

US Army Modernization: Looking at the Past to Build the Future

A Monograph

by

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With the publication of the *2019 Army Modernization Strategy: Investing in the Future*, the US Army initiated another of its periodic modernization campaigns to meet the military requirements of a new era of competition. Considering the challenges associated with change in bureaucracies, it is critical to identify actions and conditions that can contribute to both success and effectiveness. This paper considers what internal conditions the army can influence and shape, and what external conditions it can monitor, to modernize successfully. It further attempts to identify specific modernization conditions, using case studies from the interwar period between World War I and II, on which army leaders should focus. The study draws its conditions, including commitment, leadership, consensus, doctrine, and resourcing, from theorists in the fields of modernization and change management. The results of this work indicate that each of these conditions influences modernization, but further finds that the selected conditions are not exclusively definitive of success. While this study merely lays a groundwork for a better understanding of success in modernization, it opens areas of inquiry for further research, such as integrating modernization across the services, which can improve the likelihood of success, not only for the US Army, but also for the entirety of the Department of Defense.

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Abstract

US Army Modernization: Looking at the Past to Build the Future, by LTC Ted L. Stokes, Jr, 51pages.

With the publication of the *2019 Army Modernization Strategy: Investing in the Future*, the US Army initiated another of its periodic modernization campaigns to meet the military requirements of a new era of competition. Considering the challenges associated with change in bureaucracies, it is critical to identify actions and conditions that can contribute to both success and effectiveness. This paper considers what internal conditions the army can influence and shape, and what external conditions it can monitor, to modernize successfully. It further attempts to identify specific modernization conditions, using case studies from the interwar period between World War I and II, on which army leaders should focus. The study draws its conditions, including commitment, leadership, consensus, doctrine, and resourcing, from theorists in the fields of modernization and change management. The results of this work indicate that each of these conditions influences modernization, but further finds that the selected conditions are not exclusively definitive of success. While this study merely lays a groundwork for a better understanding of success in modernization, it opens areas of inquiry for further research, such as integrating modernization across the services, which can improve the likelihood of success, not only for the US Army, but also for the entirety of the Department of Defense.

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Acronyms

AEF	American Expeditionary Forces
AFC	US Army Futures Command
CIGS	Chief of the Imperial General Staff
EMF	Experimental Mechanized Force
FSR	Field Service Regulations
MDO	Multi-Domain Operations
NDS	National Defense Strategy
TRADOC	US Army Training and Doctrine Command
WWI	World War I

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Introduction

It does not matter that they have got it wrong...what matters is the ability to get it right quickly when the moment arrives.

—Michael Howard, *Military Science in an Age of Peace*

Background of the Study

The US Army published its latest blueprint for modernization, the *2019 Army Modernization Strategy: Investing in the Future*, in October 2019. This foundational document sets the army's azimuth for its next effort in a long history of modernizations and transformations. According to GEN Michael Garrett, commander of the US Army's Forces Command, *Investing in the Future* is the key to ensuring the army remains relevant and ready to fight the nation's future wars.¹ However, the US Army's inconsistent record of successful innovation threatens this effort. In fact, despite some recent and highly effective examples, such as Force XXI capabilities and the Stryker Brigade Combat Team (SBCT), a majority of recent army modernization efforts ended in premature termination.² GEN Don Starry, one of the architects of the US Army's post-Vietnam transformation, observed in 1983 that, "reform of an institution as large as our Army is problematic under the best of circumstances." Further, he stated that, throughout its history, the army consistently exhibited a penchant for preparing for the last war.³ Finally, he observed that the US Army executed its most successful modernization efforts when oriented on a single specific threat and during a period of peace. Complicating contemporary modernization, the United States remains engaged in operations in Iraq and Afghanistan, continues to pursue and target terrorist organizations globally, and faces expansionism and *revanchist* operations by multiple great

¹ Otto Kreisher, "Garrett: Army Must Modernize or Risk Irrelevance," speech at the annual meeting of the Association of the United States Army, 15 October 2019, accessed 12 December 2019, <https://www.ausa.org/news/garrett-army-must-modernize-or-risk-irrelevance>.

