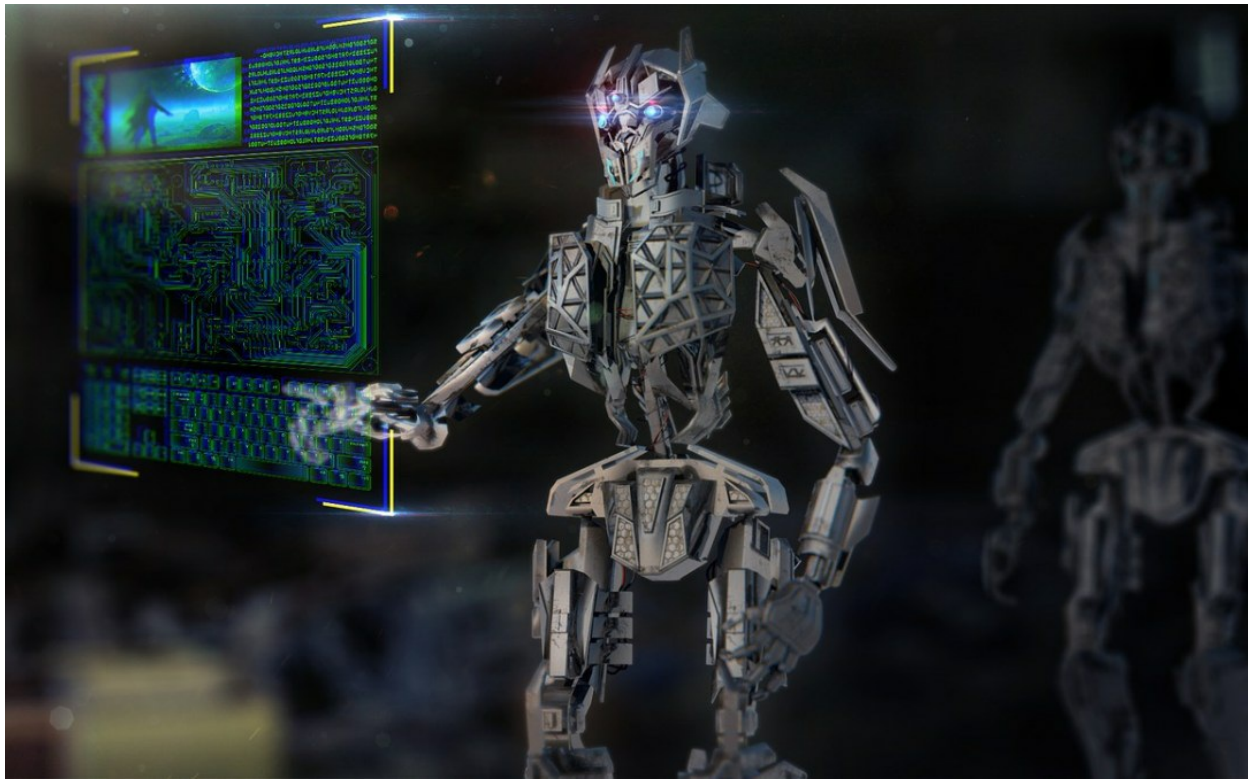


Technology and War Strategy

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Technology plays a crucial role in the outcomes of war. The rifle, the railroad and the telegraph in 19th Century Wars, the machine gun, the airplane and the tank in 20th Century Wars, and information technologies in recent wars are at the forefront of examples of how technology changes the face of wars and influences their outcomes. History shows the armies that have managed to integrate new technologies have gained advantage on the battlefield. However, technology is effective only when supported by relevant organizational structures, doctrines and only under the circumstances where the threat is well defined and the strategy well established.

It was not the quality of German tanks but tactical innovation that brought them success at the beginning of WWII. And, even though the Germans improved the quality of the tanks throughout the war, it didn't secure them an ultimate win due to a deficit in their grand strategy.

In today's contemporary wars like the war on terrorism or irregular wars demonstrate that technological superiority also might not secure victory if Allies do not have a well-conceived strategy including moral, economic and sociological aspects against adversaries.

Acknowledging that technology is a force multiplier on the battlefield, this paper emphasizes the importance of assessing the technology within the confines of grand strategy and backing it with an appropriate war making doctrine.

