscriptions; conduct cost–benefit and continuity assessments before investment	Expand targeted grants, concessional loans, guarantee schemes, vouchers for digital services, and co-financing programmes differentiated by firm size and maturity level	Digital-investment intensity; uptake of support programmes; financing approval rates; implementation completion rates; technology-related productivity gains

Human-capital and qualification gaps	Employee displacement, shortages of specialized personnel, uneven digital literacy, and limited managerial experience in leading transformation	Low utilization of acquired technologies; implementation delays; resistance to change; dependence on external providers; misalignment between technology and business objectives	Conduct role-specific training; appoint internal digital coordinators; combine technical instruction with managerial capability development; establish continuous learning and knowledge-retention procedures	Create sectoral competence centres; subsidize SME training; support micro-credentials and rapid reskilling; connect SMEs with universities, vocational institutions, and technology providers	Training participation and completion; employee digital-skill assessment; system utilization rates; number of trained digital coordinators; employee retention in digital roles
Infrastructure and technical disruption	Damage to energy and telecommunications infrastructure, unstable connectivity, hardware loss, regional disparities, and operational displacement	Service interruptions, reduced reliability of cloud access and digital payments, loss of operational data, and inability to sustain remote or distributed work	Develop redundant connectivity and power arrangements; implement secure cloud backup; maintain alternative payment and communication channels; test disaster-recovery procedures	Invest in resilient broadband, energy redundancy, regional digital hubs, shared infrastructure, and priority restoration mechanisms for critical business services	Downtime duration; connectivity reliability; backup restoration time; regional broadband coverage; continuity-test performance
Systems integration and interoperability	Rapid crisis-driven acquisition of disconnected platforms and tools without common data architecture	Duplicate processes, inconsistent data, additional administrative burden, limited visibility, and inability to automate end-to-end workflows	Map processes before procurement; select interoperable platforms; establish data standards; consolidate redundant applications; introduce	Develop interoperability guidelines, trusted vendor frameworks, standardized digital solutions, and technical advisory services for SMEs	Number of integrated processes; duplicate data-entry frequency; system error rates; processing time; share of applications connected through

			integration in manageable phases		common interfaces
Cybersecurity and data protection	Greater dependence on remote access, cloud systems, online payments, and external platforms during heightened cyber risk	Exposure to fraud, service disruption, confidential-data loss, reputational damage, and reluctance to expand digital operations	Apply multifactor authentication, access controls, encryption, staff awareness training, incident-response plans, regular backups, and supplier-risk assessment	Provide affordable cybersecurity audits, threat intelligence, incident-response support, minimum security standards, and targeted assistance for vulnerable SMEs	Security incidents; phishing-test outcomes; backup frequency; recovery time; multifactor-authentication coverage; percentage of suppliers assessed for cyber risk
Organizational resistance and weak strategic alignment	Technology adoption driven by emergency pressure rather than explicit strategic objectives or process ownership	Temporary solutions become institutionalized without evaluation; unclear responsibilities; low employee acceptance; limited return on digital investment	Establish a staged digital roadmap; define accountable process owners; involve employees in implementation; connect technology indicators to business-continuity and performance objectives	Disseminate maturity-assessment tools, transformation roadmaps, model governance frameworks, and sector-specific implementation guidance	Roadmap completion; employee adoption rates; proportion of projects with assigned owners; realization of expected benefits; maturity-assessment progress
Regional and sectoral inequality	Stronger digital capacity in major economic centres and weaker adoption in border, rural, remote, and	Unequal access to markets, advisory support, skilled labour, digital infrastructure, and	Use remote advisory networks, shared-service arrangements, digital marketplaces, and cross-regional	Apply place-sensitive support criteria; expand regional competence centres; prioritize conflict-	Regional adoption rates; digital-channel use by sector and territory; infrastructure coverage;

	conflict-affected areas	recovery opportunities	partnerships to compensate for local capacity constraints	affected territories; finance mobile and remote support services	number of supported firms in conflict-affected areas; regional recovery indices
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Note. The matrix synthesizes the barriers identified in the study and links them to interventions at both organizational and policy levels. The monitoring indicators are proposed for future evaluation and should not be interpreted as variables already measured in the present study.

