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WEB ARTICLE
WA/15/26

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Introduction

For over a century, military experts have repeatedly predicted the tank's demise. Each generation of warfare technology, from fighter aircrafts and anti-tank missiles to precision drones, has prompted fresh declarations that armoured vehicles have become irrelevant.[1] Yet tanks continue to dominate modern battlefields both physically and psychologically, adapting to each new challenge. This recurring pattern of predicted death and actual survival reveals an essential truth, which is that the tank endures not because threats do not exist, but because it continuously evolves to counter them. Understanding this cycle of obituaries and resurrections shows how weapon systems adapt rather than disappear when confronted with new technologies.

Genesis: The Original Mission (1916)

World War I's trench warfare created an unprecedented tactical problem. Machine guns, barbed wire, and artillery made infantry advances suicidal. The tank emerged as the solution: armoured protection against small arms, tracks to cross trenches, weapons to destroy fortifications, and mobility to support infantry. When British Mark I tanks entered combat at

the Somme in 1916, they embodied a mobile fortress concept that would transform warfare despite initial mechanical fragility.

Obituary 1: Post-WW I "A Passing Fad" (1918-1939)

The First Death Notice

Germany's military leadership initially dismissed tanks as tactically useless, investing in naval Dreadnoughts rather than developing armoured vehicles.[2] This scepticism represented the first major declaration that tanks had no future, an obituary written before the weapon proved its value.

Resurgence

British armoured assaults reversed this assessment. The 1917 Cambrai offensive demonstrated coordinated tank operations could achieve breakthrough while the 1918 Amiens attack shattered German defences on the famous Ludendorff's "Black Day".[3] Germany ultimately developed sophisticated combined-arms doctrine integrating tanks with infantry, artillery, and air support, proving far more effective than treating tanks as independent weapons.[4]

Obituary 2: "The Rocket and Missile Age" (1970-90s)

The Yom Kippur and Grozny Shocks

The 1973 Arab-Israeli conflict triggered intense debate about tank survivability.[5] Egyptian anti-tank missiles inflicted heavy Israeli armour casualties. Military analysts argued missiles required prohibitively heavy armour, making tanks too cumbersome to manoeuvre.[6] Military analysts worldwide concluded that cheap, man-portable ATGMs had made the expensive tank obsolete. A $3,000 missile could destroy a $500,000 tank. The First Chechen War (1994-1996) became another case study in tanks' vulnerability, arguably more dramatic than 1973. The 131st Maikop Brigade was virtually annihilated, losing 20 of 26 tanks and 102 of 120 armoured vehicles in a single engagement. Chechen fighters used the city's apartment blocks to create multilevel ambush zones, firing RPG-7s and 18s from basements, ground floors, and upper stories simultaneously. Tanks could not elevate their guns high enough to engage upper floors, while Chechens dropped grenades and fired into thin top armour.[7] So, three to

four $300 RPGs ($300 x 4 = $1200) could destroy a $10,00,000 tank. A somewhat similar cost comparison is taking place today.

Resurgence

Israeli forces rapidly implemented coordinated tactics combining artillery, airborne infantry neutralising missile teams, engineer units, and close air support.[8] This enabled an armoured breakthrough across the Suez Canal, with General Adan's division trapping Egypt's Third Army.[9] The missile had not killed the tank, but poor tactics had. By the Second Chechen War (1999-2000), Russia adapted with heavy artillery and air bombardment preceding the armour advance and infantry closely supporting the tanks. Tanks had not become obsolete but required proper combined arms employment.[10]

Obituary 3: "Wrong War, Wrong Weapon" (1990s-2010s)

Low-Intensity Conflict Arguments

As conventional warfare gave way to insurgencies, military theorists questioned the relevance of tanks. Urban combat seemed unsuitable for dense populations requiring hearts-and-minds campaigns, while narrow streets created vulnerability.[11]

Resurgence

Combat experience contradicted predictions. Tanks adapted successfully to counterinsurgency when employed as mobile fire support within infantry teams.[12] US soldiers in Iraq valued tank presence for firepower and psychological impact. Tanks reassured friendly forces and local populations, deterring insurgent attacks.[13] The tank's role evolved from spearheading offensives to providing protected firepower supporting dismounted infantry in complex terrain.

