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Technology and the economics of war in the Ukrainian conflict: analysis of the Russian war effort

Abstract

Within the context of the war in Ukraine, both sides must mobilise their countries' resources to sustain a full-scale conflict. Today, after almost three years of attrition, Russia is proving to be a resilient and determined power in the face of the military challenge posed by Ukraine and Western support. At the operational and organisational level, a number of changes were activated to prepare Russian ground forces for a protracted conflict. Russia has also adapted its resources and industries to overcome the restrictions caused by Western economic sanctions and to advance its war effort. There is a clear correlation between Russian operational adaptations, technology and war economy. This article analyses the impact of Russia's military and economic changes on the battlefield.

Keywords

Armoured warfare, Mobilisation, War economy, War in Ukraine, Russia.

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1 Introduction

The war in Ukraine has brought to the forefront issues that appeared outdated in post-Cold War conflict analysis, such as the outbreak of large-scale conventional warfare between major countries (in terms of size and international influence), the massive deployment of airborne forces and mechanised units to achieve an initial decisive strategic success, the large-scale mobilisation of reserves (hundreds of thousands of troops), the massive use of artillery in all its forms from tube to rocket to short-range ballistic missiles, and the indiscriminate use of thermobaric and cluster bombs.

Furthermore, new ways of waging war have been incorporated with the massive use of guided artillery munitions, unmanned vehicles in their different versions and modes (air, naval and ground), high-speed satellite communications, and the massive use of electronic warfare to counter them. Finally, within the strategic sphere, the war in Ukraine has revived the relevance of nuclear weapons as a pressure mechanism to achieve political ends by major nuclear powers (Cimbala and Korb, 202; D'Agostino and Diaz-Maurin, 2024; Pardo de Santayana, 2023; Trenin, 2023).

As a result, a sizeable amount of extremely important information and data has been generated and new tactics, techniques and procedures have been identified which must be analysed and studied beyond the war propaganda of both sides to assess their impact on the conflict and obtain assessments that may be systematised and applied as lessons learned in doctrine and planning for future conflicts. From the perspective of conflict theory, they are variables that must be studied in order to establish the causes that determine their use, their impact on other conflicts, and whether any of them represent a technological or doctrinal revolution that could change the way war is waged. In some historical moments, these advances have even been capable of changing the very nature of warfare, as was the case, for example, with the use of the atomic bomb in 1945 (Freedman, 1983).

This essay will analyse one such aspect identified in the war in Ukraine, namely the use of Russian armoured and mechanised forces, which in light of more immediate analyses of the conflict, it is believed that conclusions that may affect the long-term view of the role of armoured and mechanised forces in future conflicts have been drawn too hastily. This text will examine the development of Soviet operational level of war and deep battle, the changes implemented in Russia following the Russo-Georgian war from 2010 onwards, the challenges to manoeuvres posed by new multi-domain warfare scenarios as seen on the Russian-Ukrainian front, as well as Russia's mobilisation capability to provide the means and resources necessary to sustain the war effort in the long term. Identifying these variables is essential in order to estimate their future capabilities, both operationally and strategically. It is thus hypothesised that combat forms, economics and technology are interconnected in a complex multi-domain scenario in which all variations affect the evolution of the conflict to a greater or lesser extent.

2 Historical foundations of Russian doctrine

The elementary basis of Russian strategy and tactics is to be found in the works of Soviet theoreticians such as Vladimir Triandafillov, Alexander Svechin, Georgy Isserson and Mikhail Tukhachevsky in the 1920s and 1930s. In its strategic aspect, the operational level of war represented a new current of military thought aimed at transforming the foundations of nineteenth-century military strategy, using new technological means within the military sphere, including the battle tank. In parallel, at the tactical level, the concept of the deep battle (*Gluboki boi* in Russian) emerged, consisting of a coordinated staggered assault composed of aviation, armoured vehicles and infantry. An understanding of both concepts is indispensable to understanding the contemporary development of Russian military doctrine.

In the early 1920s, Svechin established the principles of operational level of war, which included the need for a robust economy, the importance of attrition and destruction of the enemy, and the lesser importance of decisive battles, among others. Svechin, like Triandafillov, saw the operational level of war as a succession of interlinked operations, the success of which affected the overall strategy (Kipp, 1994: 15). In contrast to the traditional broad, linear front line layout of the then-recent First World War (1914-1918), the operational level of war had to be developed in depth. In this regard, Isserson (1936) explained that the real challenge of the operational level of war was to make the transition between linear manoeuvre and frontal penetration, which is a natural consequence of changing from one operational method to another.