There have been different views on technology's role at war and strategy. At the one extreme, analysts such as Fuller and Creveld, regarded technology as a determinant on the outcome of the wars. Fuller claims that tools or weapons, if only the right ones can be discovered, form ninety-nine percent of victory. (Fuller, 1946) Martin Van Creveld believes that technology permeates all aspects of warfare and govern it (Creveld, 1991). No author claims that technology's role is trivial, however scholars such as Howard and Gray assert that technology is only one dimension of strategy among many others. Howard defines four dimensions of strategy, namely are operational, social, technological and logistical dimensions (Howard, 2014), whereas Gray formalized the strategy in twenty-one dicta, one of which is technology. According to Gray, "historical evidence suggests that the outcomes to none of the wars in modern history among the great powers have plausibly been determined by superiority in weapons technology" (Gray, 2010). Lonsdale admits that other factors, which include the human dimension of war, may be more influential in deciding success or failure (Lonsdale, 2005).

This paper supports a more cautious approach in assessing the role of technology and attempts to show through historical examples that technology is important but not the dominant determiner in the outcomes of wars. Moreover, this paper aims to demonstrate that technology is effective only when considered within a broader strategic context. It consists of three main parts. First, strategy's definition and Clausewitz's contributions are presented; second, technology's place within strategic theory is proposed and third, historical cases are examined having identified technology's place and role within strategy.

Clausewitz and Strategy

Governments, states and leaders have always done strategy as we understand it today, but they did not call it "strategy" until 200 years ago. Of course, just because the word strategy was not in use before, doesn't mean that no one did strategy. Strategy has universal dimensions, applicable to all wars throughout history (Gray, 2010). It is timeless in nature, but has changing characteristics based on social, economic and technological circumstances.

Strategy is generally formalized by three elements: "ends", "ways" and "means", each of which is essential for the integrity of strategic theory. If policy goals are missing (ends), it means strategists have no meaningful guidance, and therefore cannot select ways in order to achieve the political purpose. This in result, renders military means as essentially tactical dealings with outcomes limited to local successes. Likewise, if military means are not sufficient to defeat an enemy's military means, your policy goals and strategic ways become obsolete, no matter how intelligent they are. (Infinity Journal, n.d.).

No modern strategist on warfare has been more influential than Clausewitz to advance our understanding of universal principles of war. It is therefore worthwhile to highlight a few of his foundational concepts. Clausewitz' masterwork, *On War*, was the first attempt to formalize the principles that were universally valid and applicable to all wars. He called these universal principles "objective knowledge" (Echevarria, 2007). Despite some critics and detractors of Clausewitz, his ideas continue to constitute an integral part of our current understanding of "strategy".

Clausewitz' definition of strategy, "the use of engagements for the purpose of the war" is quite simple and concise. At a first look, one might not notice the importance of this sentence. Because as Clausewitz stated, "everything in war is very simple, but the simplest thing is difficult" (Gray, 2010). Indeed, it is quite astonishing to see how nations failed to stick to the basic principle of "using force for the purpose" throughout history, and they most of the time suffered fatal consequences as a result. Bernard Brodie, a well-known American military strategist of Cold War era, successfully summarizes in his book how main actors in the Second World War were far from relating the war to the political aims and put much more focus on winning the war rather than the aim of it (Brodie, 1959).

There have been some other definitions made by well-known strategists. Colin Gray, in an effort to advance Clausewitz's definition, defines strategy as "the use that is made of force and the threat of force for the ends of policy" (Gray, 2010). Richard Betts calls strategy "the link between military means and political ends". Even Liddell Hart, one of Clausewitz's earliest and most resolute critics, defined strategy in a like manner, as "the art of distributing and applying military means to fulfil the ends of policy" (Echevarria, 2007). What is common in all definitions is instrumentality, which is not different in essence what Clausewitz explains in *On War*. One can claim that whole structure of *On War* is based on the relationship between "purpose" and "means" (Echevarria, 2007), which can be paraphrased as instrumentality. Clausewitz's early appreciation for the strategy makes it difficult for subsequent strategists to differentiate from his original definition.