Obituary 4: "Death by Drones" (2019-Present)

The Pre and Nagorno-Karabakh Warning (2019-20)

The 2019 Libyan Civil War was the first armed drone versus armour combat, and Operation SPRING SHIELD, Syria (February-March 2020), was the second. The Turkish Bayraktars were used extensively, utilising MAM-L with its anti-tank warhead that enabled destruction of tanks in Libya, Syria, and Nagorno-Karabakh.[14] It is a lightweight glide bomb capable of penetrating a tank’s top armour when dropped precisely from altitude. Two years before

Ukraine, the Armenia-Azerbaijan conflict over Nagorno-Karabakh provided a stark preview of drone-centric warfare. During the 44-day war beginning September 27, 2020, Azerbaijan deployed Turkish TB2 Bayraktar drones and Israeli loitering munitions with devastating effect against Armenian armoured forces.

- Azerbaijan's coordinated drone-artillery operations systematically targeted Armenian tanks, predominantly T-72s, along with air defence systems including S-300 batteries.[15] By early October, Azerbaijan claimed destroying over 250 tanks and armoured vehicles, extraordinary losses for forces that possessed only a few hundred operational tanks at the conflict's outset.[16] Drone footage flooding social media showed Armenian armour being struck with surgical precision, fuelling narratives that tanks had become obsolete.[17]

- The conflict demonstrated several ominous capabilities: drones as sensor platforms feeding real-time intelligence to artillery units, loitering munitions systematically hunting air defences, and the psychological impact of high-definition strike videos dominating information warfare.[18] Analysts declared it potentially "the first war won by drones," with technology appearing to triumph decisively over conventional armour.[19]

- However, deeper analysis revealed a more nuanced reality. Armenian forces employed fundamentally flawed tactics: armoured units clumped without proper dispersion, air defence systems operated independently rather than providing mutual coverage, and critically, there was a failure to integrate combined-arms.[20] Professional military observers noted that losses reflected poor training and doctrine rather than inherent tank vulnerability. Azerbaijan's victory stemmed from technological superiority combined with NATO-style coordination provided by Turkish advisors, not drones alone.[21]

- Nevertheless, Nagorno-Karabakh crystallised fears about armoured warfare's future. Images of smouldering tanks destroyed by relatively inexpensive drones suggested a fundamental shift in warfare's economics and lethality.

The Ukrainian Evidence

Russia's 2022 invasion of Ukraine flooded media with images of destroyed armoured vehicles, prompting renewed declarations of tank obsolescence.[22] Russian mechanised assaults suffered catastrophic losses when executed without proper infantry, artillery, and air

coordination.[23] Unmanned aerial vehicles emerged as particularly devastating anti-tank weapons. Inexpensive commercial drones modified with explosives could precisely target tank vulnerabilities, destroying million-dollar platforms at minimal cost.[24] Both combatants improvised defences, including cage armour and electronic countermeasures, while Russia deployed heavily modified "turtle tanks" with extensive protective coverings.[25] Analysts noted that tanks struggled when operating in environments saturated with low-cost aerial threats.[26]

Resurgence Already Underway

Despite high losses, Ukraine persistently requested more tanks from Western allies. Twelve nations eventually committed over 300 modern tanks, including Leopards, Abrams, and Challengers.[27] This demand pattern has completely contradicted the obituary narratives.

The Adaptation Lag: Why Tanks Appear Vulnerable Before Countermeasures Arrive

The Adaptation Cycle

Both Nagorno-Karabakh and Ukraine illustrate a critical pattern: the technological adaptation cycle. When new threats emerge, existing tank designs initially appear vulnerable because countermeasures do not exist yet. However, declaring platforms obsolete during this adaptation lag misunderstands military technology evolution.

