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21/07/2021

Global Hegemony and Advancements in Military Technology

THE 2003 IRAQ WAR

Technology has always played an important role in global politics, economics, security, and culture. It has continuously shaped the structure of the global system, its actors, and the interactions between them and vice versa. The Iraq war serves as a reminder that recent changes in warfare, relying on global positioning systems and electronic technology of all kinds, have created huge gaps between the military power of the United States and that of other countries. However, theories of global hegemony have performed little to theoretically conceptualize technology as a powerful factor within explanations of change in global affairs. A Gramscian approach to hegemonic power provides the most comprehensive theoretical grounding under which to conceptualize technology. The Iraq war will serve as a relevant benchmark around which to construct the analysis. This paper finds a relevant yet cyclical relationship between complex technological advancements in military warfare and America's hegemonic position in international relations. Such findings lead to the conclusion that technology needs to be integrated in a more systematic manner in the theoretical discussions of global hegemonic power. It should be understood as a highly political component of the global system, which shapes global affairs through its support of coercive power, and is itself shaped by economic, political, and cultural forces.

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1. Introduction

The theory of “hegemony” and its implications have been the focus of academic writings for various decades. Traditionally employed to describe domination of one sort or another, the concept of hegemony is being slowly defined in the field of international relations. One of the most important contributions and starting points to this matter being Antonio Gramsci’s prison notes from the 1930s. He introduces the concept of hegemony as domination through consent rather than force (Bates 1975, 352).

Although scholars still haven’t found a comprehensive theoretical framework from which to study hegemony, America is the most prominent example used in the literature of hegemonic power in international relations. Whilst its supposed decline, relative to other countries such as China, has been a subject of recent discussions, America is still seen as one of the Great Powers in the political and economic international sphere (Norrlof 2010; Beckley 2012). Its aggressive foreign policies and involvement in various international conflicts, as well as its influence in international political discourses and policies have been a matter of concern for various decades now.

After almost two decades, the 2003 Iraq war has proved to be one of the most controversial conflicts of recent history. Since the start of the war, which lasted almost a decade, it is estimated that the United States spent approximately 819 billion US dollars on war costs (Statista, 2021). Only in 2007, 900 American soldiers were killed with that number rising to an alarming 25,000 civilian deaths in Iraq. The high costs and civilian casualties gained the US government great opposition from American citizens. America’s decision to invade Iraq without the United Nations (UN) Security Council authorization sparked multiple debates on the justification of the war. States, the international community, and the public positioned themselves along two narratives. Supporters of the war claim US intervention helped dismantle an undemocratic and cruel regime. A regime which posed a real threat to the international community under the possibility it might supply or make use of weapons of mass destruction. On the other hand, those who question the legitimacy of the war, argue the threat posed by Iraq’s weapons of mass destruction to have been magnified (Cottey, 2004). Moreover, it can’t justify the disregard to the authority of international institutions (e.g. UN) and disruption of international order. None of the positions have so far been fully refuted due to the ambiguous outcome of the war. Although a dictatorial regime was successfully overthrown, it was later proven that the threats posed by Iraq’s WMD programmes were exaggerated, and there were various post war challenges for Iraq, the US and the international community (Cottey, 2004).

Whilst the legitimacy of the war may always be contested, the unilateral decision undertaken by the US has raised serious debates about issues of principle and precedent. The Iraq war set a precedent of preemptive warfare which urges the question on whether and under what circumstances the USA use of force is a legitimate policy for regime change. The lack of regulation and limitations of the UN Security Council worry opponents and allies alike, evoking the possibility of America engaging in similar operations elsewhere. Finally, the war highlighted the US’ military superiority (which prompted its rapid victory), thus exposing its role in world affairs and in the nature of warfare (Cottey, 2004).

It is the aforementioned military superiority and its role in US displays of force which will be the focus of this thesis. The Iraq war involved various technological developments in the military weapon systems that have important implications for future conflicts and dynamics in the international community. In the next decades, the international system will be shaped by whether the distribution of power remains

under America's unipolarity or becomes multipolar. Rising great powers (e.g. China) may reorder the current economic and security framework, increasing the possibility of war and the restructuring of the open international economic system that has been in place since World War II. A second part of my analysis will focus on the existing actors and structures advancing military technological advancements. Rather than the state directly, it is the public private arrangement between the state and the defense industry which greatly affects patterns of technological evolution. Discovering the underlying mechanisms behind US hegemony is crucial for any subsequent consideration of the international system (Layne, 2009).

The Iraq war serves as a reminder that recent changes in warfare, relying on global positioning systems and electronic technology of all kinds, have created huge gaps between the military power of the United States and that of other countries (O'Hanlon, 2000). Moreover, America is the country with the highest expenditure in military warfare and one of the highest shares of GDP invested in its military force (World Bank, 2021). However, little research exists on the implications an edge in military warfare may have had on America's long-standing hegemony and by implication, on its motivation and subsequent victory in Iraq's invasion.

Scholars assume this unparalleled superiority in military technology is of temporary nature and thus, can't be considered relevant when studying the driving forces behind US hegemony. Globalization and improved communication technologies are thought to be an advantage for other countries to free-ride on US technological advancements, as knowledge diffuses more quickly than in previous decades (Gilli et al., 2019). However, this literature largely ignores the considerations from the increased complexity of modern-day technology. Increased complexity is mostly referred to in the literature as the increase in the number, sophistication, and adaptability of components from major weapon systems, which in turn prevents imitation attempts from other nations (Gilli et al., 2019).

In this thesis, I study the relationship between US' hegemonic power and complex technological advancements through a systematic analysis of the Iraq war. Under Gramsci's theoretical framework, the Iraq war is an example of America's display of hegemonic power. It pursued a coercive military intervention to achieve and sustain a transfer of its liberal culture and democratic values. But what role did technology in military warfare play in America's attempt to reinforce its hegemonic position. In other words: *What does the Iraq war tell us about the relationship between US' hegemonic power and complex technological advancements?*

In the following sections, I will first provide a theoretical framework and literature review on the matter. It will serve to provide a critique to current theories which have put forward an incomplete framework from which to study global hegemony and military technology and propose a Gramscian approach as a more comprehensive groundwork to base my analysis on. It will also be used to embed and justify the use of the 2003 Iraq war as a relevant case study from which to explore the aforementioned relationship. Finally, followed by a comprehensive analysis of relevant data on the matter, I will present the findings and implications of this study. I find a relevant yet cyclical relationship between increased complexity in technological advancements of military warfare and America's hegemonic position in international relations. America's long standing hegemony is sustained but not fully dependent on its military technological superiority. Technological knowledge regulates coercive power. On the other hand, its technological edge is guaranteed by its hegemonic position in international relations, thus revealing an interdependent cyclical relationship.

This paper makes the case for an interdisciplinary approach, which systematically incorporates insights of Political Science and Economic History to provide a better understanding of technology and global hegemonic power. In doing so, it opens the field to a richer understanding of how global systemic change is impacted by technology and how global politics, economics, and culture impact technological evolution.

2. Theoretical Framework & Literature Review

2.1 Framework for defining hegemonic power

Studies on power dynamics and hegemony in international relations have been the focus of many discussions in the literature on the topic. Yet, a common phenomenon in the literature is that scholars do not seem to agree on a definition or clear interpretation of the concept of hegemonic power and its influence in international relations. Its structures, dynamics, and features are still a highly debatable issue (Tomja, 2014).

Andreas Antoniadis (2018) and Goda Dirzauskaite et al. (2017) have been among the multiple scholars attempting to provide a comprehensive framework of the main theories of hegemony in international relations. Both scholars distinguish three main different approaches (realism, liberalism, and Gramscianism) in relation to nature, characteristics, conditions, and effects hegemony has on the international system. Their frameworks encompass most of the literature that has been thus far produced on the matter. I have found that no attempt has been made to apply them to specific case studies on conflicts. Most works remain on highly theoretical grounds.