Gray uses a bridge metaphor to describe this instrumentality. He states that strategists have the difficult and complex job of translating political purpose, or policy, into feasible military objectives and plans; and he compares this process to currency conversion like turning one currency [military (or economic or diplomatic, or technological)] into another (desired political objectives). The bridge connects two very different worlds which otherwise would be divided (Gray, 2010). Next section will discover sides of the bridge where technology stands.

Where Technology Lies in the Realm of Strategy?



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There is a line of thinking that views technology as an autonomous force affecting the nature of war. Some scholars even believe that it should be added as the fourth component to the trinity of Clausewitz (Stone, 2007). Indeed, technology is one of the constant dimensions of war that can affect the outcome in one way or another. However, it is only one step to employ technology, it is quite another to understand what technology means at a strategic level.

Almost in all historical cases, they are not the weapons themselves that provide strategic advantage. It is the ability to use the technology in conjunction with other dimensions of war to achieve the desired policy end state. Consider that there are oil rich countries today that have state of the art military technologies, but it is hard to see their effect on the battlefield for them.

There of course may be cases where a combatant may have technology and all tools aligned and in place, but not be victorious in accomplishing their aims. As the Iraq and Afghanistan wars demonstrated, a power with the latest technologies, backed by a robust doctrine, organization, and highly trained troops might not get what it wants if a clear purpose was not determined before the war, or if the power fails to adjust and refine this purpose throughout the war as the political situation evolves.

Furthermore, each new technology that provides solutions to the current problems, spawns new problems. For every new weapon system or technological improvement, leaders have to design related organizational structures, establish doctrine and define the relationships between current and new systems.

Technology is more related to the “means” part of the Clausewitz’s purpose-means relationship, or military objectives and tactics side of Gray’s ‘bridge’ metaphor. Scholars have long-debated which side of the bridge is more important. The policy side or the ways and means side? One shouldn’t forget that strategic mistakes cannot be remedied with tactical solutions. Technology, which is on the tactical side of the bridge, might permeate war but it does not control it. Rather, it expands the ways to accomplish the desired ends. To have a more concrete understanding, strategy and technology will be explored through historical examples in the following section.

Examples from Military History

We will examine three historical cases to have a better understanding of the relationship between strategy and technology. First example is the German’s invasion of France in the Second World War, which is a prominent example that shows how strategy is effective on the outcomes of war. Second one is the Yom Kippur War, which demonstrates that Egypt with its limited technological capabilities could achieve its policy goals against the techno-savvy Israel when executed a robust strategy in the last conventional war of previous century. The third and the last one are irregular wars that U.S. fought in Afghanistan and Iraq, which explains that strategy is relevant for every type of war and US technological superiority didn’t secure a victory against irregular adversaries when a sound strategy was not established.

– Second World War

Tanks and air power can be shown as the forefront technologies among many others during WWII. Before the war started, Allies had more tanks and aircraft in number and superior tanks in quality than Germans had (Royde-Smith, n.d.).

However, Germany won one of the most sweeping victories of modern warfare in 1940. The explanation is that they achieved it through strategic, doctrinal and organisational arrangements rather than simply technological superiority.

From the strategic point of view, rather than technological superiority Hitler's expansionist approach and desire to break economic sanctions and German Generals' efforts for revolutionary plans and techniques to avoid a protracted war paved the way for so-called Blitzkrieg and brilliant victories (Gat, 2001). However, on the other side of the hill, French and British leaders were expecting a war in the standards of 1918, slow, dominated by infantry and artillery, and defensive in character (Hart, 1970).

From the doctrinal point of view, although official German air and armour doctrines were similar to those prevalent in the other great powers (Gat, 2001), thanks to the efforts of German Generals, especially Heinz Guderian. They organised their tactical teams as combined arms teams, with the capability of independent fire and manoeuvre, thus allowing tanks use in masse with close support of aircraft. Later called "Blitzkrieg (lightning war)", it was concentrated employment of armour and air forces to confuse the enemy with surprise and speed and to encircle him, after a successful breakthrough, by means of far-reaching thrusts (Heinz Freiser & Greenwood, 2005). The German Army created six armoured divisions before the war, while Allies had no division and they mostly scattered their tanks for the support of infantry (Royde-Smith, n.d.). Ironically, it was the British who pioneered the idea of using tanks as an independent manoeuvre force (Hart, 1965). But internal resistance from some generals within the British Army didn't allow them to execute this idea.

