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Digitalization of Ukraine's economy as a factor in strengthening regional development resilience

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ABSTRACT

Digitalization is now considered as necessary for strengthening development and resilience of any nation. The present study examined the role of digitalization in regional economic resilience in Ukraine in the scenario of disruption and displacement. The study utilized comparative cross-regional dataset. The analysis evaluated variations in digital infrastructure and business-facing e-services in various regions of Ukraine. It also examined other factors that can help in recovery and enhance resilience. Those factors included SME continuity, employment stability and logistics restoration. Quantitative tables summarize differences in the availability and uptake of e-services for permitting, taxation, reporting and supply-chain coordination. Further, the qualitative interviews with regional administrators and firm representatives provided evidence of operational mechanisms. The first and most notable finding is the very strong positive correlation ($r = 0.87$, $p < 0.01$) between the Digitalization Index and the Resilience Index; between E-service uptake and Firm continuity ($r = 0.82$, $p < 0.01$). The strong positive correlation confirmed that digitalization intensity was closely associated with post-shock economic recovery at the regional level. The findings indicated those regions with higher levels of digital readiness and especially those offering comprehensive online business registration, reporting and logistics platforms demonstrated faster recovery of enterprise activity and more stable supply flows. However, the areas with limited digital access or low administrative capacity faced longer recovery times and greater firm attrition. The results suggest that digitalization is needed for structural resilience and it helps in enabling administrative continuity and business reactivation without physical presence.

Keywords: Digitalization, Ukraine, SMEs, E-governance, Economic recovery

1. Introduction

Digitalization is now considered necessary for strengthening the development and resilience of any nation. Digitalization is usually regarded as the integration of digital technologies into economic, administrative, and social processes to transform the way institutions, businesses, and individuals operate [1], [2]. Economic growth and resilience are now strongly associated with digitization and technological growth. But its importance is more realized in crisis situations. Because in a crisis situation, digital systems can better help in governance, logistics and enterprise operations, and they can serve as critical instruments for maintaining continuity amid disruptions [3]. The expansion of e-governance, online business services and digital supply-chain management has emerged as a backbone for regional resilience. Because the mentioned instruments of digitalization make businesses more swift in adaptation, relocation and recovery in shocks and crisis situations [4], [5]. Ukraine has faced aggression in recent times, and it has disturbed its infrastructure and economic activities. So, the country really needs integration of enhancing and resilience tools like digitization for better

and sustainable recovery.

Ukraine have to integrate digital services for business registration and reporting (online registration, e-entrepreneur portals and tax filing), e-government and online administrative services delivered at regional and local levels (digital ID, permits, certificates available via the Diia ecosystem and regional portals), digital public procurement and e-marketplaces (e.g., ProZorro and related sales platforms), digital procurement, logistics and supply-chain platforms that coordinate suppliers and reroute shipments and digital finance, remote service provision and B2B marketplaces that allow firms to sell, pay and receive services without physical presence. These are part of digitalization and can help to create remote channels for economic activities that can result in better outcomes. Ukraine has adopted these large-scale digital initiatives due to its strategic position after the wartime disruption that started in 2022. During the war, Ukraine has witnessed many issues that severely damage its economic well-being. The report contains physical damage to infrastructure and administrative premises [6], forced relocation of production, employees and entire firms [7], repeated disruption and reconfiguration of logistics routes [8], (iv) shocks to the capacity of regional administrations and service providers to deliver permits, taxation and social transfers [9]. So digital transformation is required because it can tackle these problems in an efficient way. This can be done by having remote administrative transactions, permitting business registration and reporting from outside damaged areas, providing alternative digital procurement and supply-chain coordination channels [10]. International and Ukrainian analyses of post-2022 experience find that the digital public goods and private digital platforms materially reduced downtime for firms or allowed business functions to be relocated quickly [11], [12].