- The adaptation cycle follows predictable phases totalling 5-10 years: Study Phase (6-12 months) analysing the threat, Research and Development (two-four years) creating countermeasures, Trials and Validation (one to two years) under realistic conditions, and lastly, Production Fielding and Training (two to five years) that involves retrofitting existing fleets and integrating into new designs. The Indian Army may lag in this time cycle due to various constraints and differing institutional priorities.

- During this lag, tanks appear increasingly vulnerable, precisely when "tank is dead" articles proliferate. However, the lag reflects normal technological adaptation, not platform obsolescence. The 1973 and 80s ATGM shock led to explosive reactive armour and active protection fielded throughout the 1980s. Urban warfare challenges in Iraq prompted Trophy APS development, deployed on Israeli tanks by 2010 and U.S. Abrams by 2019.[28]

- Currently, the drone adaptation cycle is underway. Electronic warfare systems, hard-kill APS optimised for aerial targets, AI-assisted threat detection, and integrated

counter-drone weapons are progressing through development. By 2028-2030, these countermeasures will likely be standard on major platforms, just as analysts declare drones having "solved" the tank problem permanently.

This pattern explains why each obituary appears convincing initially but proves premature. Observers mistake the adaptation lag for permanent vulnerability, failing to account for ongoing countermeasure development. Historical perspective has exposed this disconnect. Observers noted the cyclical nature of tank obsolescence predictions, with similar pronouncements following World War I, proving equally premature.[29] A 1960 historical assessment observed that defence authorities repeatedly declared tanks dying, only to find themselves unprepared when armoured warfare resurged.[30] Properly integrated within combined-arms formations, tanks continued providing mobile firepower, operational flexibility, and psychological impact that no other platform could replicate.[31]

Indian Doctrinal Evolution: From Defensive Posture to Offensive Capability

The Indian armour doctrine has evolved significantly, directly influencing tank design requirements through the classic armoured vehicle design triangle of firepower, mobility, and protection to the modern steel hexagon. Optimising all three simultaneously proves impossible; designers must prioritise based on operational doctrine.

Defensive doctrines emphasise firepower and protection over mobility. Tanks for defensive operations destroy attacking formations while surviving concentrated fire, accepting reduced strategic mobility. Offensive doctrines prioritise firepower and mobility over protection, requiring platforms capable of rapid manoeuvre and exploitation while accepting higher vulnerability to achieve a higher breakthrough tempo.

Pre-Kargil Defensive Posture (1971-1999). The Battle of Asal Uttar during the 1965 India-Pakistan War exemplifies defensive manoeuvre warfare, wherein the Indian Army destroyed over 260 Pakistani Patton tanks while losing only 10 of its own.[32] This defensive success established a doctrinal foundation emphasising attrition and defensive operations.

Following the 1971 war, India's primary security concern focused on defending against Pakistani armour thrusts across the Punjab and Rajasthan plains. This defensive orientation directly influenced tank specifications. The Arjun's design, prioritising heavy armour protection (68.5 tonnes) and powerful firepower (120 mm rifled gun), perfectly reflected defensive doctrinal requirements.

Post-Kargil Doctrinal Shift (1999-Present)

The 1999 Kargil conflict and Operation PARAKRAM (2001-2002) exposed critical limitations in India's defensive posture. The military's slow mobilisation during Operation PARAKRAM, taking weeks to position forces, provided adversaries time to prepare defences and seek international intervention. This catalysed the formulation of the Cold Start doctrine, emphasising rapid offensive operations from peacetime positions.

Cold Start fundamentally altered tank requirements, demanding platforms capable of rapid strategic deployment, high operational tempo, crossing varied terrain, and operating deep in enemy territory without extensive logistics. The Arjun tank, optimised for defensive operations, proved inadequate. Its excessive weight prevented rapid deployment, limited bridge crossing options, and thus, complicated the logistics. This doctrinal mismatch explains why technically superior platforms like the Arjun received limited procurement despite outperforming/equalling competitors in trials; it answered the questions that Indian doctrine no longer asked.