In realist thinking, actors view the international system as competitive and hostile, where power is the main determinant of events. Power implies being able to control all actors within a system and it is mainly composed of the material capabilities of an actor (Dirzauskaite et al, 2017). Under this theoretical viewpoint, the system created by the hegemon is seen as dependent on its survival. One would collapse without the other (Antoniades, 2018). In this case, the US would be seen as the leading actor in terms of hegemonic power globally. Nevertheless, global hegemony is hardly possible today under the realist theoretical viewpoint. There are nowadays various Great Powers that challenge the US, for instance, Russia or China (Beckley, 2012). An analysis made from a realist perspective would limit this research to the regional hegemony of the US which fails to address other issues at hand.

Under liberalism, the thought of a dominant power is rejected. The systems and operations of hegemonic power are the focus of the analysis (Antoniades, 2018). An actor would focus for instance on maximizing its economic influence rather than its military force. Hence, hegemonic leadership would translate into productive manufacturing, control over capital, and possession of raw materials thus creating an open market for goods and a stable monetary system in which all actors cooperate (Dirzauskaite et al, 2017). Carla Norrlof (2010) showcases America's dominant position in the international economy and concludes that while this is an important factor for US hegemony, it also needs to be complemented by military preeminence. Although this matter is relevant to the study of US hegemony, it fails to consider the influence of military technological progress in the advancement of its hegemonic position and does not account for the driving forces behind technological advancements.

Finally, the Gramscian scholarship presents hegemony as norms, institutions, and mechanisms which establish international rules of behavior to be followed. It is based on Antonio Gramsci's prison notes in which he argued that political control is based on both coercion (as in the realist viewpoint) and consent (as in the liberal viewpoint). By combining military-political and economic-cultural power,

hegemony is reached when the actor establishes a transfer of culture and ideas that ultimately result in their political and financial global domination (Adamson, 1980). America is again considered through this framework as the primary actor achieving hegemony in international relations. Through the introduction of a new liberal economic order, the use of diplomacy, and its constant military interference, the US has managed to shape global vision through its economic, political and cultural lens. From a Gramscian viewpoint, there needs to be a balance between coercion (the capacity to use force) and consent (the capacity to install ideas, culture, and vision). What distinguishes this school of thought from realism and liberalism is the consideration of both coercion and economic capabilities of an actor, along with social and political factors. Coercion is seen as a determining factor in sustaining rather than achieving hegemonic power (Dirzauskaite et al, 2017). In particular, Gramsci argues (Bates 1975, 363):

The "normal" exercise of hegemony in a particular regime is characterized by a combination of force and consensus variously equilibrated, without letting force subvert consensus too much, making it appear that the force is based on the consent of the majority.

Hegemony is thus achieved through an interaction of force and consent. In this sense, to be able to implement force, a level of consent is needed. On the other hand, to guarantee persuasion, sufficient power of force may be required. Power of force is defined as the capacity of an actor to coerce another into consent. In the current context, this broadly refers to a state's military force and its capacity to subjugate individuals, states, or institutions (Dirzauskaite et al, 2017).

The coercive and persuasive tools used by the US may act in opposition but have mostly operated in concert in the case of American foreign policy, both attempting to support US hegemony. Against this background, a critical examination of technology and hegemonic power will illustrate the dynamics of such tools. As presented in the literature review, most works on US hegemony are becoming obsolete. Faced with a new era of technological developments and advanced weapon systems, few scholars have addressed America's alleged military-technological superiority and its implications from a contemporary viewpoint. Although Gilli et al. (2019) argue that America's superiority in complex technology may be the reason for its continuous hegemonic position, it fails to consider how it relates to the theoretical framework behind the concept of hegemony, namely force, and consent.

Despite recent discussions on the decline of America's hegemonic power, there is a widespread consensus that the economic, technological, and military lead from the United States in respect to other global powers is far from declining (Cox 2001, Beckley 2012). Trends favor US dominance. For instance, China's apparent challenge to America is undermined by the work of Michael Beckley (2012) where he concludes that over the last two decades, globalization and US hegemonic burdens have expanded significantly, yet the US has not declined; in fact, it is now wealthier, more innovative, and more militarily powerful compared to China than it was in 1991.

More specifically, many scholars have delved into the US superiority in military warfare, reaching the conclusion that America has a clear standing edge in the technological advancement in military warfare in comparison to any country (O'Hanlon 2000). Some scholars have addressed the impact these advancements have had on America's regional dominance. Through an overview of 5 case studies, Karin von Hippel (2000) has studied the influence of the US in the political realm of certain countries after the Cold War (Somalia, Japan, Haiti, etc.). She shows us how superior technology can act as support for the coercive tools of America. Yet, her book is limited to independent case studies which fail to be embedded in a broader theoretical framework of hegemony.

Gilli et al (2019) put forward the most recent theory of technological complexity in modern weapon systems. Contrary to the existing literature, which suggests globalization has facilitated the imitation of technological advancements, Gilli indicates the opposite. Technological knowledge of how to design, develop, and produce modern weapon systems has become less likely to diffuse. Moreover, countries must now possess extremely advanced knowledge in industrial, scientific, and technological areas in weapons production as the complexity of its components keeps rising. Yet, like previous scholars (von Hippel, 2000), his research fails to relate to a broader theoretical framework of hegemony.

The weaknesses of relating technological advancements to a realist or liberalist conception of hegemony has been advanced by Stefan Fritsch (2011). Realism sees large technological systems as an exogenous instrument embedded in a static model of the global system, which only strives for security and welfare. It is a passive force to the country's power capabilities with the state having a central role in its development. However, this view neglects the reciprocal relationship between technological evolution and structural realities in world politics. Liberal scholars contribute to a better understanding by including the effects of technological advancements on new economic, cultural, and political structures of a state. Nonetheless, it fails to investigate the driving social forces behind it (e.g., political interests, norms, profits), thereby underestimating a cyclical relationship between technology and hegemony power.

Under the Gramscian theoretical framework of hegemony, the use of military force within Western democratic capitalist states, where there is a greater political role of consent, is regarded as insignificant. Nonetheless, it still holds an important function as a subsidiary component of rule. That is, when used beyond the regional boundaries of the state, it might help reinforce a state's hegemonic position in international relations (Paul, 2007). This can be translated to the context of technology and the Iraq war. Besides a desire to dominate capital and return to profitability, the war was a result of a crisis in America's hegemony. A temporary weakness in its political and societal environment produced a neoconservative ideological resurgence which put forward a new doctrine of preemptive war for which Iraq was to serve as the first example (Mercille, 2010). This new doctrine focused on complex technological advancements as the main tool to support America's coercive power.

Hence, as I have seen in the literature technological advancements can be conceptualized as a tool which supports coercive power. Nonetheless, its relationship with other notions of hegemonic power, such as power through consent has not been studied. This analysis will help me revisit the notion of technology and its relation to hegemony from a more comprehensive framework, by examining the impact of complex technological advancements in the Iraq war on military political power and how it further relates to the economic, political, and cultural realities of that period.

2.2 The Gramscian framework and the Iraq War

A vast extent of the literature of geopolitics have sought to understand and influence policymaking through a systematic study of the effects of geography on power relationships in international relations. However, realist and geopolitical analysis of the Iraq war have failed to provide a comprehensive critical analysis of the Iraq war and its ensuing occupation (Paul, 2007). The reasons for war remain extremely complex and indefinite. Thus, I do not attempt to make a precise reconstruction of the motives behind the Iraq war. I provide a critique to current theories which have put forward an incomplete framework and propose a Gramscian approach as a more comprehensive groundwork to base my analysis on.

Gramsci's ideas remain instrumental in understanding the mechanisms behind Iraq's invasion. In short, traditional geopolitics thinking accounts of the Iraq war suggest it has been "America's monopoly capital's attempt to flood the global economy with cheap oil, return to profitability, and address the political contradictions involved in cultivating China as its spatial fix." (Paul, 2007). In other words, it addresses the causes of the invasion with reference to oil, as a rational interest of dominant American capital. Thus, similarly to the realist viewpoint of hegemony, limiting the analysis to aspects of domination, coercion and force (Paul, 2007). Whereas oil interest and capital accumulation have not been discarded as analytically relevant, the Iraq war can be best explained under a Gramscian theoretical framework, where the consensual aspect of politics accounts as a central element of the analysis.

