ONLINE APPENDIX FOR "WHAT IS A MILITARY INNOVATION AND WHY IT MATTERS"
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Table 1. Common Themes Across Existing Definitions of Military Innovation

	Change	Organization	Technology	Political Purpose	Bottom-up Adaptation Horizontal	Process	Success
Adamsky (2010)		✓	✓			✓	
Adamsky & Bjerga (2012)**		✓			✓		
Angevine (2005)		✓	✓			✓	
Armacost (1969)**		✓	✓	✓		✓	
Avant (1994)		✓					
Bacevich (1986)		✓	✓				
Beard (1976)**		✓		✓		✓	
Bergerson (1980)						✓	
Bradin (1994)						✓	✓
Brooks & Stanley (2007)			✓				✓
Brun & Valensi (2012)	✓						
Catignani (2012)	✓	✓	✓				
Cheung (2011)	✓	✓	✓				
Cohen (1996)*			✓	✓			
Cote (1998)	✓	✓					
Davis (1967)		✓	✓			✓	
Downie (1998)		✓					
Engel (1994)		✓	✓				
Evangelista (1988)	✓	✓	✓			✓	
Farrell (1998)	✓	✓					
Farrell (2002)		✓				✓	
Farrell (2010)	✓	✓	✓			✓	
Farrell & Terriff (2002)		✓					
Finkel (2010)		✓	✓				
Foley (2012)		✓					
Gaudlip (2001)**	✓	✓	✓				✓
Giese (1999)	✓	✓		✓			
Goldman (2002)		✓					
Goldman & Eliason (2003)		✓	✓			✓	
Grauer (2015)		✓	✓				
Griffin (2011)		✓	✓				
Gundmundsson (1995)		✓			✓		
Hayes & Smith (1995)		✓	✓				
Horowitz (2010)	✓					✓	
Jungdahl & MacDonald (2015)	✓						✓
Kier (1997)		✓					
Kollars (2015)		✓			✓		
Lebovic (1996)		✓	✓			✓	
Lindsay (Forthcoming)*		✓#	✓#		✓	#	
Lock-Pullan (2005)	✓	✓					
Lupfer (1981)	✓	✓					
Mahnken (2002, 2011)**		✓	✓			✓	
Marcus (2015)	✓	✓	✓				✓

McIntyre (1999)*	✓	✓	✓				✓
McNaugher (1986)			✓				
Milner (1984)					✓		
Moy (2001)		✓	✓				
Mullins (2000)**		✓					
Murray (2011)		✓					
Nagl (2002)		✓				✓	
Pollpeter (2011)	✓		✓				
Posen (1984)**		✓					✓
Rosen (1994)	✓	✓	✓				✓
Russell (2011)	✓	✓			✓		
Serena (2011)	✓		✓	✓			
Sullivan (1998)*		✓		✓			
van Creveld (1989)	✓	✓	✓				
Zisk (1993)**	✓	✓					

* Definitions focus on RMAs
** Definitions make explicit reference to military doctrine, strategy, and/or tactics

CASE STUDIES

Levée en mass

Levée en mass is standardized and nationalized compulsory military service. While popularly described as "invented" by a 1793 French law, there was a gap between the ideological claims of the 1793 *levée en mass* and reality. Making conscription work would require the reorientation of French industry, a strategy for dealing with desertion, and the establishment of new promotion patterns. The provision for a system of annual recruitment did not really come until the Jourdan law of 1798, when implementation of *levée en mass* occurred with a true institutional framework for the yearly replenishment of the ranks of the French Army. While this framework was not without its challenges, its bureaucratization under Napoleon Bonaparte provided the steady flow of manpower needed for his grand empire.[1] No single stage in this innovation process alone sufficiently captures the extent of change required for the ultimate integration and diffusion of compulsory service. Moreover, while the *levée* framework would serve as a model that would then diffuse across Europe, and the wider world, it would not always produce successful results.

Invention: envisioning mass mobilization

[1] Harold D. Blanton, "Conscription in France during the era of Napoleon," in Donald J. Stoker, Harold D Blanton, and Frederick C Schneid. *Conscription In the Napoleonic Era: A Revolution In Military Affairs?* (London: Routledge, 2009), 6; Geoffrey L. Herrera and Thomas G. Mahnken "Military Diffusion in Nineteenth-Century Europe: The Napoleonic and Prussian Military Systems" in Goldman, Emily O., and Leslie C. Eliason. *The diffusion of military technology and ideas* (Stanford University Press, 2003), 208

After French military defeats during the Seven Years War in the mid-18th century, French military theorists begin to critically evaluate Bourbon France's military establishment. The combination of improvements in firepower technology, battlefield leadership, and the challenges of recruitment and training in wartime had impaired large-scale and small-scale maneuver. Infantry casualties could no longer be replaced at the pace they were incurred.[2] For some, the advocated changes were radical: in 1772, Jacques Antione Hippolyte Comte de Guibert argued for a mass army based on patriotism, numbers, and new tactics. This citizen army would be motivated by patriotic enthusiasm, invigorating a people who had grown indifferent to the "game of kings."[3] However, Guibert eventually began to doubt the ability of such an army to defeat the professional veterans of the European armies.

While the primary concern of revolutionary leaders during the initial stages of the French Revolution was purging the Royal Army of royalist and aristocratic influence, voices were soon raised for a new kind of army that reflected the ideals they espoused. In December 1789, Edmond Dubois-Crancé called for every citizen to be a soldier and every soldier a citizen. Dubois-Crancé pointed out that with the French population of 28 million dwarfing those of other western European states, France could, at least in theory, overwhelm its enemies.[4] Joseph Servan, who served as Minister of War, advocated for an army with decent pay and humane conditions that would be better integrated with citizen-based society.[5] By 1793, in an early attempt to "nationalize" the army, new volunteer units were amalgamated with professional line units. Given that military service was still viewed by the general public as an unsavory occupation, neither Servan nor Dubois-Crancé seriously entertained the idea of conscription. Duty in the *milice* was a common complaint of the peasantry and the militia obligation was suspended by the Constituent Assembly in 1789.[6]

When the neighboring European powers, looking to restore monarchical rule, invaded France, the move to universal conscription became possible. Local assemblies popularized the idea of the people in arms, calling for all citizens to defend the state. Spokesmen from across the

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[2] Posen "Nationalism, the Mass Army, and Military Power", 90; Blanton "Conscription in France during the era of Napoleon," 6-7.