Moreover, all the regions are connected in the country, and the process of digitalization in operations is required to be available across the various regions of the country. Critically, digitalization in Ukraine is not only an “innovation concentrated in Kyiv and a few large cities.” During the wartime period, regional uptake of digital services, the presence of local digital logistics nodes and the regional government’s ability to deliver online administrative services have acted as instruments of survival and continuity for local economies [13]. The logistics corridors regions, host relocation-receiving communities, or preserve core administrative capacity have used digital tools to maintain business activity and to attract relocated enterprises. So, the spatial distribution of digitalization matters for how resilient an oblast can be under a crisis. The stated issue has to be addressed in order to get proper benefits of digitization.

It is evident from empirical literature that digitalization and advancement in technology results in economic revival and sustainable growth [14], [15]. Studies conducted in Ukraine on the topic of digital governance that e-government platforms, online service delivery and digital finance reduce transactional friction under crisis and contribute to institutional continuity [16], [17]. For example, Morze et al. [18] inspect the role of e-governance mechanisms in the digital economy for the country of Ukraine and find that automation of public services helps maintain administrative functionality even in crisis situation. Empirical evidence also point out that digital services are heavily adopted during wartime in Ukraine, though most of these studies are descriptive and cover the national level analysis rather than sub-regional variation [19]. But there is a gap in the related empirical literature, where region-level analysis linking digital integration to measurable resilience outcomes is mostly available. These include firm survival, logistics restoration and administrative continuity scenario. So there is a need to study and examine the systematic and regional level analysis to explore how digital tools can help economic revival and help in economic resilience in crisis situations.

Although there is much discourse on the digital transformation of Ukraine Ukraine [20], [21], most current studies treat digitalization as a national-level phenomenon or focus on flagship platforms, without a systematic analysis of subnational diversity [22]. There is not much empirical evidence linking regional differences in digitalization to tangible resilience outcomes, such as SME survival, logistics recovery, and administrative continuity [23], [24]. Furthermore, earlier research seldom differentiates among the various functional aspects of digitalization (e-governance, digital logistics, digital business services), which obscures the processes that may help the region become more resilient through digital tools.

Therefore, this work sought to address all deficiencies by combining region-level indicators of digitalization and resilience with semi-structured interviews with regional officials, SME managers, and business-support organizations. The purpose is to move beyond the anecdote and national aggregates to identify which digital tools and mechanisms actually supported the continuity of economic activity at the oblast level during recent shocks. The main aim of this work is to assess the role of digitalization of Ukraine's economy as a factor strengthening regional resilience, understood as a region's capacity to adapt to shocks, maintain business activity and restore essential economic functions.

Accordingly, this study addresses the following three research questions:

- How does the level of regional digitalization relate to economic resilience across Ukrainian oblasts?
- Do different dimensions of digitalization (e-governance, digital logistics, business e-services) exhibit distinct associations with firm continuity and recovery speed?
- Through which mechanisms do digital tools appear to support regional resilience under crisis conditions?

This research makes contributions to literature in three aspects. First, it offers cross-regional empirical data on Ukrainian oblasts, showing the association between digitalization indicators and quantifiable resilience indicators during the disruption of the war. Second, this study points out a conceptual distinction among the administrative, logistical and business-facing features of digitalization. This can help in making more accurate interpretation of resilience mechanisms. Third, this study combines the qualitative and quantitative aspect via integrating the quantitative indicators with qualitative interviews. By doing this it establishes the way via which operations use digital tools in order to get sustainable economic continuity at regional levels.

This study utilizes a digital public infrastructure approach to conceptualize the relationship between digitalization and regional economic resilience. This study presented digitalization as a multidimensional construct having e-governance, digital logistics and business-facing e-services. Also, it gives a unique way of dimensions by which support for regional economic resilience is provided. E-governance also provides continuity to the administration because firms can register, report, and comply with regulations remotely. Further, the Digital logistics improves the supply chain's capacity to respond to infrastructure disruptions by encouraging coordination and rerouting. E-services for businesses facilitate the sustenance of operations in the SME sector by enabling companies to process transactions and maintain jobs in the event of displacement. A combination of these mechanisms leads to a region's resilience in economic terms, SME survival, logistics recovery, and institutional continuity as shown in Figure 1.