The US, under the pretext it needed to reinstall order and democracy in the Iraqi regime, following the false supposition it had acquired Weapons of Mass Destruction (WMD), led an invasion against the wishes of the UN and the international community (Norrlof, 2010). Non-compliance to regulations imposed by international institutions (e.g., UN) pose a great risk to international peace and order. Yet, Iraq's war is a recent example of the US' ability to use force in a unilateral and unchallenged manner. UN's Security Council debate over Iraq's noncompliance with previous resolutions on WMD urged a response on whether the use of force was necessary. States were divided, with France and Russia arguing against, and the USA in favor. In 2002, Iraq was given a final opportunity to adhere to its disarmament obligations as well as disclose in full transparency its WMD' programmes to the international community. Further polarization on the matter intensified the debate, with the USA and UK pressing for preemptive use of force. In their quest to gain authorization, they called for a second UN Security Council Resolution which resulted in a clear rejection of their request (Cottey, 2004). Whilst the first 1990s war in Iraq came about after a dozen Security Council resolutions, the second was backed by one Security Council resolution and a lack of support for the second (Haass, 2009). In March 2003, Bush's administration decided to follow through with their intervention and war began. As David Fisher (2011) argues, the war fully failed to meet any of the just war criteria. It was undertaken under the pretext of disarming Iraq, which was later proved to be based on inadequate evidence. There was an absence of any international consensus in favor of military action as well as a failed adequate assessment on whether they should undertake military action. Hence, setting a dangerous precedent for future conflicts. The argument that the war happened without just cause or planning urges the question of the driving forces behind America's display of coercive power.

Various factors contributed to America's invasion. Among them, were "the public demonstrations against the World Trade Organization in Seattle in 1999, through the bursting of the tech bubble and the political crisis surrounding the irregular election of George W. Bush" (Paul, 2007). Across this highly charged political environment accompanied by a dramatic collapse in profitability of capital, a final determinant significantly freed the United States' government to take more drastic actions. The aftermath of the 9/11 terrorist attacks provided the ideal foundation to strongly advocate for regime change (Paul, 2007). As seen in the 2002 National Security Strategy report of the United States, the discourse on the use of force shifted to a campaign favoring preemptive policies, for which Iraq became the ideal precedent:

"The United States must and will maintain the capability to defeat any attempt by an enemy—whether a state or non-state actor—to impose its will on the United States, our allies, or our friends. We will maintain the forces sufficient to support our obligations, and to defend freedom." (The White House 2002, 30)

The terrorist attacks of 9/11 provided neoconservatives with the opportunity to undermine Clinton's neoliberal approach to security threats, which was characterized by economic manipulation and small-scale military interventions. According to Gramsci's theory of the capitalist state, intellectuals are an instrumental aspect when ordering citizens under the hegemony of their particular class. That is, they are behind their class' function awareness in the economic, social and political fields. Thus, particularly in Western liberal democratic states in which coercive force remains limited, intellectual-moral leadership becomes the highest form of power when uniting the ruling class. In this sense, neoconservative intellectuals played a crucial role in America's foreign affairs policies. The crisis allowed them to reach key leadership positions, from which they advanced their own intellectual and political projects (Paul, 2007). Bush's administration's main justification to advocate for this doctrine in Iraq was followed by the presumed threat posed by technological advancements in dictatorial states, namely Weapons of Mass Destruction (WMD). This threat was further intensified by normative claims made by neoconservative intellectuals. National Security Strategy reports before and after the Iraq war (2002, 2006), legitimate their military advances through declarations in favor of "liberty and justice", "human dignity", and "democratic rights".

Moreover, the war served as a demonstrative action for the US, the world and other Middle Eastern neighbors to see. Following the 11 years of repeated disobedience from Saddam Hussein, the UN's credibility and thereupon US' credibility was being compromised. The former Bush administration intended to renew its influence and credibility in the region. This further explains the ensuing occupation that followed and the resistance of the US to withdraw its troops (Mercille, 2010). Importance of credibility issues was recognized by America's president which declared:

"If we were to leave before the mission was done, what kind of signal would that send to the extremists and radicals who want to harm either the United States or our close allies? [...] Our credibility would be damaged. Our enemies would be emboldened." (Bush 2006)

Hence, it can be concluded that both economic, cultural, and political issues were instrumental to understand America's involvement in Iraq and its relation to hegemonic power. The decrease in US corporate profits, class conflicts under neoliberalism, the recession of 2001, and the corporate scandals of the 2000s, combined with an autonomous state achieved after the 9/11 terrorist attacks, provided the perfect environment for a resurgence of a neoconservative ideology of national and military greatness which focused on a technologically driven strategy. Although capital accumulation (i.e., oil) may have been a contributing factor, it is when bounded to the underlying mechanisms of the forces between the state and its society that best explain Iraq's invasion and its ensuing occupation (Paul, 2007).

The debate on Iraq exemplifies a fundamental issue on hegemonic power and its implications. It made very apparent the absence of regulatory power by the international community on America's unilateral strategies. Consequently, it has raised many questions on the extent a country may be able to pursue private interests through military force at the subsequent detriment of viable alternative policies. By determining the role of complex technological advancements in Iraq's invasion, and more broadly in US' hegemonic power, the international community may acquire the necessary information in their quest to balance America's power or any other country that might rise to its level.

This thesis does not aim to criticize theories of hegemony, contrast them or construct a new approach to study hegemony. It is not of comparative, critical, or revolutionary nature. In contrast, I aim at examining the relationship between the advancements in technology complexity and America's hegemonic position in international relations. I will do so under the Gramscian theoretical framework

of hegemony. Although none of these approaches to study hegemony present an all-encompassing theoretical framework, the Gramscian approach provides the most comprehensive and realistic level of analysis, in which various determining characteristics regarding hegemonic power are considered.

My thesis will thus contribute to this gap in the literature by drawing a bridge between the scholars proving America's edge on technology in military warfare and the ones concerned with the driving forces behind the theory of hegemony in international relations. I will attempt to fill such a gap through a systematic examination of complexity in technological advancements in the US military warfare during the Iraq war and the implications it may have on its coercive and persuasive power, namely its hegemonic power.

3. An Analysis of the Relationship between Military Technology and Global Hegemony

Global hegemonic power has already been defined under the Gramscian theoretical framework as the ability of a country to achieve economic, political, or societal leadership in an international framework. As already stated, the US 2003 invasion of Iraq was an attempt to achieve and sustain global hegemony. This has been already analyzed in the theoretical framework by studying key digitized documents and reports stating the motives behind the US decision-making process for the invasion of Iraq (i.e. pursuit of economic opportunities, response to regional and ideological threats). Once that fact remains indisputable, the remaining links and notions implicated in the analysis will be assessed in the following manner.

First, through an analysis of technological advancements and innovations in the US before and during the 2003 Iraq war, I will showcase the relationship between complex military advancements and US' coercive power. Second, against this background, I will conduct a critical examination on the nature of the arrangements behind technological advancements and how it helps further define the relationship between US hegemony and their standing edge in military technology.

I define advancements in technological developments (i.e., advancements in complexity) as the ones derived from the Revolution in Military Affairs logic (RMA). The RMA logic is a characteristic of the ongoing strategic and technological renewal of the US armed forces (Neuneck, 2008). The debate originated in the 1990s, following the analysis of the first Iraq war. Although the idea had already been partially expressed by the Soviet Union in the 1980s, it wasn't until the later decade that defense debates were marked by the promises of IT-enabled weapons (Lawson, 2011). Thus, I start with the notion that a technologically driven military defense was at the heart of the US defense strategy before and at the time of the Iraq war. In this sense, the Iraq war of 2003 reflects the implementation of the RMA plans of military transformation. Alongside Afghanistan's military intervention, it provided the perfect ground to demonstrate the effectiveness of the RMA logic, and thus the relationship between technology and military power, which makes it a compelling reference point around which to construct the analysis.