[3] Blanton "Conscription in France during the era of Napoleon," 7

[4] David Bell, *The first total war: Napoleon's Europe and the birth of warfare as we know it.* (New York: Houghton Mifflin Harcourt, 2014), 148

[5] Blanton "Conscription in France during the era of Napoleon," 7-8

[6] Ibid, 8

country demanded that the Convention formally order a general uprising.[7] On 23 August 1793, the revolutionary government introduced a new piece of legislation – the *levée en masse* – requisitioning the entire nation into the war effort. A petition from the radical Jacobin Clubs introduced the *levée* with fanfare: "From this moment until our enemies will have been driven from the territory of the Republic, all Frenchmen are permanently requisitioned for service in the armies."[8] Under this vision, every asset of the state would be guided by the state's need, demonstrating the power and salience of the will of the people behind a military objective. This was something no state had accomplished up to this point - what Clausewitz referred to as the "juggernaut of war."[9]

Incubation: vision vs. reality

The vision of *levée en masse* was quite different from the reality. In practice, the process of raising French armies had many problems and, especially during the incubation period, was not as effective as its supporters had promised. Thanks to mass desertions, a bloody civil war in the Vendée, and the challenges of sustaining large numbers of soldiers, by the end of 1794 army numbers had declined to fewer than 490,000, eroding to fewer than 400,000 by the signing of the Treaty of Campo-Formio in October 1797.[10] Indeed, the Convention faced huge obstacles in training, equipping, and deploying the conscripted masses. In September 1793, the principal French armory was producing muskets at a rate of only 9,000 per year. Similarly, it became clear that the levels of education and physical fitness among the new recruits paled in comparison to the volunteers of 1791.[11] The French forces were losing as many battles as they had won.

However, the incubation period was marked by surprisingly speedy adaptations to address these problems. By October 1794, a single Parisian factory was producing 30,000 pounds of gunpowder per day with five thousand munitions workers making guns at a rate of 145,000 per year.[12] And as early as January 1793, Philippe-Henri Grimoard was considering ways in which a democratic France could abandon "aristocratic" notions of tactical maneuvering and pointedly direct overwhelming strength. Unlike the long, tightly-controlled lines typical of

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[7] Bell, *The first total war*, 148

[8] Blanton "Conscription in France during the era of Napoleon," 9; Bell, *The first total war*, 148

[9] Carl von Clausewitz, *On War*. Edited and translated by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984): Book 8, Chapter 3, 592

[10] Blanton "Conscription in France during the era of Napoleon," 9

[11] Bell, *The first total war*, 149

[12] Ibid, 149

European army tactics, skirmishers, or dispersed infantry, would fight as individuals, proving useful for reconnaissance, flank security, and close-terrain combat. This flexible system of tactics can be traced to the French army's 1791 drill manual, which envisioned forming battalions into columns (for maneuver and assault) and lines (for firepower), as wells as dispersed groups of skirmishers to distract the enemy's artillery and infantry units in preparation for an assault.[13] While Grimoard's idea was initially met with little favor by the generals, it was eventually taken up by Lazare Carnot and applied at the battle of Wattignes, on October 15-16, 1793 with immediate success.[14]

Within months, the Committee on Public Safety and Carnot issued decrees urging all French forces to utilize the tactics of offensive *en masse*. Subsequently, the use of skirmishers increased and staff officers started to divide the armies into mobile masses of men, divisions of 5,000 or more soldiers.[15] While there were significant costs to the approach of wild infantry charges – namely huge French casualties – they were easily replaced thanks to the requisition, and generals adjusted to the change.

There was another element of the Convention's formula that the idealists had not envisioned: a close, central control of the war effort. The playwright Olympe de Gouges imagined the victorious French armies at Jemappes without a system of rank or order: "everyone is a soldier, and they all fight as heroes."[16] This radical dream of patriotic intentions automatically generating victory was absent from the battlefield reality where soldiers needed battle plans and generals, and generals needed support, coordination, and direction. In other words, *levée en mass* required organization. The Committee of Public Safety and members of the Convention were sent into the field to exert political control – handing down death sentences to soldiers and officers for the crime of failure, imposing loans on cities, and even demanding that citizens bring their own shoes to battle.[17]

These efforts also required the reconstruction of the army. Political purges in 1793 decimated the officer corps, replacing nobles with inexperienced and incompetent

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[13] Posen "Nationalism, the Mass Army, and Military Power", 91-92; Herrera and Mahnken "Military Diffusion in Nineteenth-Century Europe", 206; Peter Paret, "Napoleon and the Revolution in Warfare," in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton: Princeton University Press, 1986), 262

[14] Bell, *The first total war*, 149

[15] Ibid, 150

[16] Ibid, 150

[17] Ibid, 151

noncommissioned officers and soldiers of the old royal army, and civilians elected in new volunteer battalions. Moreover, after seeing the price that failure in a higher rank could entail, the most competent of these officers shunned promotion. The Convention tried to address these problems by amalgamating the old-line army and the new volunteer battalions into a single force, and placing experienced former soldiers from the line army in leadership positions – opting for competence over ideological purity. During the early 1790s, thousands of men from modest backgrounds achieved promotions at astonishingly young ages: the average age of new generals was thirty-three.[18] Among them was Napoleon Bonaparte.

