SECTION V

Lessons and Ending

CHAPTER 25

Lessons from Ukraine: Benchmark or Significant Exception?

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Abstract

Since the start of the full-scale invasion of Ukraine by Russia, a deluge of articles, reports and analyses have been published that attempt to distill the lessons from this conflict. Of course, the first large scale conventional war in Europe in the 21st century will hold relevant lessons for (Western) militaries. However, these manifestations of lessons are no blueprints for change, as the lessons are context-specific and determined by the conditions of the war and the societies that wage it. This chapter is not so much about the lessons themselves but offers, instead, a novel perspective on military learning theory and practices. We argue that beyond emulating the manifestations of learning, the war in Ukraine offers an indispensable opportunity to evaluate the adaptation processes in war and consider the value of learning from others.

Keywords: Emulation, Organisational learning, Adaptation, Organisational culture, Conventional warfare

1. Introduction

For the Ukrainian armed forces, the Russian annexation of Crimea and the onset of the Donbas war in 2014 was a rude awakening. As the Ukrainian military was caught flat-footed, the conflict spurred a painful process of adaptation, resulting in an adaptation and enhancement of its fighting power between 2012 and 2022.[1] That fighting power was put to the test in 2022, and showed that Ukraine had made significant adaptations and succeeded in thwarting Russia's initial plans.

[1] According to Tom Dyson and Yuriy Pashchuk, the learning experiences of the Ukrainian armed forces proved to be far from straightforward. Differences in cultural outlooks between generations of officers and the virtual absence of an institutional process to incorporate lessons based on experiences from combat impeded Ukraine's efforts to enact organisational change in its military from battlefield experiences. Dyson and Pashchuk, "Organisational learning during the Donbas War: The development of Ukraian Armed Forces lessons learned processes," 62-64.

While international observers followed the Donbas War with keen attention, the Russian invasion in 2022 sparked a flurry of publications on the practical lessons for Western militaries.[2] The war forced Western armed forces to reorientate towards interstate competition and conventional warfare.[3] After three decades of expeditionary stabilisation, counterinsurgency and peace support operations across the globe, Western militaries had limited recent empirical data on conventional warfare to drive organisational change.

Moreover, this type of high-intensity interstate war in Europe serves as an empirical case-study for the effectiveness of strategy, doctrinal concepts, tactics, and equipment. It can yield important insight to assist organisational change and help prepare Western militaries for future wars. For instance, classical concepts such as combined arms operations, mass and robust logistics are brought to the fore by this conflict.[4] At the same time, more novel aspects of warfare such as unmanned aerial systems (UAS) and the impact of cyber activities are under study.[5] Furthermore, attention on Russian adaptation processes is limited yet crucial, because it provides a more comprehensive view on the complexity of the war. According to Theo Farrell, using observations from foreign militaries and conflicts for military change amounts to emulation: incorporating concepts and capabilities inspired by other militaries. According to Farrell, this pathway of change can be distinguished from innovation, the development of new military capabilities, and adaptation, the adjustment of existing capabilities.[6]

But how can armed forces learn from the Ukraine war? How do militaries observe, analyse, and emulate the right lessons from the experiences of other militaries? Of course, observing foreign wars to glean lessons for one's own institution is not a new phenomenon. Meaningful analyses can be made based on such observations, yet successful implementation of lessons from beyond the own institution can be more challenging due to differences in tasks, organisational or strategic culture, doctrinal underpinnings, financial constraints, and political considerations. In other words, learning from others is less straightforward than it seems.

This chapter will examine the extent to which lessons from the current war in Ukraine can help Western militaries prepare for future conflict. To examine this query, this chapter is structured in three parts. The first section investigates the

[2] Kofman, et al., *Lessons from Russia's Operations in Crimea and Eastern Ukraine.*

[3] Van der Vorm, *The Crucible of War: Dutch and British military Learning Processes in and Beyond Southern Afghanistan*, 17-18.

[4] Fox, *Reflections on Russia's 2022 Invasion of Ukraine: Combined Arms Warfare, the Battalion Tactical Group and Wars in a Fishbowl*; Robert Gibson, "Logistic lessons in the Russia-Ukraine War."

[5] Sherman, "Drone-on-drone combat in Ukraine marks a new era of aerial warfare"; Ducheine, Pijpers, and Arnold, "Bits- or Blitzkrieg? Cyber operations in the Russia-Ukraine War," 42-46.

[6] Farrell and Terriff, *The Source of Military Change,* 6-9.

concept of learning from foreign conflicts and the associated dynamics. The second section discusses three preliminary observations of the first one-and-a-half years of the Russian invasion. The third section analyses the value of such observations, directions of (re-)orientation of Western armed forces, lessons to be learned, and potential opportunities and pitfalls to implement these as part of organisational change.