The concept of frontline depth was also developed in the West by military thinkers such as John Fuller and Basil Liddell-Hart. Fuller (1927: 457), in his so-called "1919 Plan", already spoke of the deep penetration of armoured forces with the aim of destroying the enemy's main nodes. Moreover, he considered the main element of the manoeuvre to be "the development of mobility through offensive power". In the same vein, Liddell-Hart (1924: 49-50) declared that firepower multiplied by speed was strength in warfare, replacing the traditional conception of massed infantry forces.

In this sense, Western military theorists advocated the specialisation of armies and, consequently, the reduction of their numbers. But Soviet thinkers rejected this outright, as they understood that only a large mass of forces was capable of succeeding in modern operations. Triandafillov (1929: 27) did not accept that "small forces, albeit motorised", could conquer modern states, while Isserson (1936) considered it contradictory to the evolution of military systems in capitalist countries.

Using the operational level of war as a strategic basis, Tukhachevsky developed the principles of deep battle, which became the official Soviet tactical doctrine until mid-1937. Tukhachevsky devised a staggered system of offensive waves, each with a specific role in the battle: the first echelon was formed by aviation, tasked with providing close air support and gaining air superiority; the second was intended to achieve a breakthrough in the enemy front, employing infantry support tanks and heavier tanks to provide support from more remote distances; once the breakthrough

was achieved, fast tanks and motorised or mechanised units of the third echelon were to exploit the success of the breakthrough, ensuring the continuity of the operation; and finally, the reserve echelon, composed essentially of infantry, was tasked with securing the ground gained.

The primary objective was advancing deep into enemy territory, employing tank, artillery, aviation bombing and even paratrooper forces, along with confusion and deception operations (*maskirovska* in Russian) to distract enemy forces (McPadden, 2006: 16). Thus, tanks played a decisive role in the doctrine and specialised in fulfilling certain tasks, including supporting the infantry in the assault, penetrating the rear, scattering the enemy and isolating the reserve troops (creating pockets, similar to the German concept of *Kessel*). In this way, the tanks were to force the enemy to retreat and eventually destroy them, in a continuum of exploitation of success and retreat. At the same time, artillery, command posts and their communication nodes had to be neutralised (mcPadden, 2006: 17). This cycle of exploiting success is framed within the operational strategy of interrelated battles, where cumulative successes shape the theatre of operations and contribute to overall success.

Despite these theoretical and doctrinal developments, Tukhachevsky was executed in the Stalinist purges in the summer of 1937, and the doctrine of the deep battle disappeared with him. Thus, during the Second World War, Soviet tank brigades were mainly used in a dispersed and infantry support role and were available according to the needs of the front or the divisional commander. At that time, only Marshal Yakov Fedorenko managed to implement the ideas behind the deep battle, but without directly mentioning Tukhachevsky (Vlakancic, 1992: 8).

The onset of de-Stalinisation brought about significant doctrinal changes in the Soviet Union, including a revision of the theoretical foundations of the deep battle, which had been abandoned for more than twenty years. But the introduction of nuclear weapons also triggered a revision of the Soviet strategic approach (Vlakancic, 1992: 29-30). In this regard, nuclear weaponry was given the role of penetrating deep into enemy territory, while ground forces would only deal with shallow enemy concentrations (Vlakancic,1992: 30).

The successful Marshal Georgi Zhukov undertook a series of reforms aimed at gradually reducing the large Soviet mechanised divisions inherited from World War II into more mobile, motorised and armoured units (Noorman, 2023). This modification of Soviet military units together with the revision of their strategic and tactical concepts gave rise in the 1980s and 1990s to new military paradigms, such as non-linear warfare and non-contact warfare (Noorman, 2023), framed within the new Russian strategy known as new generation warfare (Grau and Bartles, 2016: 40). In this way, the doctrine of the deep battle acquired a strategic dimension beyond that conceived by Tukhachevsky at the tactical and operational level.

Some authors argue that the Russian General Staff employed the basics of deep battle at the strategic level in the wars in Georgia in August 2008 and in Ukraine in 2014-2015 (Sinclair, 2016; Morris, 2020). In this approach, the traditional concept of offensive

echelons is maintained, but with the use of other actors replacing military units. In the above-mentioned cases, Russia used the pro-Russian population in Georgia and also in Ukraine as a first echelon as a justifiable approach, in addition to intelligence gathering and sabotage operations with paramilitary groups (Morris, 2020: 8). This falls under the concept of hybrid warfare, where both civilian populations and paramilitary and military elements are integrated into the overall strategy to achieve the stated objectives.