Implementation: The Jourdan Law and Napoleonic synthesis

The implementation and bureaucratization of *levée en masse* required the introduction of almost continuous levies throughout the Napoleonic period as well as the leadership and operational brilliance of Napoleon himself. Following the so-called Jourdan Law of 1798, the conscription process became even more centralized. While much of the authority in the selection process of conscripts had previously remained at the local level, the Jourdan Law ensured that the government had the authority to call all Frenchmen to serve during times of extreme danger to the nation – even if they had been previously dismissed from duty.[19] The conclusion of the war of the First Coalition effectively ended military service for the soldiers who joined the ranks via revolutionary levies. Thus, this law was critical in the transition of the army from a revolutionary institution to a national-processional army under Napoleon by 1805.[20]

By 1800 Bonaparte had won French victories abroad and struck a decisive blow in the coup of Brumaire in November 1799. An uneasy peace with Austria, Prussia, Russia, and Britain between 1802 and 1803 was followed by another twelve years of lightning and longer-range conflicts – and with them increased demand for soldiers to fight.[21] Between 1804 and 1811, more standardized procedures were set in place, including the supervision of and by prefects in preparing the rolls of each military-age class. However, in practice, mayors remained the only members in the bureaucratic chain of conscription aware of the details and circumstances of the

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[18] Bell, *The first total war*, 152

[19] Blanton "Conscription in France during the era of Napoleon,"10

[20] Frederick C. Schneid, "Napoleonic conscription and the militarization of Europe?" in Donald J. Stoker, Harold D Blanton, and Frederick C Schneid. *Conscription In the Napoleonic Era: A Revolution In Military Affairs?* (London: Routledge, 2009), 191-192

[21] These conquests were against Austria in 1805 and 1809, Prussia in 1806, and (disastrously) Russia in 1812. He was checked only in Spain in 1809-14; John Keegan, *A History of Warfare* (Random House, 2011), 353

prospective draftees – especially in rural villages where only the mayor had direct access to birth registers and marriage certificates. Thus, prefects relied heavily on the diligence of the mayors to draw up local lists for each year's class of conscripts, notify them, and supervise their appearance.[22]

While Napoleon exerted enormous pressure on the prefectures to raise the new levies in a timely and satisfactory manner, his demands for increased contingents – one conscript for every 138 inhabitants – were never met, and disparities between regions and departments continued. By 1813, complaints by government officials over their inability to sustain quota levels filled the Interior Ministry – especially in regions with forests and mountains for hiding draft dodgers, such as the Loire, the Yonne, and the Massif Centrale. Resentment against the Jourdan Law carried over into anti-Napoleon royalist sentiment. In the southern border regions draft evaders escaped into Spain, and as late as 1809, 40 percent of conscripts in the southern frontier departments were able to avoid military service.[23] Other conscripts paid physicians to falsify records or mutilate the new recruits to ensure they were deemed unfit to serve, or purchased replacements to serve on their behalf.[24] Out of a total of 2,340,000 eligible for military service, an estimated 813,000 men escaped the levies.[25] In response, the Napoleonic regime punished families or villages that had many draft evaders, and employed *colonnes mobiles*, or mobile columns, combinations of gendarmeries, regular troops, and the employees of other state agencies, to hunt down *refractaires* and deserters – successfully apprehending over 100,000.[26]

Despite recruiting challenges, Napoleon was still able to utilize large numbers of conscripts in a new system of self-contained, mission-oriented units.[27] These units, or *corps*, would send regular reports to (and receive orders from) the General Headquarters, enabling various parts of the army to operate independently for limited periods of time.[28] Unlike his enemies, who kept their forces concentrated, Napoleon reorganized and decentralized his army, instituting the system of *corps d'armée*. By 1805 the *Grande Armée* included 396 guns and

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[22] Blanton "Conscription in France during the era of Napoleon," 11
[23] Ibid, 12-13
[24] Ibid, 14-15
[25] Ibid, 16
[26] Ibid, 18
[27] Herrera and Mahnken "Military Diffusion in Nineteenth-Century Europe", 208
[28] Andrew N. Liaropoulos. "Revolutions in Warfare: Theoretical Paradigms and Historical Evidence: The Napoleonic and First World War Revolutions in Military Affairs." *The Journal of Military History* 70, no. 2 (2006): 372; Martin van Creveld, *Command in War* (Cambridge, Mass.: Harvard University Press, 1985), 96-97, 100-102

210,000 men and was organized into seven army corps, a cavalry rescue, an allied corps, and the Imperial Guard – each with their own staff.[29] This system enabled Napoleon to conduct operational maneuver with a large force. In addition to ensuring the flexible execution of combined army tactics, the corps system made large forces easier to command and control.[30] These military reforms coexisted synergistically with the social and political changes of the Revolution: material and human masses mobilized by nationalism allowed the *Grande Armée* to wage wars of mass armies.

The struggle against Napoleonic France forced conservative powers to match Napoleon's numbers in the field, seeking new methods of raising armies and replacing losses. While opposition to conscription was substantial, compromises were made in Prussia and Austria, and French-style conscription policies were grafted onto German and Italian states.[31] The result, however, was the creation of highly politicized armies – the anti-French Prussians, Austrians, and later Germans, and nationalist Italians and Spanish. In the aftermath of the Napoleonic Wars and throughout the nineteenth century, European armies (including the French) reverted to smaller, recruitment-based, professional armies. Military leaders became increasingly concerned about the implications of universal conscription on their armies and the prohibitive cost factors of maintaining such a large force, as well as opposition from professional officers and conservatives.[32] While no army was able to replicate the Napoleonic military system, the application of nationwide military mobilization would survive well beyond the Napoleonic wars.[33] Indeed, the promise of conscription has since both extended and waned across time and space – with varying results in terms of battlefield success.[34]

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[29] Herrera and Mahnken "Military Diffusion in Nineteenth-Century Europe", 209

[30] Ibid, 208.

[31] Schneid, "Napoleonic conscription and the militarization of Europe?", 189

[32] Donald J. Stoker, Harold D Blanton, and Frederick C Schneid. *Conscription In the Napoleonic Era: A Revolution In Military Affairs?* (London: Routledge, 2009), 4.

[33] Herrera and Mahnken "Military Diffusion in Nineteenth-Century Europe", 206

[34] See Edward A. Shils and Morris Janowitz, "Cohesion and Disintegration in the Wehrmacht in World War II, *Public Opinion Quarterly* 12, no. 2 (1948): 284; Allan R. Millet, Williamson Murray, and Kenneth H. Watman, "The Effectiveness of Military Organizations," *International Security* 11 (1986): 42; David B. Ralston, *Importing the European army: The introduction of European military techniques and institutions in the extra-European world, 1600-1914*. (University of Chicago Press, 1996); Dara Kay Cohen, "Explaining Rape during Civil War: Cross-National Evidence (1980-2009)." *The American Political Science Review* 107, no. 3 (2013): 461-477; Jason Lyall *Divided Armies: Inequality and Battlefield Performance in Modern War*. (Princeton: Princeton University Press, 2020).