2. Learning from others' experiences: Emulation and wartime observations

In early literature on military innovation and adaptation, a common notion was that militaries are inherently cautious to change.[7] Even when faced with operational challenges during war, militaries can be adverse to taking risks with adaptations that might impede combat effectiveness.[8] Moreover, while the pressures of war can instill a sense of urgency to enhance the military's performance, changes in operations were assessed as less dramatic due to constraints of time, resources and risk.[9] Conversely, peace time is seen as more conducive for implementing lessons learned. Still, it is important to note that in the last decades, Western armed forces have continuously been involved in demanding expeditionary missions such as Iraq and Afghanistan where the troops in the field had to adapt to operational challenges. At the same time, the larger defence institutions remained largely preoccupied with long-term planning and procurement projects.[10]

While military organisations can foster organisational change through developing new concepts, technologies or equipment and drawing from their own wartime experiences, other armed forces can also serve as a source of reference and inspiration. This form of change is designated emulation and 'involves importing new tools and ways of war through imitation of other military organizations.'[11] In previous conflicts, liaison officers seconded to allied units or headquarters collected experiences, lessons and best practices for the benefit of their own organisations. For instance, European observers were deployed during the American Civil War

[7] See: Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars*; Rosen, *Winning the Next War: Innovation and the Modern Military*; Hasselbladh and Yden, "Why military organizations are cautious about learning," 1-20.

[8] Kuo, "Dangerous changes: When military innovation harms combat effectiveness," 48-87.

[9] Rosen, *Winning the Next War: Innovation and the Modern Military*, 253.

[10] Indeed, the various Western missions can be thought of as discrete projects with little consistent strategic thought to either the conflict or the military organisations participating in them. Further, the capabilities and concepts tested against an adversary in these warlike environments were by choice of the Western establishments and not engaged by the enemy through his analysis and selection of weaknesses in the Western military system put at play.

[11] Farrell and Terriff, *Military Change*, 6.

and the Russo-Japanese War. A more recent example of learning from others are 'hunting parties' or 'tiger teams' employed by the British Army in order to scour allied units for lessons during the war in Afghanistan.[12] Indeed, commentators advocate deploying military observers to Ukraine to observe, analyse and learn first-hand from the war in order to acquire direct access to the battlefield.[13]

Foreign developments can inspire organisational change. But how can armed forces adopt and implement new concepts, organisational structures, and technology? Two schools of thought can be distinguished: neorealism and neoinstitutionalism.[14] Neorealism contends that international competition is a main driver for military change. Based on threat perception, militaries can seek to offset any advantage by a competitor by mirroring capabilities by adversaries or partners. When a state is less secure, its incentive to emulate successful foreign military practices becomes more prominent.[15] Observations of military effectiveness in foreign conflicts can then be a potent spur for emulation.[16] In other words, according to neorealism, organisational change is driven by empirical data on new capabilities or threats. Of course, beyond emulation, states can also attempt to negate adversarial advantages through alliance formation or by an asymmetrical approach, for instance by opting for irregular warfare.[17]

Whereas neorealism suggests a rational and mechanistic approach based on the perception of the strategic context, neoinstitutionalism by contrast holds that emulation and organisational change occurs due to internal considerations; change is driven from the inside of military organisations themselves. In this school of thought, emulation does not necessarily enhance the organisation's performance. Rather, legitimacy is gained by mimicking other armed forces. This is also known as institutional isomorphism.[18] Each member state has its own strategic culture, organisational structure, and threat perception based on geographical and historical factors.[19] Some of them prefer continuity and stability and are only inclined to change if that increases prestige, resources, autonomy or survivability of the organisation.[20] For instance, the militaries of great powers can exemplify adher-

[12] Van der Vorm, *Crucible of War*, 292.

[13] Evans, "Bind Ukraine closer to American military learning"; Griffiths, "U.S. military observers and why they are needed in Ukraine."

[14] Goldman, "The spread of western military models to Ottoman Turkey and Meji Japan," 41-68.

[15] Ibid, 42-43.

[16] Fox, "Conflict realism: A new school of thought for examining the future of armed conflict."

[17] Posen, *Military Doctrine*, 61-62.

[18] Goldman, "*Western Military Models*, 43-44.

[19] Tuinman, *A European Small State Perspective on Change within Special Operations Forces*, 11-12.