In the case of Georgia, for example, casualties among Russian peacekeeping forces in the face of a Georgian attack served as justification for launching a massive operation with conventional forces, which may be framed within the third echelon of the deep battle, aimed at exploiting the gap. In this case, it was achieved through Georgia's internal destabilisation, indirectly provoked by Russia. In this regard, Sinclair (2016: 10-11) explains that the Kremlin used the justification of protecting the Russian-speaking population to execute its invasion plan, a precursor to what happened subsequently in Crimea and the southern territories of Ukraine (Colom Piella, 2023).

3 Changes introduced with the Russian military reform of 2010

While there is consensus that there was a major doctrinal change in the Russian Armed Forces, the question arises as to whether there really was a revolution in military affairs in Western terms. As part of the military reform initiated in 2010 by then Defence Minister Anatoly Serdyukov, not only were the number of ground units significantly reduced, but divisions were also replaced with brigades as the main manoeuvre force. If attention is paid to the 2010 model of the Russian mechanised brigade compared to Tukhachevsky's design in 1936, it can be seen that it is essentially a similar organisation, with fewer tank battalions in favour of more mechanised battalions (equipped with BTR-82 type wheeled armoured vehicles and BMP-2 and 3 type infantry fighting vehicles), but with more firepower due to the current means and threats.

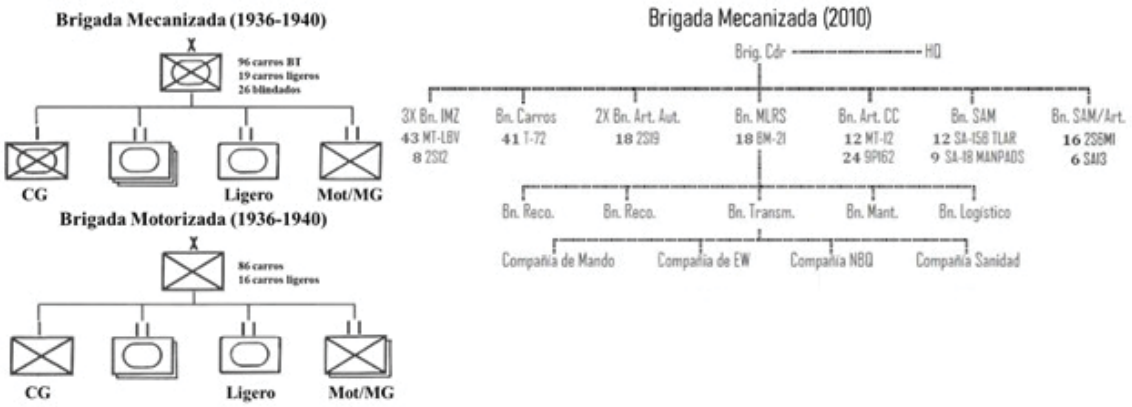

Figure 1: Soviet (left) and Russian (right) mechanised brigades. *Source*: Grau and Bartles, 2016: 31, and Defense Intelligence Agency, 2017: 53

The reduction in the number of armoured battalions in favour of mechanised battalions responds to the need to bring mobility and agility to the front line. Given the vast borders it must protect, the Russian General Staff considered the brigade to be the ideal unit in terms of rapid deployment (Grau and Bartles, 2016: 33), along with the ability to generate Battalion Tactical Group or BTGs, successfully used in 2014-2015, but totally incapable of sustaining prolonged efforts or extended fronts by their very configuration (Saurín Martínez, 2023a), as demonstrated during the first weeks and months of the invasion of Ukraine after the failure of the initial assault operation (Dacoba Ceviño, 2022).

The general reduction in large Russian manoeuvre units inevitably translated into a lower concentration of forces on the front line. Traditionally, operational-level of war theorists advocate a large offensive mass as an indispensable element for success (Isserson, 1936; Triandafillov, 1929), including the German General Heinz Guderian (2008, original published 1937). The doctrinal, organisational and operational changes of 2010 tend to employ smaller, more deployable elements to compensate for the lack of numbers. This reduction was aided by the emergence of advanced surveillance systems, unmanned aerial vehicles (RPAS), loitering munitions and effective electronic warfare.