Although the RMA derived technologies were mostly based on developments in communication technologies, it is the doctrine on which these advancements are based on which is important to define complex technological advancements. Supporters of the RMA logic in America believe military preeminence depends on the development of high-tech weapon systems in US warfare and the subsequent implementation strategies (Harris, 2003). For lack of space and because it is more directly relevant to the aspects of technology discussed here, the focus will be on the technological rather than the strategic component of the RMA logic. The literature on high-tech technologies, in comparison to low-tech standard military weapon systems, mainly consider the following aspects for its analysis (Neuneck 2008, Gilli et al. 2019):

- Increasing levels of military spending
- Innovative performance and R&D cycles
- Improvements in functional performance
- Structures allowing military technology development and production

Complex technological developments and innovations will thus be exemplified through an analysis of the trends in functional performance, R&D investment, patent applications, and military expenditure by the US government in the period before and during the 2003 Iraq war. Whilst patent applications are used as a measure of innovative performance, R&D patterns, and military spending illustrate the intensity in technological developments of the USA in comparison to other great powers before and at the time of the war (Coccia, 2015). Improvements in functional performance metrics, as a determinant of increased adaptability and effectiveness of weapon systems, helps account for levels in the sophistication of military technology (Gilli et al., 2019).

A critical examination of the functional performance of technologies, innovative and military spending trends, with the Iraq war as a benchmark, does provide us with an extensive overview of the impact a military technology may have on America's global hegemonic power. However, it does not provide a full account of the basis allowing or shaping the developments in a way which sustains such an edge in the short and long term. The existing expertise, infrastructure, and institutions behind such advancements will exemplify an analysis of technological developments which is not limited to military considerations but also accounts for economic, political and cultural considerations, which are relevant under a Gramscian framework of global hegemony. Extending the analysis to the structural realities behind technological development trends will allow us to determine whether America's already existing hegemonic power plays a role in sustaining a military technological edge.

The data and sources used in this paper will be both of qualitative and quantitative nature. Databases, digitized governmental documents, reports, and existing literature on the matter will be used for this intent. As previously stated, the 2003 Iraq war will be used as a benchmark for the analysis as it is an example of the US' pursuit of global hegemonic power whilst also being embedded in the RMA technological framework.

3.1. Technology to Sustain and Advance Coercive Power

Iraq's actual military struggle from 2003 onwards has elucidated how an edge in complexity of military technological developments sustains coercive power. It made apparent how high-tech military technologies support an effective and adaptable use of force.

Weapon systems readiness, measured by the mission-capable rate, is an example of how investments in complex technological advancements are relevant to the effective capability of US force displays. The readiness for short notice operations of the equipment deployed in Iraq has been helpful in allowing the US to sustain the mission. For instance, according to the Association of the United States Army, in the first 3 years of the war, its tanks, vehicles, and trucks have sustained capable rates in the 90% range and its Apache and Blackhawk helicopters have reached 77% (Korb et al., 2006). However, these weapons do not fully embody high tech weapons. To provide a more specific illustration on this matter, I will be examining two particular technologies derived from the RMA logic: precision guided weapons and network centric warfare systems.

Precision guided weapons were essential in US victory over Iraq. 65% of the weapons used in Iraq in 2003 were precision weapons compared to 7% in the Gulf War of 1991. It is defined as a "weapon

which can be aimed and directed against a single target, relying on external guidance or its own guidance system” (Hallion, 1995). Precision guided weapons technological development have shown astounding success in bombing impact and accuracy. According to the Stockholm International Peace Research Institute (2004), detailed targeting information provided by airborne systems, and highly accurate precision munitions allowed America’s air force to have a devastating impact on Iraqi ground forces. They also showed great adaptability to hostile environments (e.g., sandstorms).

General comparative trends can be examined to further exemplify the importance of technological developments in precision weapons. The following chart, presented by Richard Hallion (1995) looks at the case of trying to hit, with a hit probability of 90 per cent, a target measuring 60 x 100 feet using 2,000-pound unguided bombs dropped from medium altitude. He presents findings based on data extracted from WWII, the Korean war, and the Vietnam war. I can clearly observe a defined pattern of improved accuracy and efficiency. Whereas in WWII 9700 were needed with a CEP of 3,300 feet, in the Vietnam war that number was reduced to 176 number of bombs with a CEPT of 400 feet. Yet, Hallion (1995) research is limited to the 20th century. I will extend his findings to the 2003 Iraq war.

The expenditure trends on precision guided weapons showcases the US preference for them. In the Gulf war, American forces bought 210,000 unguided munitions. The Operation Iraq Freedom showed an expense of approximately 10,000 unguided weapons, less than 5% of the total expended in 1991. Thus, whilst less than 8% of weapons in 1991 were guided, that level reached over 60% in 2003. Whereas the trend towards precision guided weapon is clear, it does not provide a full account of its higher technological performance (Watts, 2013)

The evolution of the US Army’s Guided Multiple Launch Rocket System (GMLRS) from an area weapon using unguided rockets into a precision-attack system has shown increasingly high technological performance. This weapon was introduced in Iraq in 2005. Its small size allowed for the weapon to be used in urban areas against individual buildings without extensive collateral damage. Its range of 70 kilometers and a CEP of less than 5 meters, provide it with a high probability to kill its target. The 44 rockets used by 2008 only exhibited one failure (Watts, 2013)

Another example of the effectiveness of RMA based technologies are *Network Centric Warfare (NCW)*. NCW focuses on how computers and communication systems can link people through information flows dependent on such systems. It supposedly improves the rapidity and effective ways in which army forces communicate (Wilson, 2005).

Indeed, increased network communications during the Iraq war allowed its military forces to improve its coordinative capacity for quick targeting. Whereas in the 1991 Gulf war 4 days were needed to coordinate efforts, that time was reduced to 45 minutes Operation Iraq Freedom. This trend of higher efficiency was corroborated by comments from soldiers and other involved parties. Some stated that while on the move, satellite-based chats and email were effective ways to communicate. Others highlighted the increased availability of information (e.g., messages, images). Most importantly, the use of the Blue Force Tracker (BFT), was highly praised among the troops. BFT refers to the “portable computer unit carried by personnel, vehicles, or aircraft that determines its own location via the Global Positioning System, then continuously transmits that data by satellite communications.” It showcased the position, direction and speed of the carrier whilst simultaneously allowing messages to be sent (Wilson, 2005).

In conclusion, an edge in weapon systems effectiveness has shown to be supportive to Iraq’s 2003 victory. It allows for an effective use of force. The Iraq War shows us that high-tech military weapons

might help prevent any possible forces from undermining America's coercive power. This is due to their high levels of performance. When the conflict in Iraq emerged, and the US aimed at advancing or protecting its hegemonic power through force, an edge in military technology was helpful to the US' effective and adaptable display of coercive power. We have thus showcased how complex technological advancements can represent a fundamental feature to sustaining and advancing global hegemony. It is used as a supportive measure to overcome any challenges or threats to the US coercive power. It remains a central part of the US' strategic advantage.

3.1.1. Interstate competition as an independent explanatory variable

Conflicts and threats are seen as the most evident force behind the patterns in budgetary levels related to the advancement of military technology. The Iraq war shows us that the emergence of threats allows the US government to shape its political discourse in favor of investments in military technologies to sustain and support America's hegemonic power. Moreover, the conflicts themselves provide the perfect ground to test the performance and weaknesses of current technologies, thus triggering further advancements for the ones showing a low performance.

First, patterns of technological advancements (i.e., R&D, patent applications, military spending etc.) are in accordance with the emergence of international threats (i.e. Afghanistan and Iraq's military campaigns). Figure 1 shows a spike in the military expenditure of the USA (as percentage of GDP) when the threat of a possible conflict emerged. It started declining only after the troops' withdrawal in 2011. Between 2000 and by 2008, the Pentagon doubled its global military budget (going from \$386 billion to \$736 billion). Moreover, the budget for R&D of defense technologies rose from \$47 to \$82 billion (Bellais, 2013).