[20] Echevarria II, "Tomorrow's army: The challenge of nonlinear change," 85.

ence to international or professional norms.[21] Militaries generally strive toward effectiveness, professionalism and legitimacy in order to endure. For instance, smaller states can adopt specific capabilities to emulate a more senior ally. This can enhance the military effectiveness while concurrently raising legitimacy in the eyes of the senior partner.[22] A prime example of this dynamic can be seen within NATO where member states adopt the alliance's standards to achieve interoperability.[23]

Because of these contextual differences, learning from foreign wars is a challenge. Identification of the correct or opportune lessons in wartime is difficult, particularly so when the proposed solutions are not in line with institutional culture and norms.[24] The organisational culture also indicates whether armed forces draw inspiration for change from within the organisation or the broader environment.[25] Cultural biases can warp analysis of performance of other military organisations, which will hinder correct identification and implementation of valuable lessons of war and warfare.[26]

Military success or failure has different causes. Institutional and cultural norms can be critical for change.[27] Organisational developments are also thoroughly shaped by their routines and norms. In the literature on military innovation and adaption, organisational culture is increasingly identified as a primary shaper of change, both as a driver and as a barrier.[28]

To be sure, none of the challenges illustrated above suggest that learning from foreign wars is not worthwhile or impossible. Far from it, foreign wars provide valuable lessons, references, and inspiration for armed forces in lieu of direct participation in combat. However, to effectively learn from others, militaries must recognise these dynamics and limitations of these lessons in preparing for future operations.

[21] Of course, these approaches are not mutually exclusive.

[22] De Wijk and Osinga, "Military innovation on a shrinking playing field: Military change in the Netherlands," 133-134.

[23] Furthermore, most allies look primarily to the United States for inspiration. This is not to suggest that the collective armed forces of NATO allies resemble smaller derivatives of the US military.

[24] Hill and Gerras, "Systems of denial: Strategic resistance to military innovation," 109-132.

[25] Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*, 131-133.

[26] Porter, *Military Orientalism: Eastern War Through Western Eyes*, 15-18.

[27] Sharman, *Empires of the Weak: The Real Story of European Expansion and the Creation of the New World Order*, 20-26.

[28] See for instance: Finkel, *On Flexibility: Recovery from Technological and Doctrinal Surprise on the Battlefield*; Fox, *Learning to Fight: Military innovation and Change in the British Army, 1914-1918*; Long, *The Soul of Armies: Counterinsurgency Doctrine and Military Culture in the US and UK*.

3. Preliminary observations

As of now, eighteen months into the war there exists a plethora of studies, articles, and commentaries on practical, linear and one-sided lessons that Western militaries should learn. Some of them study best practices and successful adaptions of the Ukrainian military forces. Others study the dysfunctional Russian tactics and mediocre results in the military encounters with the Ukrainian military forces so as to learn 'what not to do.' For now, scholarly attention starts to grow for the adaptation and learning processes of both belligerents (including Russia) in the war.[29] In this section, we discuss the adaptation and learning processes of both belligerents along three themes: enduring realities, technology, and command & control. These observations show why the learning processes and outcomes are different for both sides. The following insights provide direction for Western militaries, how to assess and evaluate lessons from observing war instead of being engaged in it.

3.1 Enduring realities, tanks, and trenches

The performance of the tank in the first months of the Ukrainian war reintroduced the longstanding discussion on the relevance of the tank in war. 'The tank is dead' was the lesson that many observers were taking from a flood of images depicting Russian tanks mired in the mud, their turrets blown off, ambushed and destroyed by Ukrainian forces armed with cheap anti-tank weapons, drones and mines.[30] The images of streets littered with tank carcasses went often alongside feeds from Turkish-produced drones destroying tanks, seemingly with ease, reinforcing the perception of the Second Armenian-Azerbaijan War in 2020. Russian-produced tanks destroyed by the same Bayraktar-drones seemingly supported the 'tank is dead' claim, according to a considerable part of the Western military commentators and analysts.[31] However, the Ukrainian call from President Zelensky for military support and weapons specifically mentioned Western tanks: 'We must form such a tank force, such a freedom force that after it strikes, tyranny will never again rise up.'[32] In line with Ukraine's past Soviet-style military doctrine and training, tanks

[29] Spearheaded by the RUSI report on "Russian tactics in the second year of its invasion of Ukraine" that highlights how the Russians adapted their tactics in the Ukrainian conflict and the challenges this has created for the Ukrainian military that must be overcome. Jack Watling and Nick Reynolds, "Meatgrinder: Russian tactics in the second year of its invasion of Ukraine," RUSI, 19 May 2023.

[30] Johnson, "The tank is dead: Long live the Javelin, the Switchblade, the…?"

[31] Ibid.