The use of long-range weapons also helped to shape a new concept of the battlefront. Retired Lieutenant General Sergey Bogdanov and reserve Colonel Sergey Chekinov explained that, within the concept of new generation warfare, the front lines are blurring and the areas of impact are extending beyond the conventional front (Noorman, 2023). These authors, who published prolifically between 2010 and 2017, have not published any works afterwards and their current status is unknown. Among other things, they warned that a future war would start with electronic operations and unmanned systems (Thomas, 2020). In turn, the current Chief of the Russian General Staff, General Valery Gerasimov, argues that the dispersion of units, linked to a single intelligence and information space, is progressively replacing the traditional concept (Noorman, 2023). The Nagorno-Karabakh War between September and November 2020 is an example of the ongoing doctrinal shift, in which most Armenian casualties were due to the intensive use of loitering munitions by Azerbaijan, which blocked manoeuvres and prevented the concentration of Armenian forces capable of mounting counter-attacks or offensive actions of any significance. This is another situation that also characterises the land front in Ukraine.

4 Current challenges on the Ukrainian-Russian front

The war in Ukraine is in a state of stalemate and attrition, especially on the ground, as a result of the massive use of artillery, the intensive use of loitering munitions of all types and configurations, and the permanent surveillance of the battlefield (transparent front) by both sides. As Frías Sánchez (2024) explains, this has led to the loss of surprise and the easy detection of troops, which favours the defence and makes the offensive

increasingly complex. It is a situation characterised by the apparent superiority of defence over offence, similar to that experienced barely a century ago during the First World War. It was precisely at this time that the tank emerged as an alternative means of penetrating enemy lines and bringing manoeuvre back into battle. However, in Ukraine, the tank is proving incapable of providing mobility, therefore its current usefulness is in question (Fox, 2022; Zabrodsky, 2022). Pérez Franco (2024) explains that the new means of combat, especially RPAS, have once again created a no man's land in a context where securing a few kilometres of frontline has become an arduous and costly task.

In an attempt to counter the effectiveness of fire and the intensive use of loitering ammunition, improvised initiatives have emerged, especially on the Russian side, applied to T-72, T-80 and T-90 tanks, as well as BTR-82 and BMP tanks, to improve their protection: reactive armour augmentation, mesh roofs, side gratings, ball chains on turrets and, more recently, the so-called "turtle tank", which consists of the installation of complete metal structures, either with metal mesh or solid panels which, together with active electronic warfare systems, make it possible to repel guided munitions and counter attacks by loitering munitions. Some of these applications have become standard on new or used ex-factory vehicles. Although they represent a significant increase in vehicle weight and reduce the situational awareness of their crews, their survivability on the battlefield has improved. However, these are solutions that, as it has been said, have failed to bring mobility to the front.

This is because there are fundamental flaws that result in the armoured assets failing to fulfil their mission. One of them, according to Amos Fox (2023), is the dispersed use of units. According to this expert, light forces lack the power to both strike the enemy and to defend against it due to their wide dispersion. In his opinion, the small Russian and Ukrainian units are not capable of providing decisive results to operations, which results in very small offensive actions and minimal advances that do not significantly change the front line and do not even generate operational successes.

This reality has forced the Russian General Staff to modify the main organisation of its land forces, although a return to the division as the primary unit of manoeuvre (Grau and Bartles, 2016: 33) had been planned halfway through the last decade. As it shall be seen a little later, the evolution and lengthening of the conflict has led to the reintroduction of the division with enhanced capabilities, moving from a basic brigade-based force structure to a mix of brigades and divisions, the latter similar in composition to the old Soviet motorised and armoured divisions (Clark and Hird, 2023).

Moreover, modern warfare's current demands have raised a similar doctrinal discussion in the United States. As a result of the challenges of advanced observation assets and long-range fire power causing near-total stalemate on the front lines, some US thinkers began to develop the notion of multi-domain warfare (Jensen, 2016; Perkins, 2017). This doctrine sees the battlespace as having expanded to the point of involving cyberspace, outer space, electronic warfare and information as an intrinsic part of the battlefield. Thus, the frontline or theatre of operations expands exponentially to the very rear of the enemy country (Army Capabilities Integration Center, 2017).