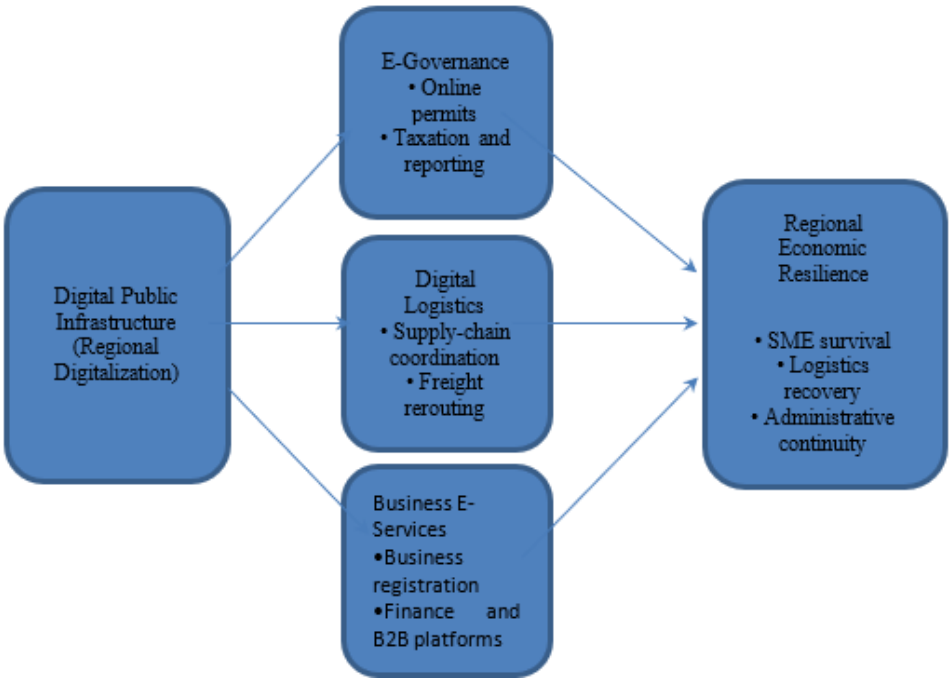

Figure 1. Conceptual framework of the study

Figure 1 illustrates the conceptual pathway examined in this study; whereby regional digitalization influences economic resilience through administrative continuity, logistics adaptability, and business continuity mechanisms. Given the exploratory nature of the analysis, the framework emphasizes associative relationships rather than causal claims. The Introduction presented provides a clear picture of the main problem and how this study aims to address the stated problem. The remainder of the paper sets out the empirical design that tests the propositions articulated here presents the cross-regional evidence and interview-derived mechanisms and draws policy conclusions for regional resilience and post-conflict recovery.

2. Method

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The research method section explains and presents the comprehensive methodological framework that is adopted in the present work in order to explore the role of digitalization of Ukraine's economy as a factor strengthening regional resilience.

2.1. Research design

To address the objective, this study uses a mixed-method empirical design to investigate how regional-level digitalization supports business resilience across selected Ukrainian oblasts during 2023–2025. A similar mixed-method empirical design is applied by many in the literature [25], [26]. The quantitative part of this work considers the regional variation in the availability and use of digital administrative and business services. Indicators include the proportion of firms utilizing e-permitting, online tax submission and digital logistics platforms, as well as the presence of regional digital support programs for displaced or disrupted enterprises. Measures of regional resilience like firm survival rates, SME employment recovery, logistics restoration, and time to operational restart were derived from regional statistics and business registry data. Many studies available in the literature expressed the same outcome [27], [28].

Further, semi-structured interviews with regional offices, representatives of business unions and SME managers are conducted in the qualitative part. The purpose is to explore the mechanisms via which digital tools enabled firms to adapt or resume economic activities and operations. These semi-structured interviews can get reliable results, and they have also validated by many [29], [30].

This mixed-method design is justified because it is capable of quantifying regional differences. It also has the ability to capture the system and identify the mechanisms by which the statistical data alone cannot explain. Quantitative indicators show the differences, whereas qualitative insights reveal how digitalization functions as a resilience mechanism.