This is a classic example of how strategy, doctrine and true execution of them affect the outcomes of war when belligerents have similar or even worse technologies. However, the same strategy of Germans proved brittle when Germany met with the enemies that had a wider resources and vast lands to cross (Gat, 2001). Thus, the purpose of the war should be adjusted accordingly throughout the war. Next section will explore how Egypt or Israel adjusted their strategies at Yom Kippur.

– Yom Kippur War

Egypt and Syria's coordinated attack against Israel on the afternoon of 6 October 1973, known as the Yom Kippur War, came as a complete surprise to Israel, which was unprepared for war. Israel was generally superior than its adversaries in terms of force balance and technology but it couldn't prevent a surprise attack in spite of her intelligence service's assurance of informing any hostile attack within 48 hours. Israel, despite all disadvantages that stemmed from the surprise attack, recovered the battlefield and

counterattacked on both fronts, destroying 1400 enemy tanks and inflicting more than eight times as many casualties as it suffered. It was a clear victory from a military standpoint (Bolia, 2004).

Air power, tank, air-defence missiles and anti-tank missiles were leading technologies of the day. Based on analysis of war; from Israel point of view, technology was not the main reason neither for failure at the beginning of war when Egypt and Syria conducted a surprise attack nor for success throughout the war when Israel recovered and counterattacked. Analysis tells that overreliance on technological devices in gathering intelligence, military plans based on unrealistic assumptions and obsessed with previous proven tactics were the main reasons of Israel's initial shock, none of which are technological reasons.

Intelligence Service's overreliance on a "special devices attached to phone and cable connections that allow Israel to eavesdrop and listen in on conversations in rooms" caused them to neglect other clear signs of an ensuing operation (Bar-Joseph, 2013).

The IDF (Israel Defence Forces) based their military plans on gaining air superiority at the beginning of war as they achieved in previous Arab-Israel Wars. After the surprise attack, they couldn't use the air power effectively due to the Soviet-made air defence systems of Egypt and Syria, let alone gaining air supremacy. As a result, air force could not be used for close air support during the war, which had been crucial for IDF doctrine (Kumaraswamy, 2013).

The IDF (Israel Defence Forces) general staff had an impression that wars on the ground are won by armour alone and failed to develop an integrated infantry-armour doctrine (Bolia, 2004). But in Yom Kippur, they got heavy casualties and lost high number of tanks due to the Soviet-made anti-tank missiles that the Arab infantry has.

Despite all failures, Israel won the war. The main factors that let Israelis overcome their deficiencies were good leadership, combat leadership experience, Israel's understanding of "fighting to exist" rather than only "fighting to win", in other words their national spirit (Bolia, 2004). If these qualities were not in place, it would be unlikely to come back for a nation experienced such a surprise attack.

This war demonstrated that;

- Winning the war depends on many other dimensions along with technology. Having superior technology might not be enough to prevent a surprise attack or to recover the battlefield.
- Enemy also has a vote. After stunning victory at six-day war in 1967, Israel should have expected a possible retaliation. But a basic premise: "Egypt would not initiate a war without having a sufficient power" caused Israel to disdain the possibility of a limited operation along the Canal.
- On the other hand, Egypt, by determining a feasible military objective within the limits of her capabilities (without having air superiority), conducted a successful operation for the first time against Israel. Even they lost the war in the end, this limited success caused a perception that "Israel's military success against Arab countries is not guaranteed" and paved the way for peace talks eventually led to the return of the

Sinai to the Egypt.

- Basing war strategy on gaining air supremacy and armour superiority might not be a good strategy, which also might result in high casualties comparing to previous wars.

Next example will explain how US did in her latest wars in Iraq and Afghanistan.

– Afghanistan and Iraq

The US won a quick and decisive victory both in Afghanistan in 2001 and in Iraq in 2003. Operation Enduring Freedom (OEF), which began less than a month after 9/11 terrorist attacks, was not a traditional invasion plan and not required months to move necessary forces. The most remarkable aspect of Afghanistan War was a few hundred Special Operation Forces (SOF) managed unprecedented level of jointness with air power. The ability of SOF to laser the targets or transmit GPS coordinates to their Close Air Support (CAS) platform was essential to the success of the Afghan campaign. Some find that this superiority in information and surveillance technologies and long-range precision which was displayed in Afghanistan formed a new way of war, called the “Afghan model”. This model was a particularly vivid demonstration of how leveraging technology can permit rapid and decisive victory at low cost even in enemy lives (Cimbala, 2005).