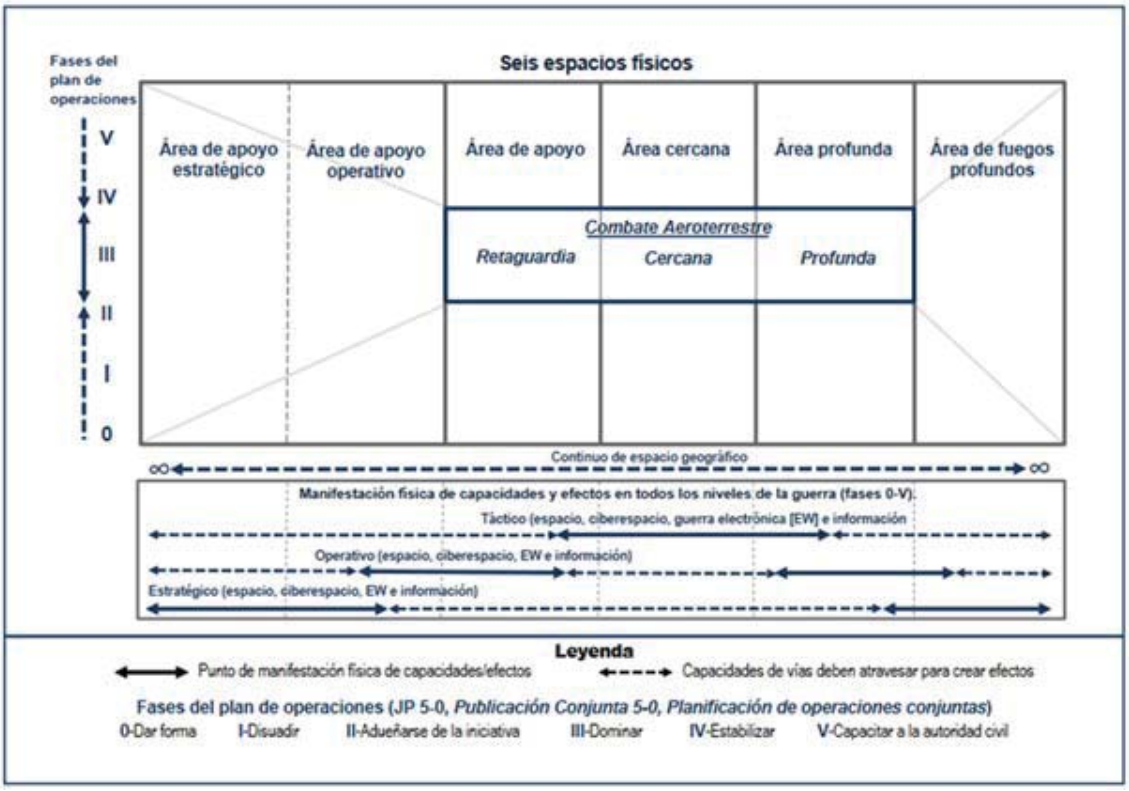

Figure 2: Comparison between multi-domain and air-ground battles. *Source*: Perkins, 2018: 47

The latter corresponds to the doctrine applied in conflicts such as World War II or the 1992 Gulf War. It is the evolution of doctrines developed in the 1930s, such as the aforementioned deep battle or *Gluboki boi*, the German mechanised warfare popularly known as *Blitzkrieg* or the postulates of Fuller and Liddell-Hart outlined above. Generally speaking, deep penetration by using agile mechanised forces as well as the combination of armour, artillery, infantry and aviation were essential elements for success, as well as suppressing pockets of enemy resistance as they advanced towards the enemy's core (Cranston, 1995). In France, similar ideas were developed by theorists such as Charles de Gaulle, Emile Allehaut and Jean-Baptiste Estienne (Fenby, 2012; Doughty, 1985; Chaix, 1996). Their application shares certain common elements: the compartmentalisation of the battle space into three main areas —rearguard, close area and depth—, with the close area being the site of the breakthrough in order to penetrate deep into enemy territory, either through frontal attacks or envelopments. The origins of this doctrine hark back to the Prussian concept of *Schwerpunkt*, which was to achieve force superiority at decisive points on the front as quickly as possible to avoid a stalemate (Vego, 2007: 103).

Success in the new theatre of operations therefore requires a return to mobility. However, the execution of manoeuvres and envelopment as they were known varies in its application in the multi-domain battlefield. Units will have to manoeuvre in an agile manner and on dispersed axes, always with the superiority of the different domains regulating the battlefield, which are cyber warfare, electronic warfare and airspace (including manned and unmanned aircraft), among others. The goal is to create an advantageous or unpredictable situation (surprise) for the adversaries, leading them to

be disorganised, at the same time as one's own units manoeuvre without being seen, while retaining the initiative (Army Capabilities Integration Center, 2017: 37-42).

This is therefore where the fundamental question arises: what role do armoured assets currently play in the war in Ukraine? How do they fit into the current doctrine? Understanding the multi-domain battle and the evolution of the deep battle doctrine are key to analysing the current situation. Armoured assets have been (and continue to be) among the hardest hit in the war as a result of a general lack of protection both at the active level and in their integration with other weapons (air superiority or mechanised infantry). But the war in Ukraine also demonstrates that it is now much cheaper to destroy armoured vehicles which are much more expensive, than the artillery munitions, loitering munitions or anti-tank missiles that are used against them. In the air-ground battle doctrine, the solution to the weakness of armoured assets was solved with the collaboration of infantry and air assets. However, the proliferation of unmanned weapons and the extension of the depth of the front have led to the general insecurity of those assets (Losacco, 2023). Infantry support is no longer the only solution to mechanised warfare; the effective use of armoured assets requires increasingly transparent multi-domain control of the battlefield where superiority in all domains is absolutely necessary for success.