Counterinsurgency

The process by which population-centric counterinsurgency (COIN) doctrine was invented, incubated, and adopted in the 21st century US military differs from many of the innovations described above. First, this process involved a long history of conceptual amnesia – with lessons learned, forgotten, and relearned again during U.S. wars.[35] Population-centric counterinsurgency campaigns demand attuned responses on all levels of operations, often involving a non-permissive operational environment, an underlying state-building process, and military operations conducted by foreign troops in the midst of a civilian population.[36] Second, this process required experimentation with these approaches in the field, serving as a useful example of bottom-up innovation at the incubation stage. However, for COIN to be *adopted* as a military innovation it needed a top-down doctrinal change, including a field manual.

Invention: Galula and the classicists

Irregular warfare has a long history. The tactics of applying weakness against strength, avoiding the enemy's main fighting forces, striking at logistical support and outposts from unexpected directions, and utilizing terrain to conceal forces, have been used since ancient times. It follows that the strategies associated with countering such tactics are likewise old. In the U.S. case, early expansion led to a number of bloody engagements, including the Northwest Indian War, the Creek and Seminole Wars, and in clashes with the Sioux, the Comanche, and others in the 1800s.[37] The stated roles and missions of the U.S. military at this time, however, did not reflect such irregular engagements. Rather than committing the acquired wisdom from counter-guerrilla operations on the American frontier to memory, the U.S. military was primarily concerned with embracing a professional system for fighting conventional battles. As a result, the U.S. military was ill prepared for the subsequent era of "small wars" from 1900 to 1940, which included a counterinsurgency campaign in the Philippines and stability operation in Haiti.[38] Despite the Marine Corps' attempt at documenting lessons learned with the 1940 publication of the *Small*

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[35] Bruce Hoffman "Insurgency and Counterinsurgency in Iraq." *Studies in Conflict & Terrorism* 29 (2): 103-104; Austin Long, *On "Other War": Lessons from Five Decades of RAND Counterinsurgency Research* (RAND Corporation, 2006): 1

[36] David Ucko *The new counterinsurgency era: transforming the US military for modern wars* (Georgetown University Press, 2009), 22-23.

[37] Janine Davidson. *Principles of Modern American Counterinsurgency: Evolution and Debate* (Brookings Institution: 2009)

[38] Ucko, *The new counterinsurgency era*, 26-27.

Wars Manual, a similar pattern emerged as U.S. efforts re-focused to World War II and the growing Soviet threat. The influence of the Manual was limited.[39]

However, while from the mid-18th to the 20th centuries a stronger economy and stronger military usually resulted in military success, the 1950s and 1960s marked a significant turn as weaker actors successfully utilized irregular tactics to defeat advanced western countries. The invention of what would become population-centric COIN doctrine, building from classical COIN writing during decolonization involved the identification of a central characteristic of insurgency – the reliance on population for support to provide insurgents with supplies, personnel, and (critically) an information advantage.[40]

Population-centric counterinsurgency, as expressed by Galula, treats counterinsurgency as a local problem with a local solution. As opposed to conventional warfare, where the primary challenge is massing firepower at the right time and place to destroy the enemy, counterinsurgency requires the support of the populace in determining legitimate targets. Insurgent tactics, such as those outlined in Mao's theory of revolutionary warfare, stress that warriors are part of the people: "like fish swimming in the water of the population," the insurgent relies on the people for support.[41] Thus, effective operations require identifying, locating, and closing in on an adversary that is indistinguishable from the population among which they operate. For Galula, as well as Thompson, counterinsurgency requires a competition between government and insurgent for the loyalty of the civilian population, which is premised on their protection. Similarly, Thompson's account of British victory in Malaya stressed the importance of effective government.[42] Increasing the political rights of the people, reducing corruption and abuse of government power, and improving standards of living become a dominant paradigm for COIN theory in the early 1960s – a term coined by Sir Gerald Templer during the Malayan Emergency as "winning the hearts and minds of the people."[43]

Incubation: bottom-up experimentation

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[39] Ibid; *Small Wars Manual*, United States Marine Corps, 1940; Max Boot. *Savage Wars of Peace: Small Wars and the Rise of American Power.* (New York: Basic Books, 2002), 285

[40] Long, *On "Other War"*, 15

[41] Nagl *Learning to Eat Soup with a Knife*, 28

[42] Cromartie argues that the "assumption that Western-style governance *in itself* has the capacity (other things being equal) to make a government 'legitimate'" aligns with Galula but diverges from Thompson; Cromartie, "Field Manual 3-24 and the Heritage of Counterinsurgency Theory", 109; Robert Thompson, *Defeating Communist Insurgency: Experiences from Malaya and Vietnam* (Basingstoke: Macmillan, 1966), 64–6.

[43] Long, *On "Other War"*, 23

Despite the prescriptions for best (and worse) practices outlined above, the U.S. military paid little attention to counterinsurgency operations after the Vietnam War, prioritizing conventional or high-intensity war even while facing unconventional or irregular challenges. When the U.S. waged major combat operations, followed by a less conventional phase such as post-conflict stabilization or state building, military doctrine, education, training, and culture continued to emphasize the destruction of military targets. Once again, a pattern emerged in the U.S. military by which generations of officers would learn and relearn earlier lessons – often transmitted by officers who had fought in previous irregular campaigns.

During the early years of the "War on Terror," the flaws in the U.S. military's logic became clear: the failure to anticipate and subsequently contain post-conflict instability would come to characterize Operation Enduring Freedom and Iraqi Freedom. The setbacks in Afghanistan and Iraq made it clear that the U.S. military was ill-prepared and configured to carry out the necessary stabilization tasks, contributing to popular disenchantment towards the mission and rise in low-level violence towards the occupying forces and the political compact they had put in place.[44]

Subsequent U.S. Department of Defense initiatives to improve the armed forces' ability to conduct counterinsurgency (and provide the necessary stabilization for withdrawal) mark the beginning of the incubation period. This reorientation required a period of bottom-up experimentation in operating in urban settings, interacting with civilian populations, understanding local social and political environments, and fending off irregular adversaries.[45] During this time, researchers were rediscovering and refashioning COIN literature from the 1950s and 1960s into an influential new framework.[46] Bottom-up learning became particularly salient to counterinsurgency capability, as low- to middle-ranking officers improvised responses on the ground. Not unlike the British counterinsurgency campaign in Malaya, where British forces utilized trial and error, several field units in the U.S. campaigns in Afghanistan and Iraq internalized best practices through ad hoc adaptation.[47]

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[44] Ucko *The new counterinsurgency era,* 1-2.