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4. Findings

4.1. Wartime Acceleration of SME Digital Transformation

The findings indicate that martial law has acted as a powerful accelerator of digital transformation among Ukrainian small and medium-sized enterprises. However, this transformation has not generally followed the conventional model of gradual, strategically planned technological modernization. Instead, it has largely emerged as an immediate organizational response to operational disruption, geographical displacement, changes in consumer behaviour, interruptions in conventional distribution channels, and heightened uncertainty in the business environment.

Digital technologies have consequently moved from being optional instruments of competitiveness to becoming essential mechanisms of business continuity. Online

communication, digital payments, remote coordination, cloud-based systems, electronic commerce, and digital customer-service channels have enabled SMEs to maintain at least partial operational capacity under conditions in which traditional business processes have become unreliable or inaccessible. This development represents a substantive shift from strategic digitalization to crisis-driven digital adaptation.

The evidence nevertheless suggests that accelerated technology adoption should not automatically be interpreted as comprehensive digital transformation. For many enterprises, digital tools remain fragmented, operationally limited, and insufficiently integrated into long-term organizational strategy. Martial law has therefore increased both the speed of digital adoption and the unevenness of its implementation.

4.2. Three Levels of Technological Maturity

The analysis identifies three distinct levels of technological maturity among Ukrainian SMEs: basic, advanced, and innovative. These levels reflect differences not only in the number of technologies adopted but also in the extent to which digital solutions are integrated into organizational processes and business models.

Approximately 60% of the enterprises examined belong to the basic maturity group. These enterprises primarily use social media, messaging applications, online banking, digital communication tools, and relatively simple customer relationship management systems. Such technologies provide immediate operational benefits and require comparatively limited financial and technical resources. Nevertheless, their use is frequently fragmented and concentrated on communication, payments, sales promotion, and basic customer interaction rather than on the systemic transformation of business processes.

The advanced maturity group comprises approximately 30% of enterprises. These SMEs use e-commerce platforms, cloud services, integrated management systems, digital payment infrastructures, and more structured tools for coordinating internal and external operations. Compared with enterprises at the basic level, advanced SMEs demonstrate a greater capacity to integrate digital technologies across several business functions. Their digitalization is therefore more systematic and more closely connected with organizational performance, market access, and operational continuity.

The remaining 10% constitute the innovative maturity group. These enterprises employ artificial intelligence, business-process automation, Internet of Things solutions, blockchain technologies, and other advanced digital instruments. Their distinguishing characteristic is not merely the use of sophisticated technologies but the integration of those technologies into decision-making, value creation, organizational coordination, and the redesign of business models.

The distribution demonstrates that digital transformation remains highly uneven. Although most Ukrainian SMEs have adopted some form of digital technology, only a limited proportion have achieved a level of integration capable of supporting fundamental organizational transformation.

4.3. Technological Maturity and Business Performance

The findings reveal a clear association between technological maturity and the financial and economic performance of SMEs. Enterprises with more integrated digital capabilities appear better positioned to preserve customer relationships, reorganize internal processes, diversify sales channels, and respond rapidly to external disruption.

Digital maturity enhances organizational visibility and improves access to operational information, allowing managers to make more timely decisions under conditions of uncertainty. Cloud systems and integrated management platforms facilitate remote work, resource coordination, and continuity across geographically dispersed operations. E-commerce and digital payment solutions reduce dependence on physical business locations and conventional distribution mechanisms. More advanced technologies additionally support process optimization, forecasting, automation, and the identification of emerging market opportunities.

The relationship should nevertheless be interpreted cautiously. The available evidence establishes an association rather than an unequivocal causal effect. Enterprises with stronger financial resources, more qualified personnel, or better managerial capabilities may be more likely to adopt advanced digital technologies. At the same time, greater technological maturity may reinforce their ability to withstand disruption and recover economic activity. The observed pattern therefore suggests a mutually reinforcing relationship between digital capacity and organizational resilience.

4.4. Typology of Digital Adaptation Strategies

The study identifies three principal forms of SME digital adaptation: reactive, adaptive, and transformational strategies. This typology captures differences in organizational purpose, implementation depth, and resilience outcomes.