Between these changes imposed once again by technology and their use in combat, tanks have the capability to bring mobility back to the front line, but a new approach is required to do so. Additionally, armoured standards are changing rapidly and a new concept of the main battle tank (MBT) is emerging as a weapons platform (equipped with active protection systems, unmanned vehicles and electronic warfare and connected to an extensive operational network) with a minimum manning level (Saurín Maartínez, 2023a). Consequently, the development of large manoeuvre units must be accompanied by technological innovation to enable them to operate safely on the battlefront (Fox, 2024: 4).

5 Mobilisation and expansion of the Russian Armed Forces

The greater or lesser success of Russian armoured assets in Ukraine is due not only to the doctrinal factor, but also to the capacity of the Russian economy and State to sustain a protracted war effort. Paul Kennedy (1987) already explained that the way in which a State employed its economic resources in times of war, as well as the length of time its armed forces fought in a conflict, conditioned victory or defeat. Furthermore, he also explained that the improvement or worsening of a power's economy must also be considered in relation to that of its neighbouring powers (Kennedy, 1987). These ideas are of great importance when applied to the Ukrainian conflict, as Russia's industrial and economic capacity is much greater than Ukraine's and consequently influences the course of events. Next, how Russia mobilised its economy and resources at the start of the war will be looked at.

On the 24th of February 2022, the same day as the invasion of Ukraine, the Russian Armed Forces brought under its command all military units of the Militias of the Donetsk People's Republic and Luhansk People's Republic (1st and 2nd Army Corps) totalling 50,000 troops. However, as a result of the heavy losses they were suffering, in July 2022, the Russian authorities activated the first mobilisation measures to restore the combat capability of the most worn-out units. The first step was the creation of a new army corps (3 AC), two mechanised infantry divisions (motor rifle divisions in Russian terminology), one armoured division, three mechanised infantry brigades and one artillery brigade. At the same time, a covert recruitment campaign was launched, enabling up to thirty-five infantry battalions to be formed under the umbrella of the Combat Army Reserves of the Russian Armed Forces (*Boevoi Armeiski Rezerv Strani* or BARS in Russian) with personnel from all backgrounds. Additionally, assault units staffed by private military companies (the acronym PMC has become widespread) were created, following the *modus operandi* initially applied during the intervention in the Donbas in 2014.

However, the attrition of Russian units in terms of personnel and material was so severe that it was necessary to mobilise the armed forces reserve, which before the war was estimated to number some two million men (*The Military Balance,* 2022). For this reason, on the 21st of September 2022, President Putin signed a partial mobilisation decree, which included the call-up of reserve personnel[1]. The Ministry of Defence immediately activated the recruitment of 300,000 reservists with an emphasis on those who had served in certain specialisation fields during their military service (drivers, artillerymen, gunners, tank crew, engineers) and those with combat experience in order to replenish the diminished units on the Russian-Ukrainian front. At the same time, the volunteer recruitment campaign, which began in July and is ongoing as of today, continued thanks to the offer of large sums of money for enlisting and remaining in the service[2].

Three months later (on the 21st of December 2022), during a very important annual meeting of the Russian Defence Ministry board in Moscow, Putin announced that an operational reserve of 150,000 troops had been formed and was in the rear in training; by this time Russian forces had already been forced to withdraw, first from Kharkiv and then from the western part of the Dnieper River, but without significant casualties or material losses. He also stated that the defence industry was increasing the pace of production to meet the forces' requirements, especially for artillery and aviation ammunition, and steps had been taken to encourage the massive uptake of RPAS. Furthermore, he stated that there were no budgetary restrictions on the funding of the armed forces for the duration of the war.

1 Decree No. 647/2022 of the 21st of September 2022 can be found on the Kremlin website: http://www.kremlin.ru/acts/news/69391. President Putin's televised speech justifying the partial mobilisation measure may be consulted on: http://www.kremlin.ru/acts/news/69391.

