

# Lessons from Ukraine: how do we build resilient logistics?

*Some insights from ongoing research*



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# The NDUC Ukraine Research Program

Collaboration between NDUC and NDUU

Project focus:

- Russian military and non-military instruments and military operations towards Ukraine from 2014 and onwards, especially in the context of the 2022 invasion.
- How Ukraine responds to Russian strategies and builds resistance.
- Relevance for Europe and Norway – Ukrainian experiences that can help strengthen European and Norwegian resilience and doctrines.

## Ongoing projects

Military Education in Extended Reality: Battle Tank Training for War

1. May 2023 – 31. Dec 2025

Norwegian Defence University College | Active

Civilian-Military Cooperation in Crisis Management: The Case of the Civil Society in Ukraine's Resistance

1. Jan 2023 – 31. Jul 2024

Norwegian Defence Command and Staff College | Active

Contested Ukraine. Military patriotism, Russian Influence and Implications for European Security

1. Dec 2021 – 31. Dec 2025

Norwegian Defence Command and Staff College | Active

Total Defence cooperation with Ukraine

1. Sep 2020 – 31. Dec 2025

Norwegian Defence Command and Staff College | Active

Military Education in Extended Reality: Full-Spectrum War

31. Mar 2020 – 31. Dec 2024

Norwegian Defence Command and Staff College | Active

[XR-prosjekt ved FHS 2024 episode 10 \(youtube.com\)](https://www.youtube.com/watch?v=...)

***“the true creator is necessity, who is the mother of  
our invention”***

**Plato, 375 BC: *Republic* (πολιτεία)**

Good inventions deserve a though-through strategy for  
maintenance and support

The ability to continue fighting rests both on the capacities of the DIB, other industries, and the ability of the society to support the armed fight and to continue the civil resistance.

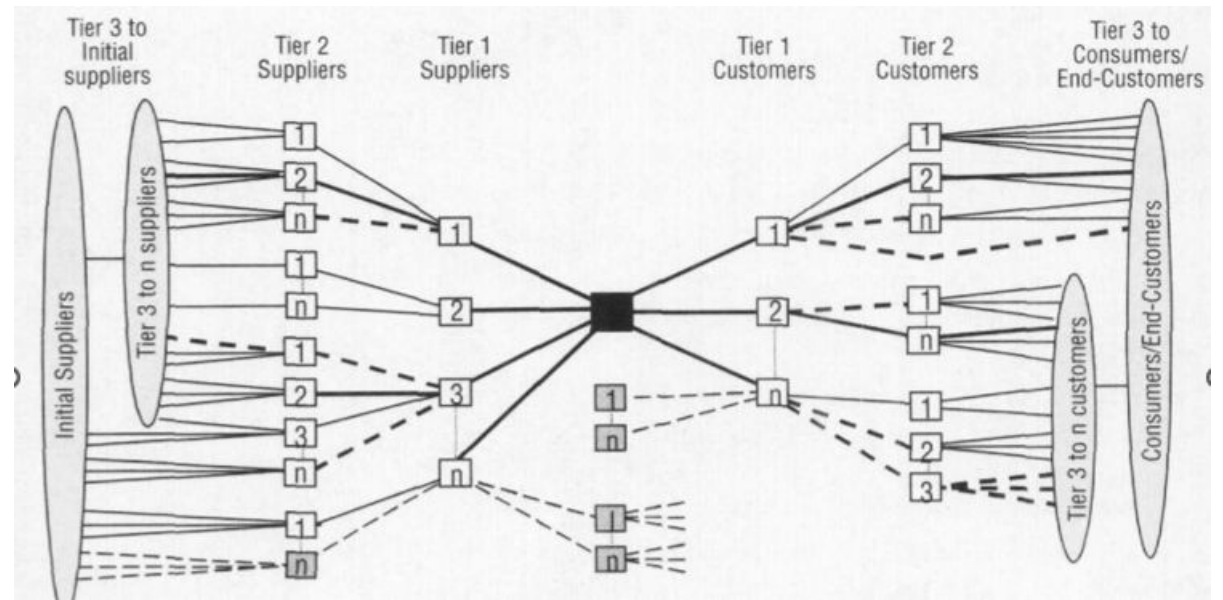
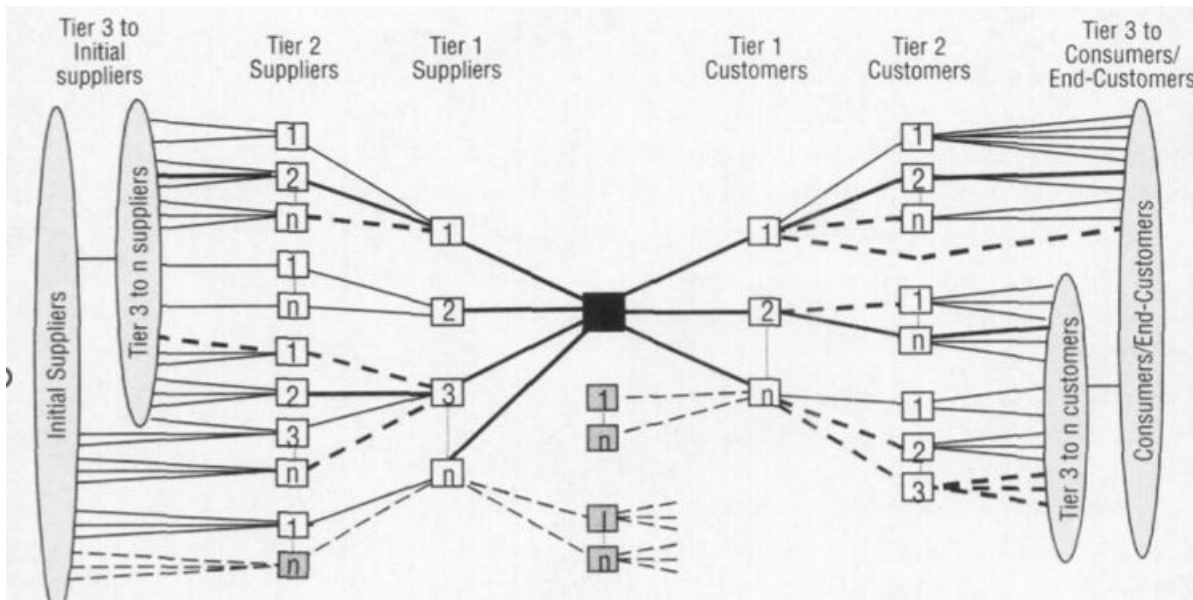
“The article outlines the first steps [...] research into the logistical aspects of warfare in the context of societal resilience. [...] seven basic indicators of national stability, the organization and network of using the strategy of rapid response to threats [...]