² Thomas Spoehr, *Rebuilding America's Military Project: The United States Army*, The Heritage Foundation, 3, accessed 24 November 2019, <https://www.heritage.org/defense/report/rebuilding-americas-military-project-the-united-states-army>.

³ Donn A. Starry, "To Change An Army," *Military Review* LXIII, no. No. 3 (1983).

power adversaries.⁴ These most recent wars have constituted eighteen years of local counterinsurgency operations. If the 2018 National Defense Strategy (NDS) accurately describes future war by expanding the concept of warfare to encompass global competition, a modernization strategy that fails to prepare the army properly would have catastrophic outcomes for the nation.⁵

The current strategic environment further complicates the US Army's chances for a successful modernization. The global transition from the Industrial to the Information Age is nearly complete; technology advances at a lightning pace, and the number of potential military adversaries has grown significantly since the end of the Cold War. The 2018 NDS accounts for this with a first-ever expansion of the concept of war -- one that envisions a return to *long-term, strategic competition* between great powers as the principal means through which nations will contest political adversaries -- using the speed and access of digital information, global communications, and advances in technology to synchronize all elements of national power in order to succeed.⁶ While the United States focused on Islamic terrorists in Afghanistan, Iraq, the Philippines, Yemen, Syria, and the Horn of Africa, both Russia and China developed and implemented strategies to modernize their militaries, focused on neutralizing or over-matching American capabilities. In recognition of this, *Investing in the Future* expands on the idea of the complexity of future battlegrounds with the introduction of Multi-Domain Operations (MDO). MDO acknowledges that both United States and adversary militaries will attempt to synchronize operations and capabilities in all domains (air, land, sea, space, information, and cyberspace) to achieve positions of advantage. MDO requires nations to synchronize and align actions and capabilities, across all military services and governmental agencies, in tightly compressed timeframes, to create targetable opportunities. It is within this complex and rapidly changing environment that the US Army will execute its

⁴ Spoehr, "Rebuilding America's Military Project," 19.

⁵ Jim Mattis, *Summary of the 2018 National Defense Strategy* (Washington, DC: Government Printing Office, 2018), 2–3.

⁶ US Department of the Army, *2019 Army Modernization Strategy: Investing in the Future* (Washington, DC: Government Printing Office, 2019), 2–3. From the US perspective, strategic competition has replaced war as the means of extending political power. The concept of competition accounts for concurrent synchronization of all elements of national power – diplomacy, information, military, and economic efforts – to secure and maintain an advantage. This makes the 2018 NDS a *national* as opposed to a *defense* strategy [author emphasis].

next modernization effort, enhancing current capabilities or developing new ones, to create temporary and/or enduring positions of advantage in all domains and prevail against future adversaries.

The purpose of this paper is to engage army leaders in a discussion to develop a more thorough understanding of the potential conditions that influence successful military modernization. This paper differentiates between internal and external conditions, defined by the organization's ability to influence and control them. Specifically, it seeks to determine what internal or external conditions can guide a modernization effort to generate deployment-ready forces with enhanced combat effectiveness in an MDO environment. Internal conditions are those that the US Army can control and influence to improve the chances of successful modernization—specifically, those it can control, modify, or eliminate without need for presidential or legislative action. Ideally, the army's leadership will identify counterproductive conditions early in the process, thus supporting organizational adjustment and improving the opportunity for success. External conditions could be national/strategic, cultural, or social in nature and fall outside the direct control of the organization. However, understanding these conditions and their impact on modernization would enable the Army to modify its approaches and efforts to improve the chances of success. An example of an external condition that could affect modernization would be a significant reduction in the army budget, reducing the army's ability to conduct research and development. This external condition could drive internal decisions and actions that impact modernization, such as curtailing research and development in favor of readiness.