2 The monthly enlistment rate is estimated at 24,500 compared to an average of 29,000 in 2023.

The then Defence Minister, General Sergey Shoigu, also announced an ambitious programme to expand the Russian Armed Forces. The number of military personnel would increase from 950,000 to 1.5 million (an increase of more than 30%) through the incorporation of more professional troops (he set a target of 695,000 recruits) and extending the recruitment age for replacement military personnel to 30 years, a measure that since its implementation means that there are more personnel available for military service and also in the reserve. He also announced the creation of military districts in Moscow and Leningrad and a North-West Forces Group stationed in Karelia on the Finnish border. He also outlined plans for the formation of twelve new ground divisions: five mechanised divisions, two Airborne Forces (VDV) and five Naval Infantry divisions from the five pre-existing brigades.

While the Russian Government justified these measures as part of the response to the NATO threat (both due to its presence near Russia's borders and because of its support for Ukraine in the war), in reality they highlighted the inability of the Russian armed forces to fight and win a full-scale war in Ukraine with the resources they had put on the ground in February 2022.

Thus, in May 2023 began the formation of the 40th AC with the creation of four new mechanised infantry regiments and one artillery regiment. In June, the Russian General Staff announced the formation of five divisions and twenty-six brigades. It is worth pointing out that during this period, the Russian Armed Forces had started to show an increasing ability to learn and adjust to the tactical and technological challenges of the Ukrainian battlefield.

During the summer of 2023, the creation of new land units accelerated with the constitution of the cores of two new mechanised armies (combined arms, as they are called in the Russian Armed Forces), a mechanised infantry division, an airborne division and the activation of the core of the first Naval Infantry division in the Pacific Fleet. Likewise, the formation of three new mechanised brigades began, as well as another three from as many pre-existing regiments and two new artillery brigades. This mass of manoeuvre began arriving in southern Ukraine in late September 2023, where it participated in the blockade and subsequent defeat of the Ukrainian summer offensive (Saurín Martínez, 2023b).

In early 2024, the headquarters of the new Leningrad and Moscow military districts were activated as a result of the division of the Western Military District and the elimination of the Northern Military District, which was responsible for the Arctic regions. On the 20th of March 2024, the Russian Defence Minister announced two more mechanised armies, a total of fourteen divisions and sixteen brigades. In April, the troop core of the North-West (Karelia) 44th AC and two mechanised divisions were formed in the Leningrad Military District, and the formation of two other mechanised divisions and an artillery brigade in Leningrad, two mechanised divisions in the Moscow and Central Districts (considered the operational reserve of the Russian Armed Forces), two mechanised brigades in the Eastern Military District and one other airborne division was initiated. It should be noted that the new mechanised divisions

have three mechanised infantry regiments and one armoured regiment, which should have an operational impact through increased armour and mobility.

By July 2024, the Russian Joint Group of Forces in Ukraine had 625,000 troops, including a rear reserve of 200,000 troops in training (five times more than in February 2022) and an armoured mass of 2,800 tanks and armoured vehicles (more than twice as many as at the time of the invasion) drawn from long-term storage depots, upgraded with the equipment indicated above and sent to the area of operations[3]. However, this mass of forces lacks strategic impact due to the current impossibility (as the authors insist at this point) of achieving a concentration of means at one point on the front to achieve a decisive breakthrough.

6 Capacity to sustain large-scale warfare

Sustaining the war in Ukraine and creating a huge mass of military units and their full equipment requires the adoption of a set of economic, financial and industrial measures that allow this effort to be undertaken with guarantees of success and over a prolonged period, only starting to yield results in the medium term (Pérez Gil, 2024). In short, it is about placing the country on a war economy footing (Karaganov, 2024).

Specifically, the Russian defence budget rose from $66 billion in 2021 to $87.9 billion in 2022, within a context of a shrinking Russian economy with a fall in gross domestic product (GDP) of 2.9%, although initial estimates were much more negative (10-15%) (Sonin, 2022). Furthermore, most analysts pointed out that the Russian economy was facing an extremely complex situation caused by the massive imposition of Western sanctions, the freezing of Russian State assets deposited in Western countries and the disruption of traditional financial and energy flows with the West as well (Pardo de Santayana, 2024).

Against this backdrop, the Russian Government, as well as the main State agencies and departments, began to implement measures to mobilise national resources, approved significantly expanded military spending and gave strong support to defence industries, financing them with increased State revenues, the reduction of public items not directly related to the war effort and extraordinary recourse to the National Welfare Fund (Russian sovereign wealth fund).

On the 5th of August 2023, the Russian Government published that military spending in the first half of the year had reached $54 billion and announced a total forecast for the end of the year of close to $100 billion. According to estimates by the Stockholm International Peace Research Institute (SIPRI) in 2024, Russia's actual expenditure in

3 At the start of the invasion of Ukraine, the Russian Armed Forces had some 3,400 tanks in service and 12,000 in reserve. In *The Military Balance, 2022,* op. cit., pp. 194 ff.