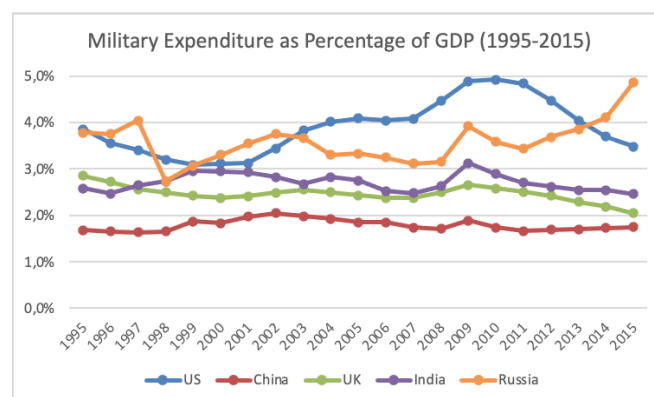


Fig 1. Military expenditure of some leading countries (% of GDP)
Source: SIPRI Military Expenditure Database 2021

Investments in technologically driven military systems were justified through Bush's preemptive doctrine against emerging conflicts. For instance, let's consider the years immediately before Iraq's invasion. National Security Strategy documents are conducted yearly by America's executive branch and define current security concerns and proposed next steps in how to deal with them. In September's 2002 issue, before the UN's second council resolution and the subsequent start of the war against Iraq, the US presented an already controversial discourse on preemptive war. Such discourse was founded on the protection of America's values, ideals, and culture, all determinant forces of a hegemonic state as seen under the Gramscian theoretical framework. Bush's administration called for a doctrine of active change, in their so-called attempt to follow these principles, and thus achieve consent (i.e. hegemony).

Consequently, Bush's administration allowed proponents of the RMA debate to reach key positions in the US military power. Faced with the unforeseen challenge of rapid technological change, US military leaders started to believe they had to become highly adaptable to the technological developments in military weaponry. Hence, they directed their focus on smaller and more lethal forces, through technical developments such as sensors, electronics, jet engines, and precision munitions acting at stand-off ranges. The 9/11 terrorist attacks further reinforced this strategy. Terrorist organizations have important implications to the design and development of states' intelligence capabilities. The threat imposed by such groups redistributed the challenges of military conflicts. As they are not linked to a state, or region, military forces face cryptic and elusive targets. Hence, it gave America the ideal pretext to shift its defense strategy to a preemptive, high-tech weaponry development capable of adapting to uncertain threats (Neuneck, 2008).

Bush's administration's main justification to advocate for this doctrine was followed by the presumed threat posed by technological advancements in dictatorial states (i.e. Iraq). The National Security Strategy, issued in 2002, portrayed such a threat in a very clear manner:

"We are menaced less by fleets and armies than by catastrophic technologies in the hands of the embittered few. We must defeat these threats to our Nation, allies, and friends." (The White House 2002, 1)

Iraq's failure to stop the production and development of weapons of mass destruction, claims which later proved to be misleading and deceptive, not only provoked the start of the war but most importantly triggered a counter reaction in America's technological developments. Indeed, it launched a preparation plan for any possible attacks. The 2002 report reveals preemptive measures to expand and invest in complex technological advancements in order to eliminate threats that could surpass or even equal the United States' military power. Innovation in the use of military forces, modern technologies, including the development of an effective missile defense system, and increased emphasis on intelligence collection and analysis became the focus of its defense strategy. In conclusion, the emergence of threats and conflicts do advance complex technological advancements through their capacity to shape political discourses and doctrines justified under the pretext of national security.

Second, the Iraq war has provided an account on how conflicts provide the perfect ground on which to test current technologies. It highlighted weaknesses or low performance in certain weapon systems reinforcing investments in military technologies. For instance, military weapons were reported to lack resistance and adaptability after 3 years of the Operation Iraqi Freedom. A fact which enticed new strategic investment plans to improve and renovate such systems from 2006 onwards (Korb et al., 2006). Various equipment that have required increased maintenance in the Iraq war are usually associated with more complex systems. The number of components and spare parts called for more knowledgeable maintenance technicians with the resources to get these components in a hostile environment. On the other hand, the development of improved and adaptable technologies also means there will be less need for maintenance. This paradox, made explicit in the Iraq war, demanded a resilient infrastructure of weapon and communications systems. Along these lines, the Center for American Progress called for a comprehensive plan to fund continuous enhancement and introduction of emerging technologies on existing systems as well as developing next-generation weapons (Korb et al., 2006).

Tactical communications systems can be used as an example to illustrate this. The modernization of US communication systems is fundamental to the effectiveness of military operations. Existing links were easily degraded or destroyed as they are not satellite based and thus, are vulnerable to surface obstacles.

Following performance trends throughout the Iraq war, America initiated new short and long term steps in rebuilding, replacing, and modifying technological weapon systems (Korb et al., 2006). In this case, the Center for American Progress advised to invest in replacing and improving such technologies among others. These recommendations reflect the relevance of these systems in the US display of “total force” and thus, hegemonic power. If the US wants to be able to effectively display its use of force, it needs to invest heavily in complex military weapon systems in order to increase their adaptability and resistance to different tactics used by its opponents (e.g., guerilla tactics used by Iraq’s counter insurgency agents) (Korb et al., 2006).

In conclusion, conflicts and the emergence of threats have partly accounted for a trend of continued innovation and development patterns in military technology, deemed necessary for the US to maintain a continued leadership in its military capabilities and justified under pretexts of national security. However, it is not the only factor behind such advancements.

Despite evidence that emerging threats and conflicts do account for increased levels of military technological advancements, the Iraq war does not fully explain the extraordinary levels of invested monetary resources and how it is sustained in the long term. There has been a continued emphasis on complex technological military advancements before and after the war. Indeed, the intensity in R&D spending has shown an increase since World War II. For instance, it represented 0.8% of the federal budget in 1940, but more than 10% by 1960, from which defense R&D received most of it. This trend continued throughout the decades (Bellais, 2013). Throughout the 90s and 2000s, America has preserved the leading position in its level of R&D spending (see Figure 3). Moreover, defense budget R&D as a percentage of total government allocations for R&D has shown constant levels since the 1990’s, with no increases at the start of the war (see Figure 2). What forces allow such patterns in military technological developments?

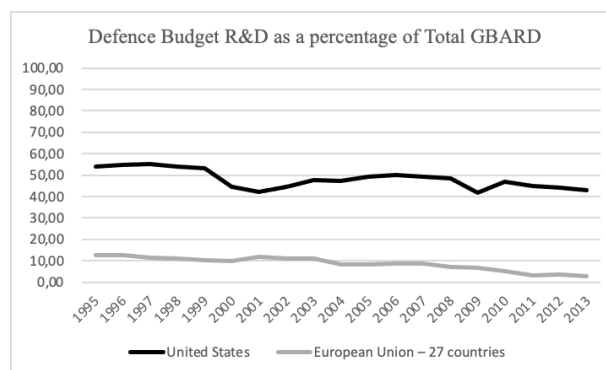


Fig 2. Defence Budget R&D as a percentage of Total Government Allocations of R&D spending.
Source: OECD (2021) “Main Science and Technology Indicators”

3.2. Hegemonic Power to Sustain and Advance an Edge in Military Advancements

Whereas we have shown that a standing edge in the complexity of military technology may support America’s hegemony, and that conflicts and emerging threats may be a driving force behind the subsistence of technologically-driven military weapons production, this remains a weak analysis of the relationship between hegemonic power and technological evolution. Until now, we have conceptualized technology as a static, exogenous force, driven by the material underpinnings of global society (i.e., survival, prosperity). The role of interstate competition (in this case, the Iraq war) is seen as a driving force behind technological advancements. This is mostly in accordance with a realist understanding of the relationship between technology and global hegemony. However, as we have seen in section 2, the

weakness of this conception relies on the instrumental understanding of technological advancements as a passive force in a country's hegemonic power. It disregards the reciprocal relationship between advancements in military technology and the structural realities behind it. A Gramscian conception of hegemony provides a far better understanding of this relationship. As the Gramscian framework suggests, hegemonic power does not consist solely of the economic and coercive capabilities of an actor. It is also related to the capabilities of the actor to achieve a consensual interaction between social forces. I will conceptualize military technological advancements as an endogenous factor dependent on the realities of the global system. Technological evolution has no explanatory power by itself. It is the forces driving this evolution which allow it to have any type of influence (Fritsch, 2011). Hence, an analysis of the interactive forces behind the US development of complex military technologies will be the focus of the following section.