[32] Gozzi, "Ukraine war: Zelensky urges speedy delivery of Western tanks."

deliver mobility and firepower, which in their view is key in an offensive war.[33] Or as the military theorist Anthony King declared: 'They need something that can actually destroy Russian tanks at distance.'[34]

Russian armour is rarely used anymore for attempts at breakthrough. The influx of shoulder-launched antitank missiles (javelin, NLAW, etc.) from Western allies at the start of the war was disastrous for Russia's tanks. After the destruction of Russian armour formations, which were not used in a combined arms configuration, flanked, and protected by air and ground forces, the Russians adapted. Now tanks supplement artillery capabilities through indirect engagements. Tanks are also used as highly accurate fire support assets able to utilise their enhanced optics to identify and knock out firing positions. Furthermore, Russians use tanks in raiding actions. Because of the continual pressure that Russian infantry place on Ukrainian defensive positions, Ukraine requires regular troop rotations. Striking troops during these rotations significantly increases the likelihood of inflicting casualties, so the Russians often conduct raids with tanks when they detect troop rotations.[35]

Besides the tank, another enduring reality of war resurfaces in Ukraine, the trench. A trench provides a very efficient way for soldiers to protect themselves against heavy direct and indirect firepower. Trench warfare, in which opposing armed forces attack, counterattack and defend relative permanent systems of trenches dug into the ground, is usually resorted to when the superior firepower of the defence compels the opposing forces to 'dig in.' This means that mobility will be sacrificed to gain protection.

As analysts suggest, the absence of air dominance on both sides and the width of the frontline (approx. 1,100 km) resulted in reduced densities of force to hold terrain. Mass fires subsequently reduced the potential to concentrate forces and manoeuvre for both belligerents. Furthermore, the proliferation of unmanned aerial systems (drones), masses of precision strike munitions and high-tech ISR capabilities provided the ability to speed up the kill chain, from sensor to shooter, effecting on concentrations of forces on both sides of the frontline. Then, it is not difficult to imagine digging yourself in.[36]

[33] Gat, *The Future of the Tank and the Land Battlefield*, 4.

[34] Gallardo and Melkozerova, "Why Ukraine believes tanks can turn the tide of war."

[35] Watling and Reynolds, *Meatgrinder*, 14-15.

[36] The introduction of Western HIMARS rocket systems is a case in point. Russian concentrations of forces and accumulations of munitions and supplies became increasingly vulnerable. The threat of destruction deep behind the frontline led to more dispersed and fragmented battlefields with lower densities of formations, fire capabilities and depots: Much, "How HIMARS rocket launchers helped Ukraine 'get back in the fight against Russia.'"

Digging in is an adaptation that both belligerents implemented while fighting.[37] However, the rationale to dig in and reinvigorate trench warfare does not follow the same learning process. For the Ukrainians, the Russian artillery superiority and sensor density prevented Ukrainian forces from concentrating sizable units, because anything bigger than company-level would be detected and targeted preemptively. The experiences from the successful Ukrainian Kharkiv counteroffensive in May 2022 reinforced the idea that a vulnerability in the defence of the adversary needs to be detected and exploited. However, the necessary concentration of an offensive force is vulnerable to detection and kinetic strikes. Therefore, digging in was necessary for Ukrainians to detect weaknesses in the Russian defence, buy time and space to equip, and to build and train an offensive Ukrainian formation for an eventual counterattack or counteroffensive.

For the Russians, the logic towards trench warfare is slightly different. Russian defensive capabilities are rooted in an old but effective twentieth century strategy.[38] The Russian way of war is based on their idea of the reconnaissance-fire complex.[39] By using vast amounts of tubed and rocket-launched artillery in combination with active reconnaissance on all levels below division, sophisticated ISR and automated command and control, the aim is to speed up the process between detection, decision-making and destruction of the target. Where the Ukrainian military logic follows the idea that fires (deep as well as close) shape the battlefield to manoeuvre into the rear or depth, the Russian calculus prescribes manoeuvre in support of fires. Russian forces focus on the actual destruction of enemy forces, where the Ukrainians try to outmanoeuvre them.

Although both belligerents experience the realities of war, they adapt in different ways. As a result, Russia and Ukraine reacted differently regarding changes in doctrine, force structure and application of tanks and trenches. For Western militaries there are no clear take-aways on the value or proposed obsolescence of tanks and trenches in modern warfare. Understanding the intricacies and subtleties of the drivers for change on both sides is essential to draw lessons.

3.2 Technology

War often sees the introduction of new military and, application of, civilian technologies. The expectations are high, and belligerents hope that their high-tech capabilities give them a marked advantage. The Russia-Ukraine war is no

[37] Noorman, "The Russian way of war in Ukraine: A military approach nine decades in the making."

[38] Betz, "Russian fortifications present an old problem for Ukraine."

[39] Grau and Bartles, *The Russian Reconnaissance Fire Complex Comes of Age*, 1-2.

exception. Hi-tech weapons, equipment and systems are being battle-tested on both sides. Javelins, families of drones, electronic attack systems, cyber weapons, air defence capabilities and 'mobile-phone-fire-mission' applications (the Delta app) have seen their application in combat.[40] However, to effectively implement new technologies, militaries must integrate them in their standing organisation, change their doctrine, and experiment and adapt to these new capabilities.