2023 was $109 billion (5.9% of GDP), a 24% year-on-year increase compared to 2022[4]. In other words, Russia's defence budget almost doubled in three years.

A month later (on the 9th of September 2023), the Russian Ministry of Finance reported that the fiscal deficit for the first eight months of the year had been 1.5% of the GDP (with initial forecasts of 2-2.5%) and on the 18th of September the Russian President declared a GDP growth estimate of 2.8%. Ten days later, the Government announced a 68% increase in defence spending for the 2024 fiscal year. The financial plan was based on a sharp increase in revenue (22%) and expenditure (16%), with defence accounting for 29% of the national budget.

Finally, on the 27th of November 2023, President Putin signed the law on the federal budget for 2024 and the 2025-2026 period planning, characterised by a high level of spending, fiscal deficits, and with significant items being declared confidential. By 2024, revenues were estimated at $393.8 billion, expenditures at $411.7 billion and a deficit of $17.9 billion. This means that between 2021 and 2024 the Russian defence budget rose from $66 billion to $111.34 billion, equivalent to 6% of GDP, although the existence of those secret budget items could raise it to 10-12% of GDP.

The tax system reform that started in July 2024 means that the Russian Government will continue to draw resources from the private production sector, primarily Russia's giant energy corporations, to finance the war in order to have a much larger, more capable, better equipped and better prepared armed forces in the long run to face new wars. Therefore, all this planning would not only seek to overcome the current stalemate in Ukraine, but also to prepare for future confrontations with other actors of equal or greater importance.

To achieve this, however, war production must remain stable in the coming years by supplying the fighting forces with the necessary means and, at the same time, continuing to equip the newly created units. In this regard, the support of key business and strategic partners, such as China, Iran and North Korea, is seen as essential to enhancing these capabilities. Moreover, most analysts (Russian and non-Russian) believe that a level of military spending of this magnitude is unsustainable for the Russian economy, places a strain on public funds, and, if sustained over a prolonged period of time, could generate scenarios of social unrest that have so far been avoided at all costs by the Russian leadership.

7 Conclusions

Technology is once again bringing about a change in how war is waged in a scenario where defence appears to be prevailing over offense, as it did on several occasions in the 20th century.

4 Comparatively, Ukraine's spending rose to 37% of its GDP to $64.8 billion, an increase of 51%. This represents 59% of Russia's, but if foreign military assistance (estimated at $35 billion) is added, the ratio jumps to 91% (Stockholm International Peace Research Institute, 2024).

The war in Ukraine is fought mainly with armoured and mechanised means developed during the Cold War, which have been adapted to the tactical and operational requirements of the new multi-domain warfare scenario but are unable to play a decisive role in breaking the deadlock.

Both operational and tactical factors are involved in the stalemate on the Russian-Ukrainian front, such as the transformation of cities into defensive strongholds, real-time access to information from all battle spaces, the proliferation of unmanned systems of all types, the intensive use of guided artillery munitions, advanced satellite communications down to the tactical level, intensive application of information technologies, and the use of truly effective electronic warfare.

In the face of this stalemate, the Russian leadership appears to have taken the necessary decisions to consider a long-term war in which it would seek to impose the weight of its immense material resources, growing armed forces and reserves which are far greater than those of its opponent, and to prove its ability to overcome the West's containment policies.

This scenario would favour Russia because Ukraine is currently facing the same problems of lack of battlefield mobility, where Western doctrine based on air-ground warfare has also failed to provide a viable solution. To this must be added the lower levels of Ukrainian reserves, the attrition of the limited operation in Kursk without the expected results, and the impact of the presidential change in the United States, until now its main supporter in the war effort.

Consequently, the Russian Armed Forces have initiated a programme of changes aimed at increasing and improving the combat capabilities of their ground units with a return to the mechanised division as the main manoeuvre unit. In the medium term, they have neither the personnel nor the means to equip the entire planned mass of troops, which means that the training process will take four to five years. The Russian leadership believes that this period of time would enable it to fulfil its plan to expand its ground forces, achieve its strategic objectives in Ukraine, and be in a position to contain the Western Bloc.

However, even with fully equipped units thanks to the war economy and their war industry producing at full capacity, they will be unable to bring about operational change unless they come up with new tactical solutions to break the lack of mobility at the front.

Thus, economics, technology and how people fight are closely interlinked in a solution that may have various outcomes based on changes to any of these variables.

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