Investing in RMA technologies is a very costly industry. For instance, The World Bank and Office of Disarmament Affairs (ODA) states that only 5% of the money spent in the defense industry would be necessary to achieve the Millennium Development Goals. As follows, complex technological advancements in the military are defined by the monetary resources allocated to this purpose. The levels of spending, funds, and budgets have important implications on patterns of innovation, arms production, and R&D. As we can see in Table 1 and Figure 3, countries with indicators of leading economic performance (e.g., the US) are associated with higher levels of military spending, innovation performance, and R&D intensity. In this sense, the economic capabilities of an actor, which are a reflection of its hegemonic power, do influence its leadership position in military technology. The United States has invested more money and resources than any other country. America's average military expenditure as a percentage of GDP between 1995 and 2010 is shown to be higher than almost any other powerful country (see Table 1). Likewise, they have the highest levels of total patent applications and R&D expenditure. However, other countries with high economic capabilities (e.g. France) have shown low levels of technological and innovative performance in comparison. Moreover, Russia also shows high levels of military spending with low levels of economic performance. Hence, the economic capabilities of a country alone can't fully account for advancements in complex military technology. It is the capacities of an actor to tie monetary resources to its existing infrastructure which is determinant to patterns of technological evolution.

<i>Countries</i>	<i>Average Military Expenditure (% of GDP) [1995-2010]*</i>	<i>Total Patent Applications (%) [1995-2011]♦</i>	<i>Average GDP per capita, PPP (constant 2010 US \$) [1995-2011]Φ</i>
USA	3,8	60,4	45394,01428
Russia	3,5	5,7	8088,197385
India	2,8	3,4	981,3241524
France	2,1	2,9	38589,23918
China	1,8	26,6	2617,494298

Table 1. Technological, Innovative, and Economic Performance of some leading countries

Source: * SIPRI Military Expenditure Database 2021, ♦ WIPO IP Statistics Data Centre, Φ The World Bank

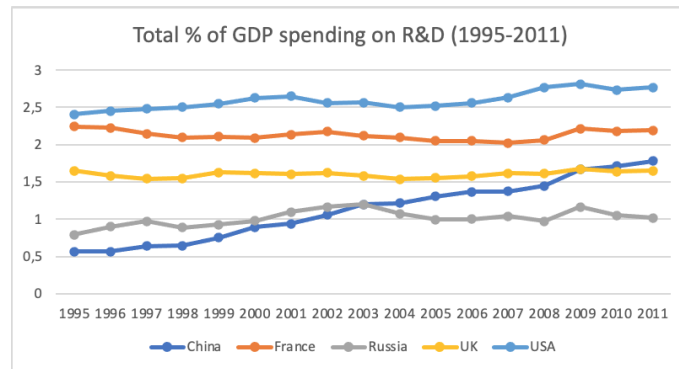


Fig 3. Percentage of GDP Spending on R&D of Some Leading Countries
Source: OECD (2021) “Gross Domestic Spending on R&D (indicator)”

Before dwelling further into the matter, let us outline the actors responsible for the advancements in technological developments in the US in the period around the Iraq war. The design of the arrangements in the US is characterized by a public-private relationship between the US government and the defense industry (i.e., arms industry) that supplies them with the required military resources. Although the defense industry provides a range of corporations supplying military services (e.g., armed personnel, logistic support etc.), the focus of this analysis will be on the arrangements regarding military technological developments and innovations as it is the relevant matter of this thesis (Hartung, 2014). Whereas defense contractors constitute the supply side of the arrangement, the US’ military institutions comprise its demand side (they obtain the military weapons). The US Department of Defense (DoD) is the main military institution referred to in this analysis. The DoD offers large military contracts to private firms which in turn develop or produce the advancements in military technology. The US government (referred to as Congress in this context), shapes the funding and budgetary decisions of the DoD (Alic, 2007). Thus, I will analyze the relationship between Congress, the Department of Defense, and defense contractors, which are the ones responsible for the supply, production, development and research of the US’ military requirements.

3.2.1. A Consensual Interaction between Social Forces as an Explanatory Variable

The period before and during the Iraq war reveals an interdependent structural reality behind the industrial model of arms production which determines trends in the technological evolution of military weapons. It highlighted a reciprocal relationship between Congress, the Department of Defense, and the defense industry, in which all parties have a vested interest. A relationship which is not only defined by the emergence of threats or conflicts but rather by the norms, values, and social factors behind its very existence. The design of this public-private arrangement exemplifies a consensual interaction between social forces advanced by the cultural, political, and economic realities of the period. This consensual interaction advances technological developments in the military. Hence, we see how America’s existing hegemonic power (defined as the consensual interaction between the US government, its defense industry, and its society) sustains its complex advancements in military technology. Conflicts are only seen as a catalyst of the relationship, stimulating its continuation.

In order to support a comprehensive evaluation of this relationship, I will provide as case studies when needed the two largest defense firms of the period: Lockheed Martin Corporation and Boeing. Since 2002, Boeing and Lockheed Martin, both US-based companies, have been the largest arms producers in the world (Fleurant et al., 2019). Thus, they will provide us with the most accurate representation of the influence the defense industry may have on the other actors.

The US defense industry is an extremely profitable business. The economic potential of the US defense industry is exemplified through general trends in market performance and spatial concentration of the largest global arms companies. Market performance is reviewed by assessing contract performance, firm productivity and profitability and exports. Whilst defense contractors operate in a highly competitive global market, since 2002, most companies' ownership and control structures have been located in the USA. In 2002, 45 companies were based in the USA with that number increasing to 70 in 2019. Moreover, those 70 companies accounted for 83 per cent of total Top 100 arms sales. At the time of the war, the top 5 in the Top 100 consisted solely of companies based in the USA. These five companies had combined sales of \$148 billion or 35 percent of total Top 100 arms sales (Fleurant et al., 2019).

The war has reinforced this trend because it created an increasingly profitable market for weapons acquisition and production. After 2002 and during the US presence in Iraq, arms production and sales have been increasing at a constant rate. Up to its 2011 withdrawal, the top 100 arms companies' sales increased by 60% (Collin and Willi, 2012). Rising military budgets justified under the so-called "Global War on Terror" were mostly acquired by defense contractors. For instance, over 400\$ billions of the 700\$ billion budget directed to the Iraq and Afghanistan war were disbursed to private defense companies. Most of the budget got distributed to a handful of large contractors, Boeing and Lockheed among few others, earning them billions of dollars of additional business (Hartung, 2014). For Lockheed, total sales in 2001 were \$24 billion and in the following months until 2002, sales had risen 13% to \$18.8 billion (Stanford, 2002).

Although this can be partly attributed to rising military expenditure for the Iraq and Afghanistan wars (see Figure 1), a trend of increased arms sales since the 1980's shows it does not directly relate to it. The US market share of worldwide arms sales increased up to 60% over the 1980's and 1960's and has followed this trend throughout the 2000's even after the end of the war (Stanford, 2002). For instance, arms sales for Lockheed accounted for 24 910\$ million in 2003, 33 430\$ in 2009, and 40 630\$ in 2016, showing a continued and sustained increment (SIPRI, 2019). The profitability of the industry has important implications on the relationship between the US government and the defense industry.