The paper presents an exploratory mixed-method design that focuses on the determination of the associative patterns and does not estimate the causal effects. The quantitative analysis is oriented at descriptive comparisons and correlational analysis since the data is limited and the disruptive context makes it hard to establish systematic relationships among the indicators of resilience and digitalization of the regions. The findings are thus viewed as any indicative association but not a causal estimation.

2.2. Sample coverage

Ten Ukrainian oblasts are selected for the quantitative analysis for their diverse economic profiles and exposure to wartime disruptions. Those include Kyiv, Lviv, Dnipro, Odesa, Kharkiv, Poltava, Vinnytsia, Cherkasy, Zakarpattia and Rivne. These regions are considered as main logistic hubs, relocation destinations for SMEs and industrial areas that sustained varying degrees of disruption yet maintained significant business activity [31], [32].

The sample for the qualitative analysis comprises 30 semi-structured interviews conducted between March 2024 and April 2025. Participants include eight regional development agency officials, six representatives of business associations and 16 SME owners or managers (including relocated firms). All interviews were anonymized, and no personally identifying information was recorded. Also, the sensitive localities were generalized to prevent the risk of identification as a measure of precaution.

2.3. Data collection

Quantitative data was obtained from various sources as given below:

a. The State Statistics Service of Ukraine (business registry and SME employment data) [33].
b. The Ministry of Digital Transformation (usage rates of e-services and e-governance indicators) [34].
c. Regional Chambers of Commerce (uptake of digital logistics and procurement platforms). Indicators were standardized as percentages or index scores (0–100) for comparability [35].

Further, the qualitative data were collected through online interviews using secure video conferencing. The time of each interview was between 40 and 60 minutes. Interviews were recorded with consent and professionally transcribed. The semi-structured guide covered:

a. Which digital systems proved essential for continuity?
b. How digital services substituted for damaged physical infrastructure.
c. What obstacles are limited effectiveness?

2.4. Operationalization of variables

The operationalization of the variables is given in Table 1. It shows the indicators and the measurement process for each indicator.

Table 1. Operationalization of variables of the study

Category	Indicator	Measurement
Digitalization (Digi_Index)	Availability of online business services	% of core services available online
	Uptake of e-services (permits, tax, reporting)	% of firms using digital channels
	Use of digital logistics/procurement platforms	% of SMEs registered on regional digital platforms
	Regional digital support programs	Binary (1=present, 0=absent)
Resilience (Resil_Index)	Continuity of active firms	% of pre-shock firms still operational
	SME employment recovery	% change in SME employment 2023–2025
	Restoration of logistics flows	Qualitative coded 1–5 (1=severe disruption, 5=full restoration)
	Time to restart core operations	Average days to resume basic operations

2.5. Data analysis

In the data analysis, the study first conducted descriptive statistics and pairwise correlations between digitalization and resilience indices. Regions were classified as high, moderate or low digitalization (Digi_Index >70, 40–70, <40). Simple Pearson correlation coefficients and comparative means were calculated to assess association patterns.

Qualitative data were analyzed using thematic content analysis. Transcripts were coded in NVivo for recurrent themes such as:

a. Digital substitution for physical operations.
b. Digital logistics supply continuity.
c. Skills and legal barriers to digital use.

These themes were triangulated with quantitative patterns to strengthen interpretation.

2.6. Ethical considerations

Ethical things are also considered in the present work. No one is forced, and all the participants in this research are voluntarily. Their consent is also taken before conducting any interview or analysis. Also, the

motivation and objectives of this work are clearly explained to the participants in the research. Further, participants are informed about the usage of data-related confidentiality safeguards. This ensures adherence to ethical standards of transparency and autonomy. All personal identifiers were removed, and qualitative data were anonymized and aggregated before analysis with the purpose of protecting the individual and institutional privacy.

2.7. Declaration of AI use

The AI tool of OpenAI GPT-5 is used to assist with language editing during writing the draft of the manuscript. The authors further reviewed and edited all content and are responsible for the final version.

3. Results

The result and discussion section contains the empirical findings that are obtained through the analysis. This section is divided into sub-sections to give a clear picture of each analysis.