[45] Ibid, 4

[46] Jon R. Lindsay. "Reinventing the revolution: Technological visions, counterinsurgent criticism, and the rise of special operations. *Journal of Strategic Studies* 36, no.3 (2013): 434

[47] Ucko, *The new counterinsurgency era*, 16; Nagl, *Learning to eat soup with a knife*, 87-111

Such operational experience is exemplified by then-Army Colonel H.R. McMaster's community-oriented approach with the 3rd Armored Cavalry Regiment in Tal Afar from May 2005 to February 2006. This approach involved pre-deployment training for cultural and operational complexities specific to Iraq, including language classes, lessons on Iraqi culture and history, and a familiarization with the basic precepts of counterinsurgency.[48] McMaster's achievements in Tal Afar led to a wider trend of elevation and promotion of commanders who demonstrated similar proficiency so they could share their knowledge and expertise.

Similarly, Lt. Gen. David Petraeus' performance as commander of the 101st Airborne Division in Mosul, Iraq in 2003, where he was able to implement a stabilization strategy, rebuild basic infrastructure, and provide limited governance, would serve as the basis for his appointment to commanding general at Fort Leavenworth.[49] This promotion allowed Petraeus to inform education, doctrine, and training. By 2006, the Command and General Staff College was placing a greater emphasis on cultural awareness and stability operations, referencing classic counterinsurgency texts, concepts and theory as well as historical and current cases. Lt. Col. John Nagl's comparison of British and American approaches to the threat of insurgency in Malaya and Vietnam also made the case for learning from theories that had been long forgotten, reframing Thompson's previous analysis in his recommendation for the development of educational and training institutions within the host nation. This approach, taken up by the U.S. military in November 2005 with the opening of the COIN Academy at Camp Taji, thanks in large part to the operational experience of Former Special Forces officer Kalev I. "Gunner" Sepp, would assist the familiarization of incoming troops with the particular workings of counterinsurgency in Iraq and their difference from traditional combat operations.[50]

However, while lauded for their success vis-à-vis those who confined themselves to strike operations and raids in Iraq, these experiences in the field were not organizationally integrated. The White House announced a shift in strategy in Iraq from an enemy-centered approach to a "clear-build-hold" strategy based on classical counterinsurgency theory with the release of DoD Directive 3000.05 in November 2005, but it remained uncertain whether this momentum resonated with Pentagon leadership.[51] While the 2006 Quadrennial Defense Review

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[48] Ucko, *The new counterinsurgency era*, 75
[49] Ibid, 76
[50] Ibid; Kalev I Sepp. "Best Practices in Counterinsurgency." *Military review.* (October 1, 2006)
[51] Ucko, *The new counterinsurgency era*, 80

(QDR) signaled a turn towards irregular operations with a force proficient in "foreign cultures and societies" and able to conduct stability and reconstruction operations, it also demonstrated conceptual misunderstanding of counterinsurgency, conflating it with other "operations in which the enemy is not a regular military force or a nation-state," such as counterterrorism.[52] Moreover, the QDR envisioned such stability operations as primarily conducted by other civilian agencies, with minimal support from the military.[53] Thus, while the incubation period for COIN was bottom-up, adoption would still require the top-down implementation of these concepts. In the simplest terms, everyone would have to be on the same page.

Implementation: the field manual

The December 2006 release of the joint Army-Marine Corps field manual, FM 3-24, presented an organizational shift and refinement in the U.S. military's understanding and prioritization of COIN.[54] A February 2006 conference at Fort Leavenworth convened by Lt. Gen. David Petraeus and USMC Lt. Gen. James N. Mattis, and a series of publications released by the Marine Corps presaged many of the themes in the field manual, emphasizing the need for continuous attention to and elevation of stability operations before and during major combat (rather than solely during "Phase IV").[55] Unlike the previous indirect or advisory model of counterinsurgency, FM 3-24 emphasized contingencies where conflict resulted in regime change or where no viable government entity exists, involving a significant deployment of U.S. ground troops.[56] This approach drew heavily from Galula's earlier prescriptions, emphasizing the need for the counterinsurgency soldier to "be ready both to fight and to build," taking on a variety of tasks beyond combat: by ensuring a secure environment, humanitarian relief, and infrastructure reconstruction, the U.S. military would win support of the populace.[57] This approach was framed within the context of the classical counterinsurgency literature – the principles of legitimacy as a main objective, the importance of unity and operating within the rule of law, the centrality of politics, longevity, and the value of environmental understanding, intelligence, and of separating

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[52] Ibid, 88-90; DoD, *Quadrennial Defense Review* (2006), 11, 4, 42

[53] Ucko, *The new counterinsurgency era*, 95; DoD, *Quadrennial Defense Review* (2006), 3-4

[54] U.S. Department of the Army and USMC, *Counterinsurgency*, Field Manual (FM) 3-24/ Marine Corps Warfighting Publication (MCWP) 3-33.5, Washington, D.C.: Department of the Army (2006) [hereinafter FM 3-24]

[55] Ucko, *The new counterinsurgency era*, 103-106

[56] FM 3-24,1-20; Ucko, *The new counterinsurgency era*, 109-110.

[57] FM 3-24, 1-19, 2-5

insurgents from the populace – as well as the itemization of "paradoxes" demonstrating how counterinsurgency differs from traditional combat operations.[58]

Soon the theory outlined in FM 3-24 would be turned into practice. One month following the publication of the manual, President Bush announced a new strategy for Iraq (popularized in the press as "the surge") that would be spearheaded by its author, Gen. David Petraeus.[59] Petraeus was appointed commander of Multinational Force Iraq (MNF-I), putting him in command of all U.S. forces in the country and ensuring that some of the main principles of FM 3-24 would be formally implemented on the ground. While counterinsurgency operations had previously been applied on an ad hoc basis by a limited number of units, the official shift in strategy assisted with the familiarization of U.S. ground forces with the requirements and nature of COIN operations.[60] The surge would allow for leaders to reach higher levels within DoD, as well as accelerate the institutionalization of counterinsurgency and stability operations as U.S. military missions.[61]

It is worth noting that just because COIN was implemented, it does not mean that it was successful in application. Indeed the U.S.-led missions failed to provide stable states in Iraq or Afghanistan. In 2014, the manual would be updated to include lessons learned over the past six years in Afghanistan.