Geographic Reality Check: The Two-Front Challenge

India faces exceptionally diverse operational environments. The forces must operate across Rajasthan's deserts, Punjab's canal-crossed plains, and high-altitude Himalayan regions, including Ladakh and Sikkim.[33] This geographic diversity creates unique challenges for armoured vehicle design.

High-altitude contingencies add another dimension. During the Ladakh crisis, India rapidly airlifted forces and equipment to forward positions. The Arjun's excessive weight made such deployments infeasible. India's entire logistics architecture, railway transport, bridge networks, and repair facilities had been optimised for medium-weight platforms, making parallel infrastructure for a handful of heavy tank regiments economically prohibitive.[34]

The Arjun's final weight of 68.5 tons created critical strategic mobility problems. Most bridges along the India-Pakistan front cannot support 70-tonne class vehicles. While India could theoretically upgrade its own border infrastructure, achieving the same in Pakistani territory during offensive operations remains impossible. This weight penalty fundamentally constrained where commanders could deploy the Arjun.[35]

New Indian Requirements: The Dual-Track Solution

India's current tank modernisation follows a dual-track approach addressing its unique two-front challenge.

- **Zorawar and Kalyani Strategic Systems Limited (KSSL) Light Tank Weighing 25 tonnes.** The DRDO-L&T collaborative project targets high-altitude mountain warfare requirements.[36] The KSSL light tank is a 25-tonne, three-man-crew amphibious platform with a 105 mm smooth bore gun, an unmanned indigenous turret, and a glass cockpit with AI-integrated systems.[37] India plans acquiring 350 units specifically for deployment against China in Ladakh and North Sikkim regions.[38] The lightweight design enables rapid deployment in terrain where heavier platforms cannot operate effectively.

- **Future Ready Combat Vehicle/Project Ranjeet (55±10% tonnes).** September 2024 saw defence authorities approve procurement of 1,770 next-generation main battle tanks replacing aging T-72 inventory.[39]

FRCV: Balancing Defensive and Offensive Requirements. Contemporary Indian security challenges demand platforms supporting both defensive and offensive operations. The Northern Border requires defensive with limited offensive capabilities in mountains, while the Western Border necessitates offensive potential for rapid strikes. India faces genuine two-front contingency requiring forces to redeploy rapidly between theatres. The FRCV design specifications reflect this doctrinal balance:

- **Defensive Capabilities**. 120mm/125mm gun for destroying advancing armour[40], modular armour and active protection systems,[41] extended engagement range (25m-7km).[42]

- **Offensive Capabilities**. 55-tonne weight, lighter than Arjun's 68.5 tonnes, high power-to-weight ratio (27:1 HP/tonne) enabling rapid manoeuvre,[43] multi-terrain capability, and strategic mobility compatible with existing infrastructure.

- **Doctrinal Flexibility**. Network-centric warfare capabilities, AI-assisted threat management, modular design for mission-specific configurations.

- The FRCV represents doctrinal maturation. Rather than optimising for either defensive or offensive operations, it accepts that modern Indian security requirements demand

both. This balanced approach prioritises mobility, essential for both defensive repositioning and offensive exploitation, while maintaining firepower and protection through advanced technology rather than sheer mass.[44]

The Zorawar and KSSL light tanks complement this philosophy. At 25 tonnes, they sacrifice protection for extreme mobility and firepower in high-altitude terrain, where defensive operations against Chinese forces predominate. The dual-track approach demonstrates India's recognition that doctrinal requirements vary by geography and adversary.

Modern Indian doctrine reflects lessons from multiple conflicts, Asal Uttar's defensive success, Kargil's mobilisation challenges, and Operation PARAKRAM's strategic limitations. Tank design has evolved from supporting purely defensive attrition warfare towards enabling flexible operations across the offensive-defensive spectrum in the present and across the whole spectrum in the future.