First, it is important to note that the profitability of the defense industry is highly dependent on the US government, regardless of the existence of a conflict. The defense ministry holds a monopoly over the US defense industry as it is the main customer of the end products. In 2002, the US Department of Defense accounted for 57% of Lockheed's sales revenue. Only 17% came from international sales. For Boeing, approximately half of its sales are foreign and half domestic. However, an important line of business for Boeing are commercial planes. If we focus on its military sales, the major percentage of its revenue came from the US. The percentage of foreign military sales out of the total sales for both companies was under 5% (Stanford, 2002).

This dependence on the DoD insulates primer contractors from almost all market risks commercial firms face. Its lack of dependence from foreign sales means other countries can't actively decrease its dominance in the market. A global freeze on US arms in 2002, including if all America's allies stopped buying US arms, would have entailed a loss of around 13\$ billion for the industry, which is not comparable to the 93\$ billion generated by domestic business. Or one of less than 5% for individual companies such as Lockheed or Boeing (Stanford, 2002). Additionally, prime contractors do not have to confront recessions, price wars, import competition, and consumer preferences (Alic, 2007).

Pentagon policies and practices do on the other hand, allow them to tailor its defense contracts to their technological requirements, including those for effective or potential conflicts. Because the bulk of the arms procurers' revenues depend on defense contracts and funding from the DoD, it enables the DoD to be heavily involved in the whole R&D process. Technological innovations are designed in conjunction with the military. For instance, when needs for new weapon systems surge, the DoD lets a few prime contractors develop prototypes and oversees the process to later choose the best design. The F-35 Joint Strike Fighter was a development and acquisition program intended to replace a wide range of existing fighter, strike, and ground attack aircraft technological systems. The US awarded initial contracts to two companies, Boeing and Lockheed, to develop prototypes of this technology. With two firms designing the project, a level of competition was acquired, which increased the likelihood of a better design. Lockheed ended up winning the final contract in 2001 (Alic, 2007).

The mergers of the 1990's in the defense industry, further enabled the capacity of prime defense contractors to fit the requirements of the Department of Defense. An extensive process of defense industrial consolidation concentrated control of the industry over the hands of a handful of large contractors. As such, firms have become incredibly capable of developing complex technological advancements. The largest US defense firms in the market are now broad based enough to have the capabilities of almost all technological skills and resources necessary to design or develop any high-tech complex military technology. If they lack skills or resources, they usually know whom to partner with to easily obtain them (Bitzinger, 2009).

The Iraq war further illustrates the ability of the US government to influence patterns of technological developments. For instance, during the war, the DoD chose to cap the production of the F-22 Raptor fighter jet production program at 187 planes because other requirements were more urgent for the war, whilst Lockheed wanted twice as many. Lockheed conducted an extensive lobbying campaign to try and fight this initiative, getting 244 members of Congress and other institutions to pressure the president into dropping the policy under the pretext it would harm jobs (Wilhelm, 2012). Their failure to do so shows how the US government has the final say on the design of certain technologies, depending on their needs.

Whereas Lockheed was not successful in fighting the initiative, it did showcase the political power of defense companies over Congress. Their ability to use lobbying as a way of influencing Congress exhibits the dependency of Congress on the industry. The profitability of the business means it's a source of important contribution to the US economy. For instance, Lockheed had 125,000 people employed in the United States in 2002 and Boeing 171,000 people (Stanford, 2002). This means that Congress has an interest for the business not to fail. The US government does not want to let \$100 billion companies employing hundreds of thousands of people go under. The hit to the economy could harm the political support of citizens towards the current government. This dependency is further strengthened by the monetary electoral support provided by the defense industry to Congress. Both Republicans and Democrats receive extensive funding from prime contractors. Hence, incentivizing policies which will favor large budgets for the DoD (Hartung, 2014).

Political interests to sustain the profitability of the defense industry, and the industry's ability to provide the DoD with all its requirements, explained why the US government has rescued various times failing contractors even when it did not contribute to requirements of national security. Major investments in military technology made during the time of the Iraq war were not always related to sustaining military power in that specific conflict. For instance, this was shown through the initiative of Congress of inserting into the DoD budget a lease of 100 aerial refueling tankers from Boeing. This was clearly done

to help Boeing recover from the decline in air travel after 9/11 and the loss of the F-35 Joint Strike Fighter to Lockheed Martin. The lease cost 26\$ billion, which was billions of dollars more expensive than buying new aircraft. The political environment fostered by the Global War of Terror enabled Congress to justify this action, thus acting as a reinforcing factor of the interdependence of the relationship (Hartung, 2014). This showcases once more that the interdependent nature of the arrangement is at the heart of military technological advancements.

3.2.2. Interstate competition as a dependent explanatory variable

We have seen that an interdependent relationship exists aside from the existence of threats or conflicts. Threats and conflicts thus become a dependent explanatory variable of complex technological advancements. Its dependency rests on the stability of the consensual relationship between the US Congress, the Department of Defense, and the Defense Industry. It acts as a catalyst of the three forces vested in this relationship: the political interests of the US Congress, the technological requirements from the DoD, and the economic potential of the defense industry. The Iraq war has shown us that conflicts can encourage political interests to sustain or advance its coercive capabilities, at least in theory. Thus, shaping the requirements of the DoD towards specific needs targeted at meeting these interests. Needs which foster a new market for weapon acquisition and innovation, leading to an increase in the profitability of the defense industry.

4. What does the Iraq war tell us about the relationship between US' hegemonic power and complex technological advancements?

Following a comprehensive analysis of hegemonic power and complex technological advancements in the military during the period of the Iraq war, I have constructed the following model (see Figure 3).

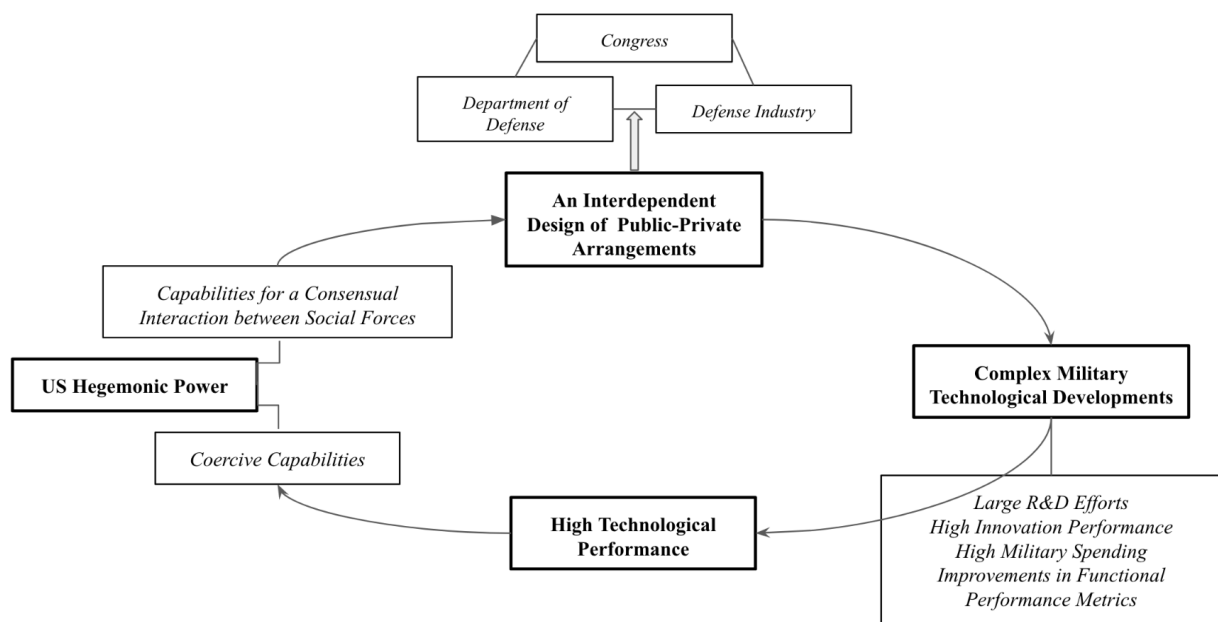


Fig 4. A Cyclical Model of Global Hegemony and Complex Technological Developments.