Understanding this difference, this paper aims to determine what conditions must the US Army set internally, and what external factors must be addressed (and, if necessary, mitigated) to enable the army to modernize most effectively? The significance of this paper is not in its predictive capability, but rather in its potential to generate new thought and discussion toward effectiveness in modernization and, ultimately, ensure that the outcome of the latest strategy is more successful than the historical norm.

Based on the variety of sources underpinning this study, some clarification on definitions is required. Specific to change, several terms describe organizational and institutional change; “modernization,” “transformation,” and “innovation” are but a few. Some references and authors assign each term specific

definitions.⁷ Other authors use them interchangeably to represent “a new and improved method or procedure.”⁸ While “innovation” or “modernization” imply a focus on a discrete technology or capability, “transformation” implies broad, enterprise-wide change. All three are applicable in the current army modernization effort. Given this, and in recognition of the recent publication of *Investing in the Future*, this work will employ the term “modernization,” with the understanding that each type of change stated above could be included therein. A second clarification concerns qualitative valuation. Several different descriptors appear across the body of modernization study, to include *effectiveness*, *efficiency*, *successful*, and *valuable*, to name a few. As this study will not include an economic assessment of modernization case studies, but rather focuses on the ability of a modernized force to achieve its intended capability in relation to a contemporary force, this study will employ “effectiveness” as an evaluative term.⁹

Two factors bound this study, one related to scope and the other related to sources. Since the nature of military forces is to target and neutralize adversarial capabilities, most contemporary military modernization efforts remain classified and inaccessible. Recognizing this limitation, this paper remains an unclassified procedural analysis; it will not evaluate specific technical details of potential adversarial forces. Secondly, although organizational change incorporates a wide range of theories, no universal theory exists; researchers must either expand upon previous works or develop concepts of their own. In this regard, this paper will leverage the theories of multiple authors. Doing so, we assume that, where those authors concur, the relative importance of a given variable toward effective modernization is more valid.

This study is composed of four sections. The Introduction lays out the background of the study and formulates the hypothesis and the questions that will validate or invalidate it. The Literature Review frames the

⁷ Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1991), 7.

⁸ Bryon E. Greenwald, “The Problems of Peacetime Innovation: The Development of US Army Antiaircraft Artillery During the Interwar Period -- A Case Study in Preparing the Army for the Future” (School of Advanced Military Studies, United States Army Command and General Staff College, Ft. Leavenworth, KS, 1995), 3.

⁹ *Merriam-Webster.com Dictionary*, s.v. “effective,” accessed 24 November 2020, <https://www.merriam-webster.com/dictionary/effective>. This paper uses Merriam-Webster Dictionary’s definition of the term “effective,” as – *producing a decided, decisive, or desired effect*.

analysis by discussing a number of widely accepted theories of organizational change and outlines the case studies selected for analysis in the Methodology section. This section introduces the individual case studies, identifies the justification for their selection, and constructs the instrumentation and evaluation rubric for the analysis. The Case Study section explores three individual military modernization periods and measures the outcome of each against the modernization condition rubric. In the Conclusion, I include an Analysis subsection that summarizes and compares the conclusions from each of the case studies. The section also contains a Recommendations subsection, which provides a narrative analysis of the data drawn from the case studies, assesses any identifiable, direct parallels between one or more of the case studies and the army's current modernization effort, and recommends further avenues of research on this topic.

Literature Review

Review of Modernization Theorists

To develop a rubric to assess future modernization efforts by the US Army, this study looks at the work of a number of authors to determine what conditions contributed to success in past modernizations. These experts—military officers, historians, and business professionals—used their own theories to define successful conditions for modernization. While not officially accredited as “theorists,” the authors referenced below are experts in their field with established reputations for clarity of insight concerning modernization and innovation.