Global Resurgence: Next-Generation Platforms (2025-2040)

The Fifth Generation Arrives. The trends in the world's major armies are as follows:

- **M1E3 Abrams (United States)**: American planners accelerated development to 24-30 months, with four prototypes entering army formations in 2026. Innovations include hybrid-electric propulsion reducing fuel consumption by half, an unmanned turret enabling a three-person crew, enhanced top-attack protection, AI-assisted threat management, and modular architecture. [45]

- **Main Ground Combat System (France-Germany)**. This Franco-German collaboration aims to replace Leopard 2 and Leclerc fleets. April 2025 saw the establishment of the MGCS Project Company. MGCS envisions a networked system incorporating crewed and autonomous vehicles with initial production targeting post-2028.[46]

- **K3 Black Panther Evolution (South Korea) and Chinese 4th Generation Development**. Next-generation designs emphasise advanced networking, semi-autonomous operations, and reduced weight. China tests 40-tonne prototypes featuring unmanned turrets and two-person crews for enhanced strategic mobility.[47]

Revolution, Not Evolution. Next-generation designs represent a fundamental reconceptualization with hybrid-electric propulsion, reducing fuel consumption by 50% while

powering energy-intensive systems.[48] Active protection systems intercepting projectiles with unmanned turrets, eliminating crew vulnerability.[49] Automated loading reducing crews to three persons.[50] AI-assisted threat detection managing unmanned platform integration.[51] Weight reduction to 40-50 tonnes improves strategic mobility.[52] Modular open architecture enabling rapid technology insertion.[53]

Countering the Drone Threat. Ukraine combat experience accelerated anti-drone innovation. Electronic warfare and jamming systems are deployed on current vehicles, while hard-kill active protection systems undergo accelerated development and fielding. Even simple explosive reactive armour demonstrates effectiveness against small kamikaze drones. [54]

Future platforms will integrate organic drone launch and control capabilities while defending against enemy unmanned systems through layered electronic and kinetic countermeasures.[55] US military leaders envision tanks transitioning from traditional breakthrough roles toward exploitation missions, with autonomous systems and precision fires creating initial penetrations before armoured forces exploit gaps[56], which may not be true for the Indian context, given the conditions, enemy capabilities, and threat matrix.

From Prey to Predator: Tank as Drone Hunter and Beyond

The current narrative frames tanks as vulnerable to drones, a defensive posture missing revolutionary potential. Future tank development will invert this relationship, transforming armoured platforms into dedicated drone hunters dominating the battlespace again.

Next-generation tanks will mount specialised systems, including rapid-fire cannons optimised for aerial targets, directed energy weapons engaging multiple drones simultaneously, and networked missiles intercepting swarms. Advanced radar, acoustic sensors, and AI-powered threat detection will enable tanks to identify, track, and prioritise drone threats across the battlespace. Rather than merely defending themselves, tanks will serve as mobile anti-drone command posts coordinating networked defence while prosecuting threats at extended ranges.

From German Blitzkrieg to MUM-T Blitzkrieg. A tank equipped with comprehensive anti-drone systems, and networked with unmanned platforms, both aerial and ground, as well as long-range vectors, creates a protective umbrella for infantry, logistics, and command elements. This reverses current vulnerability; instead of drones hunting tanks, tanks become apex predators that other forces cluster around for protection. Future tanks will control counter-drone swarms, deploying defensive drones intercepting incoming threats while maintaining offensive capabilities, creating layered defence-in-depth. As the marriage of tanks and air force created the Blitzkrieg, so shall the marriage of tanks and drones/loiter munitions/UCAVs/ LRVs create the modern MUM-T Blitzkrieg.

The Modern Phalanx. The tanks with added capabilities, along with the transformed air defence, will form both the shields and spears of the modern phalanx, which will be capable of not only defending the force concentrations but also destroying anything that comes within their radius. This evolution shall re-establish tank dominance through technological superiority. By mastering the drone threat, tanks shall reclaim their historical role as the platform around which combined-arms operations organise, not despite the drone revolution, but because of it.