At the start of the war, the Ukrainian military possessed more or less the same equipment and technology as the Russian armed forces, due to their Soviet legacy. However, new equipment and predominantly Western technology started to roll into Ukraine's military when foreign support programs started delivering.[41] What helped the implementation of new equipment and tech was Ukraine's strong digital and creative industry. This included an effervescent ecosystem of digital start-ups, innovative technological institutions and universities, but also developers.[42] The driver for change in Ukraine was therefore more or less bottom up, instead of enforced through policy and strategy from the top. It made the Ukrainians quick and successful in utilising available dual-use technology from the strategic to the tactical levels through an iterative process.

The learning process started for Ukraine after the invasion of Georgia (2008) and the annexation of Crimea (2014). Being in the underdog position, they needed to focus on deterring or defeating Russia's potential revisionist ambitions. Ukraine's technology enlistment strategy followed the functional approach: What is the Russian threat and how can we smartly utilise available technologies. This requires people that are creative, who can experiment and have room to fail and learn on a highly iterative scale.

Yet, in the technology competition model Russia had the upper hand. Russia was able to build, advance and integrate the technologies to create a technological combat overmatch over their adversaries. Russia has been analysed and monitored by Western institutions and observers for decades. The focus has been on nuclear weapons and their high-tech capabilities: (military) innovations, such as hypersonic missiles, cyber communities, troll farms, drone capabilities, Armata tanks, radar and electronic warfare, and stealth capabilities. These capabilities determined

[40] The Economist, *Ypres with AI*, 3-4.

[41] Krebetsch, "Foreign support to Ukraine: Evidence from a database of military, financial, and humanitarian aid."

[42] Ukraine was called "the emerging digital tiger of Europe: Bandura and Staguhn, "Digital will drive Ukraine's modernization." Mainly in the Kyiv and Lviv area, businesses, universities and governmental organisations work closely together on AI, bigdata, digital marketing and cloud computing. See for example: Macaulay, "Why supporting Ukraine's tech ecosystem is so important; Find out what Ukraine's founders had to say."

how the West perceived Russian strategic threat.[43] On March 2018, General Valery Gerasimov, the chief of the General Staff of the Russian armed forces, noted that the Syrian conflict represented the 'contours of future war.'[44] He called the Syrian experience 'priceless' for Russia's military. As the United States and its allies used a wide arsenal of high-tech weapons there, such as drones, satellites, and various robotic systems, the Russian military was able to learn from its potential adversary and to mimic similar tactics and technologies. The Russian defence strategy geared up, top-down, for a long-term high-tech competition with the United States and NATO.[45] Strategy however also remained determined by old-Soviet legacy systems, research institutions and the hierarchical military cultural values.

Simultaneously, the opponent's military starts adapting to the new reality from the moment it is confronted with technological innovations. As a result, the military advantage of novel dwindles after it is introduced on the battlefield and drops like a stone the moment that the technology is captured by the enemy.[46] Technology often appeals to military leadership through a promise of instantaneous advantage and success, but this can be disappointing because of the inevitable action-reaction cycle. Western analysts argue that while new technologies are very useful, they are not wonder-weapons that transcend general principles of warfare.[47] Cyber offensives can be countered by cyber defence, redundancy, and alternate non-cyber-dependent equipment; massed use of remotely piloted aircraft can be countered by new anti-aircraft weapons and new electronic warfare equipment; and while precision fire is efficient, it does not provide everything ground forces need from their fire support. Though both Russia and Ukraine might be somewhat deficient in precision fire, it has not proven a total game-changer, and older fire and manoeuvre weapons are still providing essential capabilities.[48]

The learning processes of both belligerents take off from different starting points, but also the purpose of using the latest technology is different. Russia gained experience and experimented with novel technologies in warlike theatres such as

[43] Samuel Bendett, *The Rise of Russia's Hi-Tech Military*, 2.

[44] Zakvasin, "«Контуры войны будущего»: как российская армия готовится к конфликтам нового поколения."

[45] Bendett, *Russia's Hi-Tech Military*, 7.

[46] Trofimov, "Ukraine's new offensive is fueled by captured Russian weapons."

[47] Russia, for example, has been capturing some of the US and NATO-provided weapons and equipment left on the battlefield in Ukraine and sending them to Iran, where the US believes, Tehran will try to reverse-engineer the systems and reincorporate them in the Russian formations. For its part, Ukraine equips its units not only with Western equipment, but also with captured Russian weapons. Tanks, howitzers, and ammunition left behind by retreating Russian forces are now being used against their former owners.

[48] Hecht, *The Russo-Ukraine War: Possible Lessons for the IDF*.

Syria and Georgia. Ukraine must fall back on the combined experience from the Donbas-war (2014-2022). Equally important for the differences in learning processes are the specific cultural, economic, and societal factors. Those also determine how and to what extent dual-use technology is integrated into the military.