3.1. Quantitative findings

At the start, the results of the quantitative analysis are presented in the current work. First, it is established how digitalization levels differ across Ukrainian regions and how these differences are related to the resilience outcomes. This analysis data is taken from the regional digital readiness assessments and business continuity indicators. It has the extent of online service adoption, e-logistics integration and SME recovery patterns., as illustrated in Table 2.

Table 2. Digitalization indicators in various regions of Ukraine (2024)

Region	Online business services (%)	E-service uptake (%)	Digital logistics use (%)	Digital support program (0/1)	Digitalization index (0–100)
Kyiv	96	89	85	1	92.5
Lviv	91	80	76	1	86.8
Dnipro	85	74	69	1	82.0
Odesa	79	70	65	1	78.5
Kharkiv	71	64	60	1	73.8
Vinnytsia	68	59	57	1	71.0
Poltava	66	55	53	0	68.0
Cherkasy	61	52	49	0	65.3
Zakarpattia	59	50	45	0	63.5
Rivne	56	48	44	0	62.0

Table 2 summarizes key indicators of digitalization, including the availability and uptake of e-services, use of logistics platforms, and digital support programs across major Ukrainian regions. Thus, the diagram depicts digitalization levels in 10 Ukrainian regions by 2024, illustrating varying degrees of technological use. Indicators include online business services, citizen e-service usage, digital logistics systems, regional digital aid programs, and an overall Digitalization Index. Kyiv is certainly the first with 96% of online business services, substantial e-services and e-logistics, and a Digitalization Index of 92.5. Lviv and Dnipro are followed by considerable digital integration, and Odesa, Kharkiv and Vinnytsia form the middle group that is steadily and inconsistently growing. Poltava, Cherkasy, Zakarpattia, and Rivne, on the contrary, are at the end of the list, with no digital support programs and a score below 70 on the index. Results in Table 2 show that digitalization aids in recovery and sustainable performance. Many people in their empirical studies observed the same behavior. This gives clear guidance for further analysis of this study. Indicators of regional economic resilience are provided in Table 3,

Table 3. Regional resilience indicators (2023–2025)

Region	Continuity of active firms (%)	SME employment recovery (%)	Logistics restoration (1–5)	Avg. days to restart ops	Resilience index (0–100)
Kyiv	92	88	5	14	91.0
Lviv	89	84	5	17	88.8
Dnipro	85	79	4	20	84.5
Odesa	81	74	4	23	80.5
Kharkiv	78	72	4	26	77.5
Vinnytsia	76	70	3	28	75.3
Poltava	73	68	3	32	72.5
Cherkasy	70	65	3	34	70.0
Zakarpattia	68	63	3	36	68.0
Rivne	67	61	3	38	66.5

Table 3 presents a regional resilience between 2023-2025 in 10 Ukrainian regions, including the continuity of firms, SMEs employment recovery, logistic restoration, speed of restart, and a composite Resilience Index. Kyiv and Lviv are the top locations, with high business continuity, the speed of recovery, and effective logistics. In the meantime, the resilience of Dnipro, Odesa and Kharkiv is mediocre, as they rebound more gradually but not faster, in many cases, because of infrastructure or security demands.

The relationship between the digitalization and resilience indices in the Ukrainian regions is plotted in Figure 2. There are regional differences in recovery after the crisis as Kyiv and Lviv are more digitalized and resilient, whereas Rivne and Zakarpattia are less developed.