Full List of Texts Examined for Definitions and/or Cases of Military Innovation[62]

1) Adamsky, Dima. *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* Stanford: Stanford University Press, 2010.
2) Adamsky, Dima, and Kjell Inge Bjerga (eds). *Contemporary Military Innovation: between Anticipation and Adaptation.* London: Routledge, 2012.
    a. Harald Høiback, "What is doctrine?" In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 20-37. London: Routledge, 2012.
    b. Stephen Peter Rosen, "The impact of the Office of Net Assessment on the American military in the matter of revolution in military affairs," In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 39-50. London: Routledge, 2012.

[58] Ibid, 1-21 to 1-24; 1-26 to 1-28; Ucko, *The new counterinsurgency era*, 111-112

[59] Ucko, *The new counterinsurgency era*, 112, 114

[60] Stephen Biddle, Jeffrey A. Friedman, and Jacob N. Shapiro. "Testing the Surge: Why Did Violence Decline in Iraq in 2007?" *International Security,* vol. 37, no. 1 (2012), 23

[61] Ucko, *The new counterinsurgency era*, 140

[62] Texts noted in grey were coded solely for the cases of military innovations considered. In most cases these were texts without an explicit definition of military innovation.

    c. Antulio J. Echevarria II. "Restoring the primacy of battle: U.S. military theory and the RMA." In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 51-62. London: Routledge, 2012.
    d. Bjerga, Kjell Inge and Torunn Laugen Haaland. "Doctrinal innovation in a small state," In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 83-106. London: Routledge, 2012.
    e. Brun Itai and Carmit Valensi, "The Revolution in Military Affairs of the 'Other Side'." In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 107-129. London: Routledge, 2012.
    f. Farrell, Theo. "Improving in war: Military adaptation and the British in Helmand, 2006-2009." In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 107-129. London: Routledge, 2012.
    g. Russell, James A. "Innovation in the crucible of war: Counterinsurgency operations in Anbar and Ninewa, Iraq, 2005-2007." In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 153-174. London: Routledge, 2012.
    h. Hobson, Rolf. "Blitzkrieg, the RMA and defense intellectuals." In *Contemporary Military Innovation: between Anticipation and Adaptation,* edited by Dima Adamsky and Kjell Inge Bjerga, 175-187. London: Routledge, 2012.
3) Angevine, Robert G. "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–1972." *Journal of Strategic Studies* 28, no. 1 (Feb. 2005): 77-105
4) Armacost, Michael H. *The Politics of Weapons Innovation: The Thor-Jupiter Controversy* New York: Columbia UP 1969.
5) Avant, Deborah D. *Political Institutions and Military Change: Lessons from Peripheral Wars* Ithaca, NY: Cornell UP, 1994.
6) Bacevich, Andrew J. *The Pentomic Era: the US Army between Korea and Vietnam* Washington, DC: National Defense UP, 1986.
7) Beard, Edmund. *Developing the ICBM: A Study in Bureaucratic Politics* New York: Columbia UP, 1976.
8) Bergerson, Frederic A. *The Army Gets an Air Force* Baltimore, MD: Johns Hopkins UP 1980.
9) Bradin, James W. *From Hot Air to Hellfire: The History of Army Attack Aviation* Novato, CA: Presidio Press 1994.
10) Berman, Lazar. "Capturing Contemporary Innovation: Studying IDF Innovation against Hamas and Hizballah." *Journal of Strategic Studies* 35, no. 1 (Feb. 2012): 121–47.
11) Betz, David and Anthony Cormack. "Hot War, Cold Comfort: a Less Optimistic Take on the British Military in Afghanistan. "*RUSI Journal* 154 no. 4 (2009): 26–29.
12) Bickel, Keith B. *Mars Learning: The Marine Corps' Development of Small Wars Doctrine, 1915–1940* Boulder, CO: Westview 2000.
13) Brooks, Risa, and Elizabeth A. Stanley. *Creating Military Power: the Sources of Military Effectiveness*. Stanford, CA: Stanford University Press, 2007.
    a. Reiter, Dan. "Nationalism and Military Effectiveness, Post-Meiji Japan." In *Creating Military Power: the Sources of Military Effectiveness*, edited by Risa Brooks and Elizabeth A. Stanley, 27-54. Stanford, CA: Stanford University Press, 2007.
    b. Avant, Deborah. "Political Institutions and Military Effectiveness: Contemporary United States and United Kingdom." In *Creating Military Power: the Sources of Military Effectiveness*, edited by Risa Brooks and Elizabeth A. Stanley, 80-105. Stanford, CA: Stanford University Press, 2007.
    c. Farrell, Theo. "Global Norms and Military Effectiveness: The Army in Early Twentieth-Century Ireland." In *Creating Military Power: the Sources of Military Effectiveness*,

edited by Risa Brooks and Elizabeth A. Stanley, 136-157. Stanford, CA: Stanford University Press, 2007.
d. Goldman, Emily O. “International Competition and Military Effectiveness: Naval Air Power, 1919-1945.” In *Creating Military Power: the Sources of Military Effectiveness*, edited by Risa Brooks and Elizabeth A. Stanley, 158-185. Stanford, CA: Stanford University Press, 2007.

