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*Thinking on Innovation, Industry, and International Security*

Research Note

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## Military-Industrial Mismatch: Battlefield and Business Learning Rates

My long research note of 25 August, “[On Learning Lessons from the Russo-Ukrainian War](#),” analyzed the debate on how much seems to have changed of late about the character of warfare. For the military, at least two things differ: drones and data. I now extend that analysis to industry, where the issue includes customary rates of development and production. In today’s *Wall Street Journal*, Yaroslav Trofimov brings two quotes from top military management that encapsulate the dichotomous problem:

*Nothing stands firm. War is the time when technology develops. Every operation is different, and if you repeat it the same way, it would make no sense because the enemy already has an antidote.*

— Vice Admiral Oleksiy Neizhpapa, commander of the Ukrainian Navy

*We have a lot of lessons to learn. One is that quantity is a quality of its own. You need numbers, you need force numbers. In the West we have reduced our military, we have reduced our stocks. But quantity matters, mass matters.*

— Major General Christian Freuding, the head of Ukraine operations at the German Ministry of Defense

In short, we will need new stuff, constantly, and a lot of it. So how well is this present lesson being learned?

Fortunately, the Chinese pursue learning through simulation (Elsa B. Kania & I. B. McCaslin). North Americans and Europeans, however, get to observe the present war through partial participation, and hopefully make pick up the pace of their adaptation. As W. Alex Vacca noted in his excellent work on the Russo-Japanese War, drawing the wrong lessons is easy if the observers are predisposed to frame things through their bureaucratic upbringings. Unhelpfully, NATO’s militaries and war industries are not known for agile learning and procurement. Their multi-year processes might be “fine for tanks or helicopters, [but are] “too slow to keep up with the pace of cyber” (T. J. Holland, in Shashank Joshi). On the other hand, some suppliers have responded quickly, such as Northrop Grumman with its American technicals: anti-drone chain guns fitted to Ford pickup trucks (Sam Skove).

Russians have at least been learning defensively: sowing deeper minefields, substituting antitank missiles for vulnerable howitzers, employing more laser-guided rounds for the remaining guns, and sequencing windows of jamming for their own communications and navigation in battle (Hlib Parfonov). Behind the front, they have been networking air defenses, and dispersing and hardening headquarters (Shashank Joshi). On the other hand, not learning is convening a meeting of your whole command team at your huge historic headquarters building, in the face of an enemy with overhead reconnaissance and cruise missiles (Mykola Vorobiov).

Indeed, for Ukrainians, adaptation may be a national characteristic (Elina Beketova). Their battlefield learning under acute resource constraints has been impressive. Operationally, consider their decision to maintain pressure along the whole front, pinning down the best Russian troops, and thus denying creation of an operational reserve. This contradicted the NATO school-solution, and thus required real thinking (Nataliya Bugayova). Technologically, consider the “Army of Drones” initiative at the Digital Transformation Ministry. This

has provided “rapid battlefield feedback loops between drone operators and developers, leveraging public and growing private funding, and most importantly scaling production and training” (Federico Borsari and Gordon Davis). That is not the classic American way of war (Russell Weigley), even if that has regrettably just been a way of battle (Antulio Echevarria). Note that the initiative has sidestepped the Defense Ministry, still said to be a bastion of post-Soviet bureaucracy.

All this has established “an interactive, two-sided competition” in the war (Stephen Biddle, in Samya Kullab), of not sustained, but merely transient advantages. In such contests, management in the military and industry need to focus on “advanced pattern recognition and observation to set broad strategic themes, and then let people experiment within them” (Rita McGrath). With this dynamic, drones have provided singular advantage. Drones are everywhere in this war (Trofimov), and drones have been “democratized throughout the Ukrainian rank and file, with command and control decentralized into ‘islands of forces’ that have the freedom to alter tactics on the fly” (Kerry Chávez). This trend towards democratization of destruction has been at work for well over a decade, and may significantly change the global balance of power (James Hasik & Mark Revor).

We have seen signs of change to the west, but they still sometimes surprise. This week, the CEO of a European software firm told a gathering I attended that his latest war-fighting application in Ukraine required 18 days for writing the code, two days for loading onto drones, and four days for flight-testing, before entering into combat against Russians. Such rapid cycles of combat experience provide data on what works and does not on the battlefield, which can then flow back as actionable knowledge for design teams (see the essay by Morgan Meaker). Notably, the hands-on necessity here matches recent findings on the value of predictive analytics in industry. Learning requires investment in sensors, computing, bandwidth, and cloud storage—basically, collecting and analyzing it all yourself (Erik Brynjolfsson *et alia*).

Mass matters? Yes, always. But time matters, too (Anthony Saich). So what if you need a lot more of something, quickly, and you’ll need it to be different next month? Post-Cold-War counterinsurgent campaigns taught NATO’s war ministries of the need for wartime adaptation in doctrine and practice, and sometimes they took those lessons. The Russo-Ukrainian War is hopefully teaching them of that need in materiel. Actionability, however, varies by industry. The American munitions mobilization of 2023 showed how this is possible in a capital-intensive industry with standing production facilities. The MRAP experience of 2007 showed how this is possible for North America’s large truck-building industry (see my 2021 book).

Shipbuilding is another matter. In World War II, US yards built submarines and destroyers very quickly. Cruisers, however, took years, and today’s submarines and destroyers are the size of WWII cruisers (see my long research note of 20 July 2023). The case is similar with aircraft. Fighters in WWII cost somewhat more than tanks, but now they cost somewhat less than frigates. All the manufacturers with whom I have spoken agree that markedly increasing production rates of fighter aircraft would require three years of lag-time. All this means that little new and large would come before the fourth year of a big war with China.

For the present war, Russia’s industrial offset was Soviet stocks of tanks and howitzers, though not of *Slava*-class cruisers. Ukraine has already demonstrated a wartime alternative: quickly iterating with the small and many when the big and exquisite are unavailable. If war with China is really a strong possibility by 2027, then military-industrial strategy has corresponding alternatives: build capacity now for immediate production, or build capability now for future development and production. The second seems more alluring if wartime learning stands a strong possibility of rendering obsolescent the stockpiles. Recall that the Royal Air Force entered the Second World War with biplanes and ended it with jet fighters. My CEO friend mused about the possibility of redirecting the funding for just two Joint Strike Fighters into an air fleet of drones. He then asked and answered his own question: “can Lockheed and Raytheon Technologies get out of their own way to do this? No.” Perhaps they actually can, but if they cannot, their devotion to existing programs and ways of doing business presents a huge opportunity for market entry by startups.

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