Hence our research questions:

1. What can we (NATO, partners) learn from UKR about
  - a. Supply chain responsiveness, robustness and resilience?
  - b. Infrastructure robustness?
  - c. How these aspects rely on, and contribute to societal resilience?
2. What are / have been UKR strategic approach to strengthening their societal resilience?

# A war of supply chains and DIBs

- Strategic logistics: access to resources. National industry, national stocks, national infrastructure (Kress, Eccles)
- Access to alliance resources, re. COL Richard Newland (Tuesday): the importance of having collective coalition logistics
- “You must fight with what you have and what you get”



# RUS strategic logistics and DIB

- Tsarist era rail system – compatible track gauge in USSR + Finland and Mongolia
- RUS defence industry - interoperability
- Supplemented from Iran, China, North Korea

Defense Express  
ukr.defense.news@gmail.com

December 9, 2023  
130256 8



**Random check of ammunition supplied to Russia by the Democratic People's Republic of Korea showcases serious problems, with even lead wires getting stolen at North Korean plants**





Stridsvagn 122 (Sveriges version av Leopard 2) på en övning i Revingehead. Foto: Johan Nilsson/TT

Source: BBC research, Getty Images



En tyrkisk-ägd Leopard 1-stridsvagn fotografert i Tyrkia i 2009. Modellen gick ut av produktion på 1980-talet. Foto: SELCAN HACIOGLU, AP/NTB



Source: BBC research, Getty Images



Source: BBC research, Getty Images



Norge kjøpte sine Leopard 2A4 brukte fra Nederland. Nå skal et ukjent antall av dem gis til Ukraina. Foto: Vidar Ruud, NTB

MBT			
Type		caliber	Country
T55	rifled gun	100	Czech
Leo1 A5	rifled gun	105	Denmark
M55S	rifled gun	105	Germany
Leo1 A5	rifled gun	105	Netherlands
M55S	rifled gun	105	Slovenia
Leo2 A4	smoothbore	120	Canada
Leo2 A4	smoothbore	120	Denmark
Leo2 A6	smoothbore	120	Germany
Leo2 A5	smoothbore	120	Germany
Leo1 A5	rifled gun	120	Germany
Leo2 A4	smoothbore	120	Netherlands
Leo2 A4	smoothbore	120	Norway
Leo2 A4	smoothbore	120	Poland
Leo2 A6	smoothbore	120	Portugal
Leo2	smoothbore	120	Spain
Strv 122	smoothbore	120	Sweden
Challenger	rifled gun	120	UK
Abrams M1A1	smoothbore	120	US
T72M1	smoothbore	125	Bulgaria
T72M1	smoothbore	125	Czech
T72M1	smoothbore	125	Czech
T72 Avenger	smoothbore	125	Denmark
T72M1	smoothbore	125	Germany
T72 Avenger	smoothbore	125	Netherlands
T72A	smoothbore	125	North Macedonia
T72M1	smoothbore	125	Poland
PT-91	smoothbore	125	Poland
T72B	smoothbore	125	US