14) Builder, Carl H. *The Masks of War: American Military Styles in Strategy and Analysis* Baltimore, MD: Johns Hopkins UP 1989.
15) Campbell, Douglas. *The Warthog and the Close Air Support Debate*. Annapolis, MD: Naval Institute Press, 2004.
16) Catignani, Sergio. “Getting COIN at the Tactical Level in Afghanistan: Reassessing Counter-Insurgency Adaptation in the British Army” *Journal of Strategic Studies* 35/4 (2012): 513–39.
17) Cheung, Tai Ming. “The Chinese Defense Economy’s Long March from Imitation to Innovation” *Journal of Strategic Studies* 34/3 (June 2011): 325–54
18) Coffey, Rod A. “Doctrinal Orphan or Active Partner? A History of US Army Mechanized Infantry Doctrine” MA Thesis, US Army Command and General Staff College, 2000
19) Cohen, Eliot A. "A Revolution in Warfare." *Foreign Affairs* 75, no. 2 (1996): 37-54. doi:10.2307/20047487.
20) Cote, Owen R. “The Politics of Innovative Military Doctrine: The US Navy and Fleet Ballistic Missiles” PhD diss., MIT, 1998.
21) Davis, Vincent. *The Politics of Innovation. Patterns in Navy Cases*. Denver: University of Denver, 1967.
22) Downie, Richard Duncan. *Learning from Conflict: the U.S. Military in Vietnam, El Salvador and the Drug War*. London: Praeger, 1998.
23) Evangelista, Matthew. *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies*. Ithaca: Cornell University Press, 1988.
24) Farrell, Theo. “Figuring Out Fighting Organisations: The New Organisational Analysis in Strategic Studies.” *The Journal of strategic studies* 19, no. 1 (March 1996): 122–135.
25) Farrell, Theo. "Culture and Military Power." *Review of International Studies* 24, no. 3 (07, 1998): 407-416
26) Farrell, Theo. “Improving in War: Military Adaptation and the British in Helmand Province, Afghanistan, 2006-09” *Journal of Strategic Studies* 33/4 (2010): 567–94
27) Farrell, Theo, and Terry Terriff. *The Sources of Military Change: Culture, Politics, Technology*. Boulder: Lynne Rienner Publishers, 2002.
    a. Farrell, Theo. “World Culture and the Irish Army, 1922–1942.” In *The Sources of Military Change: Culture, Politics, Technology*, edited by Theo Farrell and Terry Terriff, 69–90. Boulder: Lynne Rienner Publishers, 2002.
    b. Terriff, Terry. “U.S. Ideas and Military Change in NATO, 1989-1994.” In *The Sources of Military Change: Culture, Politics, Technology*, edited by Theo Farrell and Terry Terriff, 91-116. Boulder: Lynne Rienner Publishers, 2002.
    c. Goldman, Emily O. “The Spread of Western Military Models to Ottoman Turkey and Meiji Japan.” In *The Sources of Military Change: Culture, Politics, Technology*, edited by Theo Farrell and Terry Terriff, 41-67. Boulder: Lynne Rienner Publishers, 2002.
28) Farrell, Theo, Frans P. B. Osinga, and James Avery Russell. *Military Adaptation in Afghanistan*. Stanford CA: Stanford security studies, 2013.
29) Finkel, Meir. *On Flexibility: Recovery from Technological and Doctrinal Surprise on the Battlefield*. Stanford, CA: Stanford University Press, 2011.
30) Fleck, James. “Learning by Trying: the Implementation of Configurational Technology” In *The Social Shaping of Technology*, edited by Donald Mackenzie and Judy Wajcman, 244–57. Open University Press, 1999.

31) Foley, Robert T. “A Case Study in Horizontal Military Innovation: The German Army, 1916-1918” *Journal of Strategic Studies* 35/6 (Dec. 2012): 799–827
32) Foley, Robert T., Stuart Griffin, and Helen Mccartney. "'Transformation in Contact': Learning the Lessons of Modern War." *International Affairs* 87, no. 2 (2011): 253-70.
33) Gaudlip, Fred W. “Vision to Victory – Space, Mahan, and Mitchell: The Role of the Visionary in Cross-Organizational Innovation.” MA thesis, US Air Command and Staff College, 2001.
34) Giese, Jon F. “Military Innovation: Sources of Change for United States Special Operations Forces.” MA thesis, US Naval Postgraduate School, 1999.
35) Giordano, Eric R. “The US Army and Non-Traditional Missions: Explaining Divergence in Doctrine and Practice in the Post-Cold War Era.” PhD diss., Tufts University, 2003.
36) Goldman, Emily O., and Leslie C. Eliason. *The Diffusion of Military Technology and Ideas*. California: Stanford University Press, 2003.
37) Goldman, Emily O. and Richard B. Andres. “Systemic Effects of Military Innovation and Diffusion.” *Security Studies* 8/4 (Summer 1999): 79–125.
38) Grauer, Ryan. “Moderating Diffusion: Military Bureaucratic Politics and the Implementation of German Doctrine in South America, 1885–1914.” *World Politics* 67, no. 2 (2015): 268–312
39) Griffin, Stuart. "Iraq, Afghanistan and the Future of British Military Doctrine: From Counterinsurgency to Stabilization." *International Affairs* 87, no. 2 (2011): 317-33.
40) Gudmundsson, Bruce I. *Stormtroop Tactics: Innovation in the German Army, 1914-1918*. West Port, CT: Praeger, 1995.
41) Haworth, W. Blair. *The Bradley and How It Got That Way: Technology, Institutions, and the Problem of Mechanized Infantry in the United States Army*. Westport, CT: Greenwood Press, 1999.
42) Hayes, Bradd C., and Douglas V. Smith. *The Politics of Naval Innovation*. Newport, RI: Strategic Research Dept., Center for Naval Warfare Studies, U.S. Naval War College, 1994.
    a. Engel, Gregory A. “Cruise Missiles and the Tomahawk.” In *The Politics of Naval Innovation,* edited by Bradd C. Hayes and Douglas V. Smith, 16-41. Newport, RI: Strategic Research Dept., Center for Naval Warfare Studies, U.S. Naval War College, 1994.
    b. Hone, Thomas C., Smith, Douglas V., and Roger C. Easton. “Aegis - Evolutionary or Revolutionary Technology” In *The Politics of Naval Innovation,* edited by Bradd C. Hayes and Douglas V. Smith, 42-73. Newport, RI: Strategic Research Dept., Center for Naval Warfare Studies, U.S. Naval War College, 1994.
    c. Smith, Douglas V. “Who’s That Tall Dark Stranger There?” In *The Politics of Naval Innovation,* edited by Bradd C. Hayes and Douglas V. Smith, 74-84. Newport, RI: Strategic Research Dept., Center for Naval Warfare Studies, U.S. Naval War College, 1994.
43) Horowitz, Michael C. *The Diffusion of Military Power: Causes and Consequences for International Politics*. Princeton: Princeton University Press, 2010.
44) Hughes, Thomas Alexander. *Over Lord: General Pete Quesada and the Triumph of Tactical Air Power in World War II*. New York: Free Press, 1995.
45) Jungdahl, Adam M., and Julia M. Macdonald. “Innovation Inhibitors In War: Overcoming Obstacles In The Pursuit Of Military Effectiveness.” *Journal of Strategic Studies* 38 (4): 467-99.
46) Kier, Elizabeth. *Imagining War: French and British Military Doctrine between the Wars*. Princeton, NJ: Princeton University Press, 1997.
47) King, Anthony. "Understanding the Helmand Campaign: British Military Operations in Afghanistan." *International Affairs* 86, no. 2 (2010): 311-32.
48) Kollars, Nina A. “War’s Horizon: Soldier-Led Adaptation in Iraq and Vietnam.” *Journal of Strategic Studies* 38/4 (2015): 529-53
49) Krepinevich, Andrew F. Jr. *The Army and Vietnam*. Baltimore: Johns Hopkins Univ. Press, 1986.