Reactive strategies involve the minimum adoption of digital solutions necessary to respond to immediate external pressure. Enterprises following this approach typically introduce isolated tools to maintain communication, receive payments, or continue limited sales activity. Digitalization remains defensive and short-term, with limited integration into wider organizational structures. Although this approach may prevent complete operational interruption, it offers relatively weak foundations for sustained recovery.

Adaptive strategies involve the systematic implementation of digital solutions across core business processes. SMEs adopting this approach reorganize important functions such as sales, customer service, financial management, logistics, internal communication, and workforce coordination. Digital technologies are used not only to survive immediate disruption but also to stabilize business operations and strengthen organizational flexibility.

Transformational strategies represent the most advanced response. They involve the substantial restructuring of business models, organizational processes, customer relationships, and value-creation mechanisms around digital technologies. Enterprises following this approach use technology to enter new markets, redesign products or services, automate processes, create digital revenue streams, and improve data-driven decision-making.

The resilience outcomes associated with these strategies differ considerably. Enterprises implementing transformational strategies recorded a business activity recovery index of 0.52, compared with 0.31 among enterprises relying on reactive strategies. This difference indicates that deeper integration of digital technologies is associated with a stronger capacity to restore business activity under wartime conditions. The result also suggests that isolated technology

adoption is less effective than the coordinated transformation of organizational processes and business models.

4.5. Principal Barriers to Digital Transformation

Despite the strategic importance of digitalization, Ukrainian SMEs continue to encounter substantial financial, human-capital, technical, and organizational barriers.

Financial limitations constrain investment in software, equipment, cybersecurity, employee training, and professional technical support. Wartime uncertainty further discourages long-term capital expenditure, particularly among enterprises focused on immediate survival.

Workforce qualification represents another major barrier. Many SMEs lack employees with the skills required to select, implement, maintain, and effectively use digital systems. The problem concerns not only technical competence but also managerial capacity to align technology adoption with organizational objectives.

Technical challenges include unstable infrastructure, integration difficulties, cybersecurity risks, data-protection concerns, and dependence on external platforms or service providers. SMEs using multiple disconnected tools may experience data fragmentation, process duplication, and limited interoperability.

Organizational resistance and insufficient strategic planning additionally restrict transformation. Rapid adoption under crisis conditions may produce temporary solutions that are not subsequently incorporated into coherent digital strategies. Accordingly, the central challenge is not simply access to technology but the capacity to institutionalize its use across the organization.

4.6. Practical and Policy Implications

For SME managers, the findings support a gradual but strategically coordinated approach to digital transformation. Enterprises should prioritize technologies that address clearly identified operational needs, integrate new tools with existing processes, invest in employee training, and develop backup arrangements for critical digital services. Government platforms and accessible cloud-based solutions may reduce implementation costs, particularly for enterprises with limited financial and technical capacity.

The results also demonstrate that digital transformation should be incorporated into business-continuity planning. Cybersecurity, data backup, alternative communication channels, remote-access procedures, and diversified payment and sales systems should be treated as essential elements of organizational resilience rather than optional technological improvements.

At the policy level, the findings indicate a need to expand targeted financial-support programmes, strengthen digital infrastructure, and establish sector-specific competence centres. Such centres could provide SMEs with technical consultation, training, implementation guidance, cybersecurity support, and access to tested digital solutions. Policy interventions should also differentiate between levels of technological maturity, as enterprises at the basic, advanced, and innovative stages require different forms of assistance.

4.7. Synthesis of the Findings

Overall, the findings demonstrate that digital transformation has become a central mechanism of SME resilience in Ukraine under martial law. However, its organizational value depends less on the mere adoption of individual technologies than on their strategic integration into business processes and models.

The comparison among technological maturity levels and adaptation strategies shows a consistent pattern: SMEs employing integrated and transformational approaches demonstrate stronger recovery capacity than those relying on fragmented and reactive measures. Digitalization therefore functions simultaneously as a short-term survival mechanism and a potential foundation for long-term organizational renewal.

The principal implication is that wartime digital transformation should not be understood solely as an emergency response. When supported by managerial capability, workforce development, appropriate infrastructure, and effective public policy, it can provide a pathway from crisis adaptation toward sustainable competitiveness and post-war economic recovery.

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