self propelled		
Type	caliber	Country
Alakran	120	Spain
Archer	155	Sweden
AS-90	155	UK
Caesar	155	Denmark
Caesar	155	France
DANA	152	Czech
Gozdzika	122	Poland
Gvodzika	122	Czech
Gvodzika	122	Finland
howitzer	105	Portugal
Krabs	155	Poland
M109	155	UK
M109	155	US
M109A	155	Norway
M109L	155	Italy
M113	81	Spain
M113	120	Spain
M1981	152	Romania
Panzer <span>m</span> örser	120	Lithuania
Pzh 2000	120	Netherlands
Pzh 2000	155	Germany
Pzh 2000	155	Italy
Raks	120	Poland
RCH	155	Germany
Zuzana	155	Denmark
Zuzana	155	Germany
Zuzana	155	Norway
Zuzana	155	Slovakia



ACMAT	HMMWV	MWP-1
ACSVs..	Husky	NM189
Alvis	ISUZU	NM217
Amarok	Iveco trakker	Oshkosh M-ATV
AMX-10 RCR	Jeep Wrangler	Otokar Cobra II
AMZ Dzik-2	Land Cruiser	PbV-501
AT42	M1117	Peugeot P4
Bandvagn BvS	M113	Renault TRM
BMC Kirpi	M1224 Maxxpro	2000
BMP-1A1	M2A2 Bradley	RG-31 Nyala
Bradley	M548	RMMV HX 40M
BTR	M577a	Roshel Senator
Bushmaster	MAN KAT1	Rosomaks
BVP-1	Marder 1A3	Scania P92
Cougar	Mastiff	Sisu
CV9040	Mercedes Benz	Stryker
DAF-YA4442	290GD	Svatava
Fenneks	Mercedes Sprinter	TAB-71
FIAT fullback	Mishubishi L200	Toyota Hilux
FV104	Mitshubishi 73	URO VAMTAC
	Morooka	VABs
		Valuk
		Volvo N10
		Wolfhound
		YPR-765

# How do we perceive robustness, responsiveness and resilience in supply chains?



The old oak at Akershus fortress, Oslo. *Photo: Morten Uglum*



100 m final Diamond League Lausanne 2016.  
*Photo: Ruben Spricht/Reuters*



Grass that bends in the wind.  
*Photo: Taoyuetong, Pixabay*

We define societal resilience as the ability of individuals and teams, organisations, networks and societies, separately and as a whole, to prepare for, respond to, resist, recover from and adapt to, major disruptions, and as such encompass elements of both robustness, responsiveness, and resilience

# NATO Article 3 is basically about societal resilience

«In order more effectively to achieve the objectives of this Treaty, the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack»

- NATO 7 Baseline Requirements

1. Assured continuity of government and critical government services.
2. Resilient energy supplies.
3. Ability to deal effectively with uncontrolled movement of people.
4. Resilient food and water resources.
5. Ability to deal with mass casualties.
6. Resilient civil communications systems.
7. Resilient civil transportation systems.

# Levels of resilience

- Resilience on the battlefield
  - Soldiers that can be replaced, equipment that can be repaired – parts, tools, competence, capacities
- Resilience in the supply chains
  - Interoperability of equipment and procedures, dual/multiple sourcing, re-planning of supply routes, transport capacities that can be repaired, dispersion of assets
- **Resilience in the society**
  - **Individuals, communities and authorities with innovative capacity, competence, motivation (“multi competence”) that keep society going and support the armed forces**
- Resilience of alliance and partnerships
  - Alternatives if an ally / partner doesn't deliver as promised, access to defence industry in other countries – the importance of standards, procedures, interoperability of equipment

Ukraine Bought 'All The Gas Trucks Available In Europe' To Keep Fueled (Updated)

Thanks to a massive influx from the U.S. and other allies, and buying thousands of fuel trucks, Ukraine says it has plenty of fuel.