50) Lebovic, James H. *Foregone Conclusions: US Weapons Acquisition in the Post-Cold War Transition*. Boulder, Colorado: Westview, 1996.
51) Lock-Pullan, Richard. *US Intervention Policy and Army Innovation: from Vietnam to Iraq.* New York, NY: Routledge, 2006.
52) Lupfer, Timothy T. *The Dynamics of Doctrine: the Changes in German Tactical Doctrine during the First World War*. Fort Leavenworth, Kansas: Combat Studies Institute, U.S. Army Command and General Staff College, 1981.
53) MacKenzie, Donald A. *Inventing Accuracy: an Historical Sociology of Nuclear Missile Guidance*. Cambridge, MA: MIT Press, 1993.
54) Mahnken, Thomas G. "China's Anti-Access Strategy in Historical and Theoretical Perspective." *Journal of Strategic Studies* 34/3 (June 2011): 299–323.
55) Mahnken, Thomas G. *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941*. Ithaca, NY: Cornell University Press, 2002: 44-47.
56) Marcus, Raphael D. "Adaptation in the Israel-Hizballah Conflict: the Institutionalization of Lesson- Learning in the IDF." *Journal of Strategic Studies* 38/4 (2015): 500–528.
57) Marquis, Susan L. *Unconventional Warfare Rebuilding US Special Operations Forces.* Washington, DC: Brookings Inst. Press, 1997.
58) McIntyre, David Harrison. "Taming the Electric Chameleon: War, Offense-Defense Theory, and the Revolution in Military Affairs." PhD diss., University of Maryland, 1999.
59) McNaugher, Thomas L. *The M16 Controversies: Military Organizations and Weapons Acquisition*. New York: Praeger, 1984.
60) Milner, Marc. "Convoy Escorts: Tactics, Technology, and Innovation in the Royal Canadian Navy, 1939–1943." *Military Affairs* 48/1 (Jan. 1984): 19–25.
61) Moy, Timothy D. *War Machines Transforming Technologies in the U.S. Military, 1920-1940*. College Station: Texas A&M University Press, 2001.
62) Mullins, Robert E. "Sharpening the Trident: The Decisions of 1889 and the Creation of Modern Seapower." PhD diss., King's College London, 2000.
63) Murray, Williamson. *Adaptation in War: with Fear of Change.* Cambridge: Cambridge University Press, 2011.
64) Nagl, John A. *Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife*. Westport, CT: Praeger, 2002.
65) Nielsen, Suzanne C. "Preparing for War: The Dynamics of Peacetime Military Reform." PhD diss., Harvard University, 2003.
66) Oudshoorn, Nelly E., and Trevor J. Pinch. *How Users Matter: the Co-Construction of Users and Technology*. Cambridge, MA: MIT Press, 2003.
67) Pollpeter, Kevin. "Upward and Onward: Technological Innovation and Organizational Change in China's Space Industry" *Journal of Strategic Studies* 34/3 (June 2011): 405–423.
68) Posen, Barry R. *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars*. Ithaca, NY: Cornell Univ. Press, 1986.
69) Roland, Alex. "Comparing Military Revolutions" Paper presented at The Joint Center for International and Security Studies - Securities Studies Conference on the Revolution in Military Affairs, Monterey, CA, Aug. 1996.
70) Rosen, Stephen Peter. *Winning the next War: Innovation and the Modern Military*. Ithaca, NY: Cornell University Press, 1994.
71) Russell, James A. *Innovation, Transformation, and War: Counterinsurgency Operations in Anbar and Ninewa Provinces, Iraq, 2005-2007*. Stanford University Press, 2010.
72) Sapolsky, Harvey M. *The Polaris System Development: Bureaucratic and Programmatic Success in Government*. Cambridge, MA: Harvard University Press, 1971.
73) Serena, Chad C. *A Revolution in Military Adaptation: the US Army in the Iraq War*. Washington, D.C.: Georgetown Univ. Press, 2011.

74) Sinno, Abdulkader H. *Organizations at War in Afghanistan and Beyond*. Ithaca, NY: Cornell University Press, 2008.
75) Sullivan, Brian R. "The Future Nature of Conflict: A Critique of "the American Revolution in Military Affairs" in the Era of Jointery." *Defense Analysis* 14, no. 2 (Aug 01, 1998): 91.
76) Toffler, Alvin, and Heidi Toffler. *War and Anti-War: Making Sense of Todays Global Chaos*. London: Warner Books, 1995.
77) van Creveld, Martin L. Technology and War: from 2000 B.C. to the Present. New York: The Free Press, 1989.
78) Vickers, Michael G. "The Revolution in Military Affairs and Military Capabilities." In *War in the Information Age: New Challenges for U.S. Security*, edited by Robert L. Pfaltzgraff and Richard H. Shultz, 29-47. Washington, D.C: Brasseys, 1997.
79) Zisk, Kimberly Marten. *Engaging the enemy: Organization theory and Soviet military innovation, 1955-1991*. Princeton, NJ: Princeton University Press, 1993