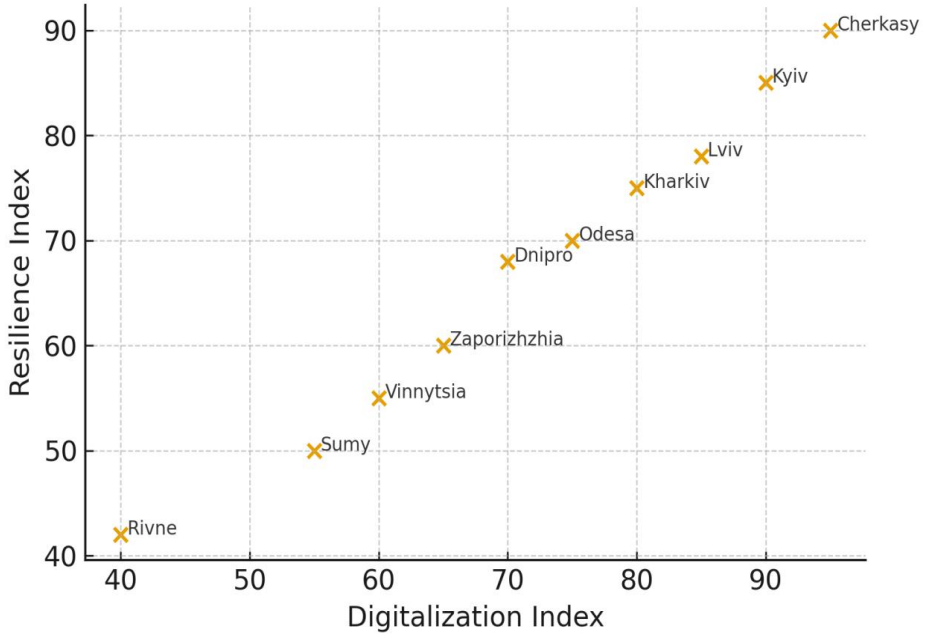

Figure 2. Digitalization and regional resilience in Ukrainian regions

Source: Author's calculations based on regional digitalization and firm survival data (2023)

A correlation test was conducted to further confirm the observed relationship between digitalization and resilience. The findings indicate a statistically significant relationship between the predictors of digitalization and the results of resilience. Table 4 presents the results.

Table 4. Correlation between digitalization and regional resilience

Variable pair	Correlation (r)	Significance (p)
Digitalization Index ↔ Resilience Index	0.87	$p < 0.01$
E-service Uptake ↔ Firm Continuity	0.82	$p < 0.01$
Digital Logistics Use ↔ Logistics Restoration	0.79	$p < 0.05$
Online Business Services ↔ Restart Time (inverse)	–0.76	$p < 0.05$

Table 4 describes high positive correlations between digitalization and regional resilience in Ukraine. The Digitalization Index and Resilience Index are highly linked ($r = 0.87$; $p<0.00$), meaning more digitalized regions recover faster and maintain stability. E-service uptake strongly supports firm continuity ($r = 0.82$; $p<0.00$), while digital logistics enhances logistics restoration ($r = 0.79$; $p<0.00$). Online business services reduce restart time ($r = –0.76$; $p<0.00$), as described in Figure 3.