BY HOWARD ALTMAN | PUBLISHED FEB 15, 2023 8:14 PM EST

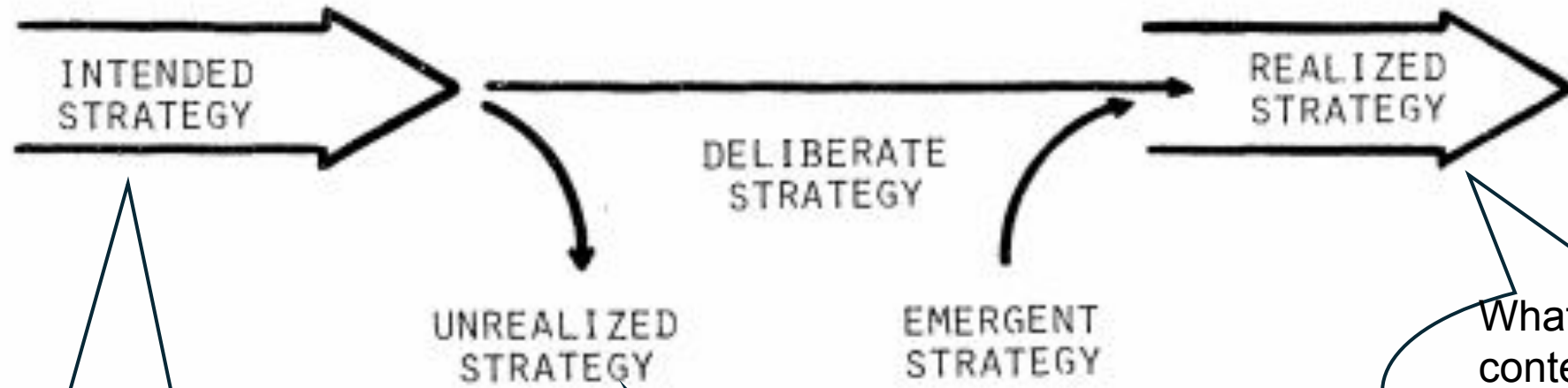
THE WAR ZONE

# Infrastructures and robustness

- Infrastructures can be robust but not resilient – they need supporting structures that are resilient
- Three different levels of infrastructures, all contributing to societal resilience:
  - **Institutional infrastructure** – the ability of the State to function as an administrative unity through parliamentary system, laws, bureaucracy, culture etc - resilience e.g., of leadership; *“I need ammunition, not a ride”*
  - **Material infrastructure** – vertical and horizontal engineering – resilience e.g., through access to engineering equipment, spare parts, workforce
  - **Social infrastructure** – motivation, learning-by-doing, social strata, professions – resilience e.g., based on access to manpower with the will to defend one’s country, competence of the population, bottom-up initiatives and innovations

# Resilience strategies

- Can be categorised as proactive, concurrent and reactive strategies
  - Proactive strategies: decision makers take preventive actions and pay their costs in advance (mitigation strategies)
  - Reactive strategies: decision makers take action only after a disruption has taken place (contingency strategies)
  - Concurrent strategies: quick reactive thinking and first-response abilities to cope with disturbances in the during-disruptions phase – cope with change, adapt and respond to unexpected events
    - Re Plato; necessity is the mother of invention



Does Ukraine have an intended strategy for societal resilience? Do we (the partners) have an agreed-upon strategy for resilient support?

How do Ukraine / we learn from what doesn't work?

What is the content of the realized strategy for resilience?

What are innovations based on (re. Plato), and why do Ukraine / we think it will work?

*Table 1 A tentative framework for studying societal resilience.*

Level of analysis	Type of intended deliberate strategy		Emergent strategy
	Proactive strategies	Reactive strategies	
Individuals and teams	For responsiveness	For responsiveness	For responsiveness
	For robustness	For robustness	For robustness
	For resilience	For resilience	For resilience
Organisations (companies and authorities)	For responsiveness	For responsiveness	For responsiveness
	For robustness	For robustness	For robustness
	For resilience	For resilience	For resilience
Networks (supply chains and infrastructure systems)	For responsiveness	For responsiveness	For responsiveness
	For robustness	For robustness	For robustness
	For resilience	For resilience	For resilience
Sectors, national and supranational	For responsiveness	For responsiveness	For responsiveness
	For robustness	For robustness	For robustness
	For resilience	For resilience	For resilience



# Key takeaways

- Operational success relies on supply chains and logistics that are aligned with the OPLAN, and a robust Industrial Base to endure and sustain operations
- A resilient society, through its institutional structure (governance, bureaucracy, political system) and social structures (competence, motivation), is paramount to keep innovating, to man the industrial base with workforce, and to maintain the material infrastructure
- Ukraine has fought for 10 years – we need to learn how they cope in order to prepare ourselves and help Ukraine to prevail
  - Our research findings will be available during Fall 2024

# Some interesting research about UKR

- [Russian Logistics in the Ukrainian War: Can Operational Failures be Attributed to logistics? - Scandinavian Journal of Military Studies \(sjms.nu\)](#)
- [Societal resilience in theory and practise | Collection of the scientific papers of the Centre for Military and Strategic Studies of the National Defence University of Ukraine \(nuou.org.ua\)](#)
  - <http://znp-cvsd.nuou.org.ua/article/view/298247/291048>