Among the pioneers in the field of military innovation study, Harold R. Winton argued in *To Change an Army: General Sir John Burnett-Stuart and British Armored Doctrine, 1927-1938* that successful modernization requires six conditions.¹⁰ The first condition is a close relationship between the purpose of an institution and the form an institution takes. Secondly, Winton asserts a requirement for senior leaders continuously to articulate a vision for the future. Winton's third condition is an intellectual mastery of the

¹⁰ Harold R. Winton, *To Change an Army: General Sir John Burnett-Stuart and British Armored Doctrine, 1927-1938* (Lawrence, KS: University Press of Kansas, 1988), 239.

nature of war and the development of doctrine to direct the execution of future wars. His fourth condition is the validation of doctrine through field-testing to form the basis of change. The final two conditions deal with the leaders in an organization, specifically developing a high level of support and consensus to overcome habits and parochialisms of branches or services, and the need for reformers to remain accepted by the body and not become alienated or marginalized.

Refining Winton's approach, Williamson Murray's and Allan Millet's *Military Innovation in the Interwar Period* looks at military modernization efforts in several domains from 1920-1939. From these, they identify four key conditions for successful innovation: 1) a clear institutional concept and desire to integrate, 2) an officer corps that is intellectually and professionally open to modernization, 3) an organization that actively leverages historical lessons learned, and 4) an organization that is flexible in thought and doctrine.¹¹

Considering Murray's and Millet's work alongside Winton's, both declare the criticality of an adaptive doctrine to any modernization effort, and the influence that the organizational culture of the modernizing organization exercises on the process. Where the two studies diverge, Murray and Millett focus on a centralized and guiding institutional concept and the importance of historical lessons learned, while Winton focuses more on the contribution of senior leaders in driving the process and building a consensus to overcome the obstacles of biases and parochialism.

The challenge of adapting to the emergence of armored combat vehicles also attracted the interest of practitioners. In "To Change an Army," Starry examines modernization efforts by the German Army from 1933-1945. Starry argues that successful modernization requires seven specific conditions. The first condition is the establishment of an institution or mechanism that clearly identifies the need for change and to guide it. To execute change successfully, Starry identifies a need for a rigorous institutional educational background, to develop a common cultural bias in the officers responsible for change. Starry's third condition is a requirement to have a central "spokesman" for change, which contributes directly to his fourth condition, the building of a

¹¹ Williamson R. Murray and Allan R. Millett, *Military Innovation in the Interwar Period* (New York: Cambridge University Press, 1998), 310–25.

consensus and gaining of converts toward the effort. The fifth requirement is continuity among the architects of change to enforce consistency. Starry's final two conditions deal with the organization itself, specifically, support from the top of the organization by senior members, and the execution of field trials by the organization to test the validity of the change.¹²

Starry concurs with both Winton's argument and Millett's and Murray's findings on an organizational requirement to establish a consensus, which Starry refers to as a "culture of converts." Starry agrees with Winton on the importance of the role to be played by senior leaders' expounding on the need for change and providing senior level support, and supports Millett's and Murray's conclusion of identifying a clear need for change. Starry further introduces education and cultural biases, continuity, and experimentation through field trials as further antecedents to success.

To these perspectives, Harvard professor Dr. John Kotter provides a position informed by his research into change in the business world. Kotter modelled an eight-step process for successfully guiding change. The "Kotter Model" posits that effective transformation occurs when an organization: 1) establishes a sense of urgency, 2) creates a powerful guiding coalition, 3) develops a vision and strategy, 4) communicates the change vision, 5) empowers others to act on the vision, 6) creates short-term wins, 7) consolidates improvements and produces more change, and 8) institutionalizes new approaches.¹³ While not explicitly crafted to apply to military organizations, Kotter's approach lends itself to leadership and management coursework (especially professional military education). It is included here to incorporate a non-military perspective that aims to minimize military biases.