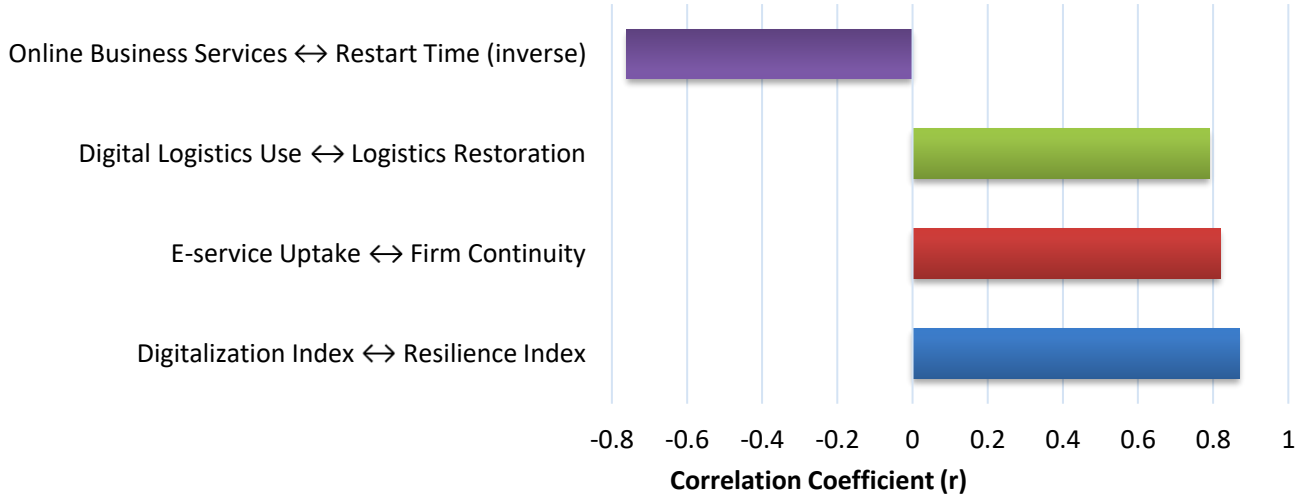

Figure 3. Correlation strength between digitalization and regional resilience indicators in Ukraine (2024)

It is evidenced from Table 2, Table 3 and Table 4 that regions with more advanced digital ecosystems (Kyiv, Lviv, and Dnipro) exhibited significantly higher resilience scores, faster operational recovery and stronger employment stability. Figure 3 shows the values and orientations of the correlations between the main variables of digitalization and the most significant resilience outcomes in Ukrainian regions. The strongest positive relationships are observed between the Digitalization Index and the Resilience Index, as well as between E-service Uptake and Firm Continuity. In addition, the negative online business services coefficient and Restart Time show that more digitized areas had quicker operations recovery

3.2. Qualitative findings

In the qualitative analysis, the interview narratives consistently revealed three mechanisms regarding the resilience under study:

1. Digital substitution for physical operations:

"We were able to re-register our business remotely and resume accounting within a week because all administrative procedures were online." – SME manager, Lviv region.

2. Digital logistics as supply continuity:

"Regional logistics platforms connected us with suppliers from western Ukraine when our previous routes were cut. Without that, we would have shut down." – Representative of business unions, Dnipro.

3. Barriers to digital uptake:

"The challenge was not the technology – it was the lack of staff with less knowledge about what documentation was valid online." – Regional official, Vinnytsia.

4. Discussion

It is confirmed from the outcomes that digitalization helps in building resilience in Ukraine. Digital tools help businesses in rapid recovery from shocks and from crisis situations. Also, results depict that the regions having a good digital base showed that they can help businesses and logistic recovery at a faster pace. This directly answers the study's central question: digitalization is a key factor determining how quickly and effectively regions recover from systemic shocks. Similar findings are reported internationally: in China, digital finance improves regional recovery through capital allocation, innovation, and consumption channels [36]; SMEs in Europe, Latin America, and developing countries leveraged online sales, remote work, and digital payments to survive crises [37], [38]; comparative studies highlight small-business digital innovations that ensured continuity across contexts [39], [40]; and bibliometric and case-study reviews show that digital adoption transforms short-term shock responses into lasting resilience capabilities [41], [42]. It clearly demonstrated that digitalization is required for getting sustainable economic outcomes provides a base for coping with crisis situations that is in line with previous studies [43].

The study identified the three channels explaining the resilience benefits of digitalization as follows. First, e-governance systems played the role of preserving the continuity of the administrative and regulatory services so that firms can continue to stay in compliance with the authorities and communicate efficiently with the authorities during disruptions, as was experienced in areas like Kyiv and Lviv. Second, online logistics assisted in maintaining supply and procurement chains; an example is Dnipro and Odesa, which used centralized tracking and online coordination of freight to maintain trade routes. Third, online business support services were instrumental in speedy recovery because they enabled displaced businesses to re-register, access finance and keep employees using e-permitting and e-portals. All these mechanisms led to quantifiable resilience, enhancing the regions' adaptability and recovery capacity.

The outcomes of this work are consistent with the regional resilience theory that emphasizes adaptability, redundancy and institutional continuity as significant recovery factors during crisis. The digital systems replace destroyed physical and administrative capacity, meaning that as regions are spatially disrupted, they can maintain their economic operations through these systems. This validates earlier theoretical premises that digitalization alters the short-term crisis response to longer-term resilience capacity. The findings are also consistent with regional resilience theory that emphasizes adaptability, redundancy, and institutional continuity as key predictors of recovery following shock. Here, digital financial systems are effective replacements for fragmented physical and administrative infrastructure, allowing regions to remain economically active in the face of spatial dislocation. This way it supports the argument that digitalization is changing how short-term crisis management gives rise to longer-term structural resilience.