A study of the Iraq war has manifested a cyclical relationship between complex military technological developments and US hegemonic power.

First, it served as a basis on which to test the effects of technology on coercive power. I found that high tech military weapons have sustained the US' coercive capabilities by means of their high technological performance. Precision guided weapons and network centric warfare used in the war have been used as examples of how improvements in functional performance metrics have helped sustain an effective and adaptable use of force.

Yet, technology by itself is not a sufficient explanatory variable behind the high performance of military advancements. The Iraq war did account for emerging patterns in technological advancements, however limiting our analysis to interstate competition as a fully independent explanatory variable constrains us to a realist conceptualization of hegemonic power. Under a Gramscian account of hegemonic power, coercion is one but not the sole condition of a hegemon's power. Gramsci's analysis of hegemony involves an analysis of the ways in which the perpetuation of class rule is achieved through consensual means. Thus, hegemonic power conveys the attainment of consent from various social forces in a continuous manner.

Following an analysis of the social forces behind the advancement of complex military technology, we find a second aspect of the relationship between hegemonic power and military technology. The US' already existing hegemonic power, exemplified through the design of its interests in relation to its modes of production, can be used as the main explanatory factor behind developments in military technology. Public-private arrangements between the US Department of Defense, Congress, and defense contractors are characterized by an interdependent relationship, all parties having a vested interest in the relationship. This interdependence is a representation of US hegemonic power. It illustrates the US' capabilities to achieve a consensual interaction between social forces, namely the political and economic interests of the three institutions. An interdependence of economic, societal, ideological, and political factors between all actors achieves such a consensual interaction.

I have constructed a second model to provide a more detailed explanation of this aspect of the relationship (see Figure 5).

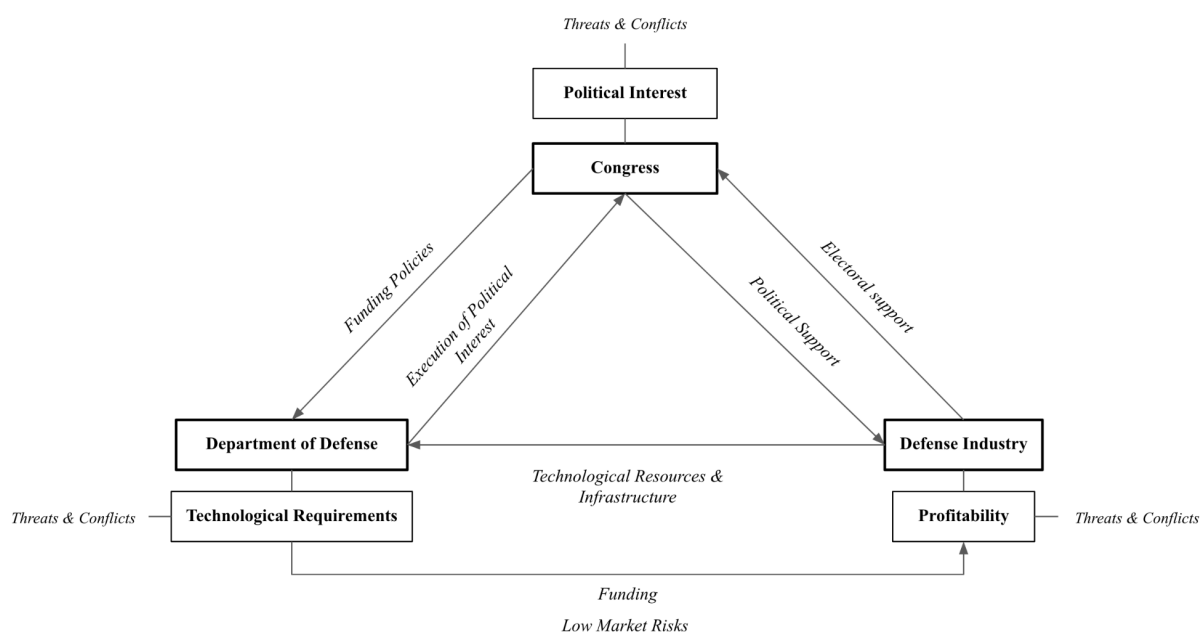


Fig 5. A Conception of Hegemonic Power: A Consensual Interaction between Social Forces.

The defense industry's main social power is its economic potential. Its profitability, further intensified by the industrial consolidation of the 1990s', means only a handful of companies receive most of the profits and thus have developed the necessary capabilities to sustain the requirements from the DoD. Profitability also allows defense contractors to exert major political influence on the Congress through funds directed at electoral support or lobbying. It is also the economic potential of the defense industry in society which redefines the political interests of Congress. Congress needs to protect the industry to avoid a negative impact on the US economy (i.e., loss of jobs), and thus a negative impact in its political interests (i.e., lack of citizen's electoral support). Congress offers political support by shaping its public policies on defense allocated budgets to the DoD. The levels of funding determined by Congress are a fundamental factor of the profitability of the defense industry. This is because the DoD, as the main customer, holds an extensive monopoly over the industry which makes them the most important monetary contributor for defense contractors. Such monopoly protects the economic potential of the industry by insulating it from daily market risk (e.g., customer tastes).

The Iraq war has illustrated the role of conflicts and threats in this relationship, and its implications on technological military advancements. They are mainly a catalyst for the interdependent arrangement. Conflicts reinforce the profitability of the industry by creating an extensive market for weapons acquisition, production, and development. They also redefine the political interests of Congress in favor of doctrines supporting complex technological military advancements. Finally, they outline new technological requirements for the DoD which are consistent with the development of more high-tech weapons systems.

Hence, this model helps us understand how the advancements in military technology came to prominence. It is the existing hegemonic power of the US which is responsible for this matter. Securing a consensual relationship between these actors and its social forces required an understanding of their own interests in relation to the mode of production, as well as the motivations and interests of the other groups. An interdependent design implies the existence of a certain stability in the institutional basis of technological advancement which helps sustain long term patterns.

5. Conclusion

This thesis does not provide a new theoretical framework from which to study technology and hegemonic power. It simply exemplifies an already existing relationship between both, which has important implications for global affairs.

The Iraq war has elucidated the need for technology to be integrated in a more systematic manner in the theoretical discussion of global hegemonic power. It should be understood as a highly political component of the global system, which shapes global affairs through its support of coercive power, and is itself shaped by economic, political, and cultural forces.

An understanding of these forces may explain the subsistence of a country's hegemonic power in international affairs, namely the United States. Thus, advancing a better understanding for other states on how to regulate its apparently unchallenged power. From our findings, we can infer, that as long as the US defense contracting business remains part of an interdependent relationship towards the US government, it will maintain a stable power in international relations. The role of foreign firms will remain limited, and other states will continue to find it a challenge to close the gap in their levels of technological advancements.

The Iraq war has also showcased the dynamic process of the relationship. A number of factors (e.g., conflicts, political interest, cultural changes, the emergence of new threat), can threaten or reinforce the cyclical model presented in this paper. Hence, the dynamic nature of the military world, requires a constant reexamination and reevaluation.

Whereas at the beginning of the 21st century there seemed to be no forces strong enough to challenge the US cyclical model of hegemony and technological advancements, there is no guarantee they will not emerge. For instance, there are already signs of a counter reaction from rivals or threatened states to challenge its military force. This has been shown through an active proliferation of Weapons of Mass Destruction, a shift to low-tech warfare strategies, and new asymmetric tactics (e.g., guerilla groups) in developing countries. Globalization and the spread of knowledge also means military strategies of other countries have shifted accordingly, imitating or adapting to US technology. The ability of the USA to use its military superiority to achieve decisive victory in future conflicts is therefore likely to depend on a range of other factors, including the relative strength or weakness of any future opponent and its armed forces, geography, the ability of the opponent to threaten retaliation (including with WMD) and the willingness or otherwise of the USA to accept casualties (Bromley et al., 2010).

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