3.3 Command and control

There is truth in the popular quote from Napoleon: 'In war, the moral is to the physical as three is to one.' A winning military is a military with high morale, effective leadership, and distributed power among its ranks. Commentators and strategists explain the performance of belligerents in war. Ukrainian leadership is effectively boosting the morale of their troops using the Western command philosophy of mission command. Mission command goes beyond orders and requires an environment of freedom and trust between leaders and subordinates. In the chaos and uncertainty of war, troops are empowered to make their own decisions, take the initiative, and lead boldly. The Ukrainian Commander of the Armed Forces Gen. Zaluzhnyy explained the contrast between his generation with Soviet-style top-down command experience and the new generation: 'These are completely different people – not like us. These are not scapegoats, as in the Russian army, for example, but real helpers who will soon replace officers.'[49]

This distinction, however, is not that simple. Michael Kofman posits that the Ukrainian forces actually consist of two armies:[50] a Soviet legacy hierarchical system and a more modern Ukrainian military based on the idea of mission command, trained on leadership and command and control by American and British trainers. The former army is less open to innovation and experimentation and commanders tell their subordinates what to do and how to do it. Learning processes are formal and limited. Franz-Stefan Gady notes this dichotomy within the Ukrainian armed forces and states that 'it's clear that Ukraine is struggling with how to employ its forces. Once in the fight, they sometimes display poor tactics and a lack of coordination between units. All while having to cope with still deeply entrenched bureaucracy, infighting and a continued reliance on 'Soviet-style thinking.'[51] Additionally, the attrition of western trained leaders in the bloody battles at Bakhmut, Vulhedar

[49] Quoted in: Conor, "Mission command spurring Ukrainian succes."

[50] The question is being raised for the West that it has moved too fast and too far in reducing its arsenal of tanks and statistical artillery (both guns and mortars).

[51] Quoted in: Altman, "A sobering analysis of Ukraine's counteroffensive from the front; A military analyst just returned from touring the Ukraine front and has offered his blunt take on how the counteroffensive is really going"; See also the twitter feeds of Franz-Stefan Gady and Michael Koffman from 18th July 2023 where they lay out sixteen relevant observations from their trip.

and Kherson in combination with their replacements with mobilised and volunteer forces with limited training and experience hampers Ukrainian opportunities for bottom-up learning. Recognising that mission command is culturally defined and needs a tradition of trust and liberal values is one thing, but transferring the gist of it is another.[52]

On the Russian side, distributed mission orders are rare. Analysts agree that Russia has a tendency of reinforcing failing operations until orders are changed at higher levels. The lacking initiative and problem-solving ability of junior leadership has implications for combining different arms and joint capabilities on the tactical level.[53] The early phase of the Russian invasion rapidly unravelled the myth that the Russian armed force was modern and capable of matching Western standards. However, having failed in the initial stages of the war, its commanders reverted to traditional Soviet-era warfare, top-down and hierarchical, using massive artillery bombardments coupled with echeloned attacks of expendable Wagner mercenary-type units and high-capable VDV units. Moreover, Russia demonstrated its ability to fight and mobilise at the same time, tie down a large Ukrainian force in a grinding battle for Bakhmut and force the Ukrainians into a disadvantageous war of attrition.[54] There is also evidence of reduced impact of HIMARS missile strikes due to effective Russian countermeasures and sophisticated defensive obstacle zones, where Russians combine counter mobility efforts with effective fires that absorb offensive Ukrainian attacks, without the need of deploying their operational reserves.[55]

The Russians observed, learned, and adapted in a way that matched their strategic culture, organisational structures and traditional military norms and standards. Ukrainian forces have transformed into a recognisable Western military force with Western investments since 2014, with a radically different leadership culture, although this transformation remains far from complete.

[52] Or as a Ukrainian soldier tells a U.S. researcher at a Western training location: 'Our way of war is not Western or Russian – it is Cossack. We just happen to be fighting with a lot of donated American and NATO equipment.' In: Matisek, Reno and Rosenberg, "US-led security assistance to Ukraine is working."

[53] Zabrodskyi, Watling, Danylyuk, and Reynolds, *Preliminary Lessons in Conventional Warfighting from Russia's Invasion of Ukraine: February–July 2022*, 12-13.

[54] The Economist, *Slow Learners*, 10.

[55] Kilner, "Ukraine forced to update Himars software after Russia jams rockets"; Watling, "West must focus on preparing Ukraine's troops – or we will all pay the price."