Most observers believe that Operation Iraqi Freedom (OIF) was unprecedented in terms of speed and low cost. Americans achieved a pace of advance far outstripping that of the Germans in Ardennes in 1940 and Patton’s advance in 1944. Whereas only 9 percent of the munitions expended during the Gulf War featured precision guidance, nearly 70 percent of bombs used in air assaults in OIF were guided. Sensor-to shooter cycle was shortened remarkably. For instance, process of spotting a new target, assigning a weapon to hit it, and finally hitting it shortened from three days in the Gulf War to less than 40 minutes, both in Afghanistan and Iraq. To sum up, the combat phase of OIF was a “brilliant success” in many ways (Shimko, 2010).

Despite earlier successes, the post-conflict phases of Afghanistan and Second Iraq War were a disappointment. The Iraq War Plan was prepared on the premise that the Iraqi people would welcome American troops as liberators, build their own democratic government and quickly rebuild their country by using oil revenues. It was thought that number of troops to conduct the war would be enough to provide stability. But, it didn’t happen. The assumptions were flawed. The insurgency, started after occupation, caused the loss of thousands of lives. “Revolution in Military Affairs” and “Military Transformation” debates in 1990s led to a perception that technology could make great difference in war by lifting the fog of war. However, technology did not provide the solution to the insurgency that followed. Despite its considerable technological edge over its enemies in Iraq and Afghanistan, the US failed to develop an adequate strategy to achieve its political objectives.

Conclusion

It is very straightforward that technology is a force multiplier in the battlefield. Strategists and commanders need to take it into account in their strategies and plans. However, its advantages remain at the tactical level when it is taken away from the strategic context and regarded as the forefront driver for the success of war. As history has shown us, what

is needed is an ability to assess the strategic effects of technology for use in the direction and purpose of war. Thereby, the mechanisms including strategists who can form the bridges between policy and means to better integrate technology into strategy should be established within organizations. It is the need for these strategists (or experts) that hold a solid understanding of our past, the universal tenants of strategy, that are best positioned to predict how new technologies might shift the strategic balance of power.

Clausewitz's famous theory that subordinates all military efforts to policy goals is still relevant. Past and current wars demonstrate that this link between purpose and means is simple on the surface, yet very complicated in execution. States and governments have numerous tools (technological, economic, social etc.) at their disposal. Strategist must choose the best tool for the purpose, and understand the effects of tools through using a strategical lens and keeping the purpose in mind.

As it is mentioned in historical cases, technology itself is not helpful if it is not designed for the use in a correct organizational structure. German's use of tanks in masse was an organizational innovation rather than technological. Therefore, possible disruptive technologies like cyber, unmanned systems, space systems should be envisaged in an organizational design. Having cutting edge technologies on the field become useless without related doctrines. In the process of developing a new technology, we need to seek an answer to the question of "What is the best way or method to use the new technology?"

Exploring new technologies and ideas is one thing, establishing them as systems within organizations, institutions or states is another thing. Most of the time, people resist to new ideas and new technologies. It was the Germans used tanks in masse although the British were the first to understand the importance of using tanks as a separate manoeuvre force. But British officers couldn't persuade high-ranking officers in the army. German officers were also having great difficulty in explaining the virtue of using the tanks in masse to their senior commanders. But Hitler's passion for a clear victory and a few Generals' persistence made it possible.

Although strategic theory is simple on the surface, it is hard to implement. It needs a great coordination between strategists and those people conducting ways and means. There are many experts on distinct technologies but I believe, there is vacuum between technology experts and those could understand the strategic impacts of relative technologies. In general, states need some mechanisms integrating technology into strategy.



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As we have seen throughout the history, there is always a weapon or weapons of the day. Today cyber, unmanned systems, especially combat UAV seems is promising, space systems seem as the possible areas to be disruptive technologies. It is important to have them. But we should keep in our minds that it is as important to know the way of using them as having them. Therefore, we need to constantly seek answers to the question of “What is the best way or method to use the new technology?” as we develop those technologies.

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