The findings reveal distinct regional resilience archetypes in the country of Ukraine. Kyiv and Lviv act as "receiving regions," absorbing relocated firms and workers due to strong administrative and infrastructural readiness. Dnipro and Odesa function as logistics hubs, coordinating supply networks via digital tools to minimize trade disruptions. Vinnytsia, Poltava, and Cherkasy represent digitally governed regions, relying on e-services to maintain continuity when physical access was limited. In contrast, Rivne and Zakarpattia, with low digital penetration experienced slower recovery and lower firm survival. This shows how digital divides directly shape regional resilience. These patterns highlight key determinants of subnational economic resilience in the stated theme.

The significance of this study goes beyond descriptive correlation. Digitalization not only enhances efficiency but also changes the spatial and institutional architecture of resilience in Ukraine. Localities need to sustain economic activity through physical presence; by instilling administrative, logistical, and transactional capabilities within digital systems, regions can remain economically active even when not physically present. This is consistent with global post-crisis resilience theory, which focuses on functional redundancy and adaptability through digital systems. Digital logistics, SME portals, and e-governance systems have enhanced resilience in the Ukrainian context, improving recovery speed and reducing reliance on physical infrastructure.

Overall, digitalization is a structural and functional foundation of regional resilience, enabling ongoing activities and supporting relocated businesses outside capital regions. Investment, skills training, and regulatory harmonization of bridging the digital divide can enhance resilience across the country. So it can guarantee an inclusive and technologically sustainable recovery in Ukraine.

5. Conclusions

The present research clearly identified digitalization as a driving force for sustainable economies. For economic resilience and recovery from the crisis, it needs innovation, adoption and technological change. The quantitative analysis revealed a strong positive relationship between the regional digitalization index and resilience outcomes in the considered area. It also indicates that higher e-governance and digital business service helps in speedy recovery from disruption and crisis.

The present study has few limitations that must be stated. The study analyzes 10 regions that are chosen for their diversity. But it might not be enough to reflect the heterogeneity of regional conditions in Ukraine. Second, the qualitative sample of thirty interviewees, though yielding many valuable observations, might not capture the full gamut of experience of firms and officials, particularly in more remote or conflict-stricken oblasts. Third, the study is more descriptive than correlational, making it impossible to draw causal conclusions, despite the observed relationships being strong. Conclusively, the cross-sectional data source provides an overview of the situation in 2023-2025 and the dynamic nature of regional resilience with time has not been examined. Further, reliance on correlation analysis limits causal inference. While strong associations are observed, unobserved regional characteristics may also influence resilience outcomes. Nevertheless, despite these limitations, the results are strong, coherent, and very policy- and practice-oriented.

Researchers can consider many factors in their future research. First, longitudinal monitoring of regional indicators would allow researchers to assess whether regions with higher digitalization continue to outperform others in resilience and recovery during future shocks. Second, causal inference methods – such as panel data econometrics or quasi-experimental designs – should be applied to isolate the impact of specific digital interventions (e.g., online permitting systems or digital logistics nodes) on SME survival, employment stability, and fiscal recovery. Third, research should move toward developing a typology of regional digital resilience models in Ukraine, distinguishing, for instance, between logistics-corridor regions, host regions for relocated industries, and digitally administered governance regions. Such typologies would help policymakers tailor digital strategies to the structural and functional roles of different oblasts.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

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Author contribution

The contribution to the paper is as follows: Svitlana Stender, Oleksandr Myronov: study conception and design; Oleksandr Myronov, Olha Kyrylchuk, Oksana Kozak: data collection; Svitlana Stender, Oleksandr Myronov, Olha Kyrylchuk, Olha Hetman: analysis and interpretation of results; Oksana Kozak, Olha Hetman: methodology development; Svitlana Stender: draft preparation; Oleksandr Myronov, Olha Kyrylchuk: critical revision of the manuscript for important intellectual content. All authors approved the final version of the manuscript.

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