4. Opportunities and pitfalls in learning from the Russia-Ukraine war

Against the backdrop of these preliminary observations, the question arises as to whether Western militaries can draw lessons for organisational change from Ukrainian and Russian tactics, operations, and military capabilities. Arguably, the Ukraine war validates the conscious decision of Western militaries to recalibrate towards conventional warfare. Enhancing both the collective deterrence posture of NATO and the member states' ability to fight at scale against a capable opponent is necessary after three decades of expeditionary stabilisation and counterinsurgency operations. In this regard, the war in Ukraine underscores the enduring realities of war and warfare and questions the obsolescence of tanks and trenches in modern warfare.[56] And thus, highlights the urgency of renewed investments in time, attention and resources that has dawned on Western militaries.[57] The previous section also demonstrates the rise of new technologies. Western militaries are observing the developments in employing drones in various roles and the associated countermeasures with keen interest. Furthermore, the use of the electromagnetic spectrum in both defensive and offensive roles will hold pertinent lessons for observers.

Yet, as compelling as the military developments in Ukraine are, translating the observations and related focus into specific building blocks for change and implementing those elements into existing formations and organisations is far from straightforward. While the operations in Ukraine show important developments and trends in warfare, analysts should be aware of the limitations of emulation and deep learning from these observations. What are these limitations?

First, western forces should be aware of the 'fallacy of linear projection' as described by William Fuller. He cautions against extrapolating developments in current wars towards new conflicts that can have far distinct characteristics.[58] The return of great power competition does not equate to a resurgence of conventional

[56] For instance, the presumed demise of the main battle tank's relevance in modern warfare proved to be premature. Furthermore, the impact, ammunition consumption and attrition rates of tubed artillery indicate that indirect fire in sufficient quantity is still a crucial capability in the 21st century The return of trench warfare in Europe, in evidence since the Donbas War is a case in point. Finally, and most fundamentally, the recognition that infantry, supported by other arms and branches, is the enabler of seizing, holding and defending terrain.

[57] Tuinman and Soldaat. "Officieren weer leren vechten," 113-125; Barno and Bensahel. "The other big lessons the U.S. Army should learn from Ukraine"; Van der Vorm, *The Crucible of War: Dutch and British Military Learning Processes in and Beyond Southern Afghanistan*, 344-346.

[58] Fuller, "What is a military lesson?" 41-44.

high-intensity warfare. Insurgencies, proxy-wars, and even non-kinetic influencing will also be part of the future security environment.[59]

Moreover, despite the ending of the large-scale interventions in Iraq and Afghanistan, Western states remain engaged in intrastate conflicts. If anything, security trends in Africa and Asia indicate that Western stabilisation efforts will continue for the foreseeable future. Western militaries cannot solely focus on conventional warfare and need to place their take-aways from the Russia-Ukraine war in a broader contextual perspective.[60]

Another limitation is that the developments in Ukraine are shaped by the interaction between the belligerents. As such, Russia and Ukraine represent complex adaptive systems that are engaged in a competition of adaptation to ensure victory. This means that the responses are in large part shaped by the particular dynamics of the conflict, which will not be applicable to other wars with different participants.[61] Consequently, western armed forces need to look at the challenges one adversary creates for the other, rather than looking primarily at the solution to perceived problems. Moreover, the corollary is that potential adversaries also observe the developments in Ukraine. Both state and non-state actors will scrutinise the adaptions by both Russia and Ukraine and try to develop responses.[62] In addition, 'these will try to offset resulting Western organizational changes by seeking asymmetrical responses.'[63]As such, these three elements suggest that emulation of lessons from the war in Ukraine through solely the neorealistic lens is flawed as the threat perception and mission set in Western states differs from both Ukraine and Russia.

A final limitation to consider when learning from developments in the war in Ukraine can be seen with the neoinstitutionalist lens: learning processes are in part shaped by organisational culture and preferences. As Dyson and Pashchuk describe, the Ukrainian learning process during the Donbas War was shaped by distinct generational cultures within the armed forces.[64] Somewhat counterintuively, the legacy of Soviet-education has become more prominent in the last year

[59] When the US National Defense Strategy of 2018 heralded the return of Great Power Competition and the associated need to recalibrate towards conventional capabilities, it cautioned in an addendum against divesting in irregular warfare. United States Department of Defense. *Summary of the Irregular Warfare Annex to the National Defense Strategy.* (Washington DC, 2020): 2-3.

[60] Van der Vorm, *Crucible of War*.

[61] Watling and Reynolds. *Meatgrinder*.

[62] See for instance: Kilcullen, *The Dragons and the Snakes: How the Rest Learned to Fight the West*; Brun, "'While you're busy making other plans'-The other 'RMA,'" 535-565.

[63] Finkelstein, "Beijing's Ukranian battle lab."

[64] Dyson and Pashchuk, "Organisational learning," 141-167

due to combat losses and the recalling of elder officers to the military.[65] This is not to say that one organisational culture is better than the other, but different norms and values will lead to different responses to operational challenges.[66] Solutions for the Ukrainian armed forces during wartime can be unhelpful for Western militaries at peace. In sum, the context of the conflict and the culture and character of participants shape the manifestations of learning processes, and adaptations and are not transferable to other conflicts. These identified limitations in drawing ready-made lessons regarding enduring realities of warfare, technology, command and control and the associated concepts from the war in Ukraine point towards the importance of adaptability in Western militaries when confronted with operational challenges.[67] In other words, besides the question of what to learn, the challenge of how to learn is even more germane.