A Return of Heavy and Light Cavalry and Dragoons: The Cyclical History. If India's defence industry can deliver the requisite tanks and the FICVs in time quality and, Indian Mechanised Forces can revisit the old concept of light tanks as 'Hussars' (screen, scout, exploit, harass), the MBTs T-72s/ T-90s/ ARJUNs and Attack Helicopters as 'Cuirassiers' (deliver the decisive blow) and Mechanised Infantry as 'Dragoons' (mobile infantry that holds what armour takes), all these with integrated drones, loiter munitions and UCAVs.[57]

Mechanised Forces as Nuclei of Future All-Arms Multi-Domain Operations. Writing on the wall is that future wars will only be won through technology shaping the environment, standoff capabilities, precise lethality, and the ability to hold ground under extreme conditions. The modern phalanx with mechanised forces as the nuclei shall be able to integrate the various layers or rows (historically, six to seven rows to overcome a mounted assault) through a robust communication architecture. The various rows shall be of long-range artillery, AD, EW, aviation, missiles, UAS, etc., with other domains of cyber, space, and

information/cognition superimposed as invisible shields and spears. This formidable mix, when launched, shall deliver the required blow wherever necessary. Infantry shall provide the anchor to this phalanx in all terrains, by leading in mountains and high altitudes and supporting in plains and deserts.

Pattern Recognition: Why Obituaries Keep Failing

Military history demonstrates repeated premature declarations of weapon system obsolescence driven by flawed assumptions.[58] Each prediction cycle exhibits the following common characteristics:

- **Vulnerability Fixation**. Critics highlight that tanks can be destroyed while ignoring that every weapon system faces threats. Bullets kill infantry, yet dismounted troops remain essential.[59]
- **Assumption of Technology as Static**. Obituaries presume tanks will not adapt to counter emerging threats, contradicting a century of continuous evolution.
- **Combined-Arms Neglect**. Most "tank failures" represent poor execution or integration rather than platform inadequacy.[60]
- **Context Confusion**. Heavy losses in specific circumstances do not invalidate platforms' broader utility across diverse environments.

Conclusion: Tank as an ‘Adaptive, Offensive, Cognitive, Battlefield Platform’

Four times across a century, authoritative voices declared the demise of the tank. Three times, adaptation proved predictions premature, and we are living a fourth one. The Indian experience crystallises universal principles; requirements evolve with threats, geography, and technology. The adaptation lag, however, has been longer, giving rise to the lingering viability concerns from the 70s till date. It was mainly because of the indigenous capability development limitations and import dependencies. Now that these constraints are ending, the FRCV and FICV should become a reality and, more importantly, on time.

Future tank relevance depends on technological integration (AI, active protection, and hybrid propulsion), mission readiness (mix of light and medium tanks for combined operations), combined-arms coordination, offensive dominance as drone hunters, and recognition of the adaptation cycle. Today’s problems of concentration of force can only be overcome through

a strong, layered, and integrated shield of air defence which provides area, point, and individual platform AD, along with the offensive capability to destroy the generators of this threat.

Only ground forces can physically seize and hold territory. Tanks provide mobile protected firepower that no other alternative replicates, along with the psychological advantage for their own troops and generating fear for enemies. The drone revolution has only strengthened their relevance. Future platforms equipped with comprehensive anti-drone systems will dominate precisely because they shall counter the same threat that made them and other vehicles vulnerable. They shall become both the shields and the spears of the modern Indian phalanx by transforming into the modern 'MUM-T Blitzkrieg.'

The fifth obituary may emerge soon. If history holds, it too shall prove premature. Declaring tanks obsolete has become old fashioned.[61] Such declarations overlook the tank's fundamental characteristic, which is continuous adaptation to survive and, increasingly, to dominate.

DISCLAIMER

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