The above limitations show that there is no clear-cut panacea for enhancing the learning processes in armed forces through observational learning. However, there are ways to circumvent the four above-mentioned limitations and enhance learning processes that can lead to valuable lessons to implement for Western militaries.[68] We suggest four ways to do that. First, by training Ukrainian soldiers and units in European countries, Western militaries are well positioned to learn from Ukrainian experiences.[69] Better yet would be to deploy military observers in an official capacity to complement (military) academics who study the war in the country.[70] Even then, the Ukrainian armed forces will be naturally selective in what to show foreign observers.

Secondly, beyond direct observations, militaries can collaboratively analyse the developments and contemplate an organisational response. For NATO member states, such a study group could be spearheaded by NATOs Joint Allied Lessons Learned Center (JALLC) to ensure a comprehensive analysis across the alliance.[71] A third suggestion is that militaries should study contemporary conflicts beyond Ukraine in order to broaden the view and to assess whether developments from Ukraine proliferate to other theatres. Finally, Western militaries can mimic the direct engagement in wars that generates formative lessons. As described

[65] Adamsky, *The Culture of Military Innovation*.

[66] Terriff, "Warriors and innovators: Military change and the organizational culture of the U.S Marine Corps," 216-217.

[67] Barno and Bensahel, *Adaptation under Fire: How Militaries Change in Wartime*.

[68] The Economist, *Baptism by Fire*, 12.

[69] Britzky, "How US troops in Germany are training Ukrainians to save one another on the battlefield."

[70] An obvious restriction is that Western officers will be limited to directly observe the Ukrainian efforts.

[71] Dyson and Pashchuk, "Organisational learning," 141-167.

above, observational learning and emulation are important but come with limitations. These efforts should be combined with serious evaluations of exercises, experiments, simulations, and deployments. In that way, the resulting identified deficiencies can be converted to actionable response and put to the test, for example by having a dedicated unit that acts as the adversary and is free to seek any advantage to thwart the training unit's plans.[72]

5. Conclusion

With the reorientation of Western armed forces towards interstate competition and large-scale conventional combat, the observations from the war in Ukraine seem to come at an opportune moment. Analysts and commentators observe both old and new concepts that are put to the test with different conclusions and changes in tactics, investments, and concepts by both belligerents. These observations provide a vital source of information for Western militaries and can guide organisational changes in the realms of the realities of war, technology and command and control. Nevertheless, Western militaries should consider the dynamics and limitations of observational learning and emulation because there are no template solutions.

This chapter discussed these limitations by using neorealism and neoinstitutionalism as frames of reference for observational learning and emulation. We specifically draw attention to various limiting factors. The threat perception and employment of armed forces will be markedly different for most states. Just consider the enduring engagement by Western militaries in various stabilisation and peace support operations. Moreover, the dynamics of adaptation between Ukraine and Russia are highly contextual and potentially irrelevant against other adversaries in future conflict. From the institutional perspective, the extent to which Ukraine's and Russia's military can be used as a benchmark for modelling Western armed forces, appears to be limited. To be sure, there are institutional aspects that deserve emulation, such as Ukraine's demonstrated capacity to absorb diverse equipment and adopt novel technologies. Yet, whether Western militaries can approximate this without the sense of urgency conferred by fighting a war is an open question.

[72] By assigning this role on a rotational basis, this can inspire creative thinking and enhance adaptability among service members. Units in the field will find (partial) solutions to operational challenges. Initiative in adaptation should thus be facilitated and reinforce the distributed command philosophy of mission command. Still, central guidance to harness bottom-up efforts is essential to ensure a comprehensive understanding of the challenges and potential solutions. In this way, experiences from others can be used as reference and inspiration for the organisation's learning processes and thus adopted: Dawes, "Project Geronimo: Sophisticated OPFOR for sophisticated training."

Nevertheless, the importance of adaptation and change, learning from others and how this conflict allows us to focus on the key elements of large-scale conventional war is clear. Still, this does not imply that learning processes and others' lessons can straightforwardly be copied and implemented. To optimally use these observations, it is important to use these insights while remaining aware of the four limiting factors of such learning experiences detailed in the chapter. In the case of learning from observing the Russia-Ukraine war, we suggest the following: deploy observers, institutionalise the learning process, broaden our view by looking beyond the Ukrainian perspective, and study emulation initiatives in other theatres. Undoubtedly, potential adversaries are also closely examining this and other conflicts as well in order to adapt and enhance their effectiveness. Western militaries need to change and adapt wisely to prepare to the best extent possible for a potential large-scale conflict while retaining the agility to adapt to new emerging challenges.

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