Kotter supports the arguments of Murray, Millett, and Starry that creating a "sense of urgency" is the critical first step in any successful modernization. Kotter's model aligns with both Starry's and Winton's positions on the importance of a guiding senior leadership by identifying the power of "guiding coalitions." Finally, Kotter supports the arguments of all four preceding authors, who stress the importance of consensus

¹² Starry, "To Change An Army," 23–24.

¹³ John P. Kotter, *Leading Change* (Boston, MA: Harvard Business School Press, 1996), 33–145.

and “openness to innovation,” with his instruction to both develop and communicate a vision and to empower broad-based action. To these Kotter adds conditions to create and consolidate quick accomplishments and the requirement to anchor change in order to prevent reversals.

Thomas Spoehr, director of The Heritage Foundation’s Center for National Defense, provides the final contribution to this work’s examination of modernization conditions. In *Rebuilding America’s Military Project: The United States Army*, Spoehr recommends changes in the institutional, operational, personnel and materiel domains.¹⁴ Germane to this study are key recommendations for success in modernization, restated here as: 1) prevent over-specification to capabilities, 2) promote critical thinking and avoid “groupthink,” 3) ensure continuity in key leaders of change, and 4) employ an education and development system that prepares individuals to lead change.

The Methodology section of this paper will distill the above theories and discussions into a single set of proposed modernization conditions. These conditions serve as criteria to assess a set of historical case studies in order to determine their validity as desirable conditions for successful modernization.

Review of Historical Case Study References

To provide for a common assessment, this work limits its analysis to modernization efforts that occurred during the interwar years from 1918-1939. To further control for biases or national/strategic impacts, it will compare and contrast three case studies: the United States, Britain (representing an ally), and Germany (representing an adversary). Finally, for standardization and brevity, each study assesses a single modernization effort within the armies of each nation, specifically, the development of tank and armored forces prior to 1939. Through this lens, this work aims to identify criteria and conditions that are generalizable to a larger modernization effort.

Millett’s and Murray’s three-volume *Military Effectiveness* provides an excellent and well-structured source for all three case studies. Beginning with each nation’s strategic situation at the time it began

¹⁴ Spoehr, *Rebuilding America’s Military Project*, 61–64.

modernization, this reference traces the strategic, operational, and tactical effectiveness of the effort. This work provides further insight by examining factors outside acquisition and fielding initiatives, to include professional military education and doctrine, which contributed to either success or failure.

Military Innovation in the Interwar Period, also by Millett and Murray, discusses modernization efforts by Britain and Germany, focusing on the nations' political and military postures and the impacts on military modernization created by World War I (WWI).¹⁵ The lessons determined in this study provide a deeper understanding of the influence of conditions beyond the military realm and how these conditions can impact an innovation effort. A final significant contribution of this reference is its focus on the criticality of individuals within a modernization, either successfully leading or retarding the process.¹⁶

Murray's and Richard Sinnreich's *The Past as Prologue; The Importance of History to the Military Profession* provides an alternative view of modernization by assessing conditions and circumstances that directly contributed to the failure or limited success of modernization efforts.¹⁷ These circumstances, ranging from economic and budgetary considerations to military officer culture, support the hypothesis that not all aspects of a modernization are controllable by the military organization itself. With a focus on British and American military history, this text provides a deeper understanding of how organizations view history and what lessons they can and should learn from them as they develop plans for future innovations and wars.

In *Winning the Next War*, Stephen Rosen provides a detailed consideration of the British Army's modernization efforts with tanks and armored warfare. Similar to Millett and Murray, Rosen explores the importance of senior leaders in guiding and executing modernization efforts and further explores the nature and effectiveness of these leaders as "military mavericks."¹⁸ Additionally, Rosen's work presents a different

¹⁵ Murray and Millett, *Military Innovation in the Interwar Period*, 6–19.

¹⁶ *Ibid.*, 41–45 and 378–83.

¹⁷ Williamson R. Murray and Richard H. Sinnreich, *The Past as Prologue: The Importance of History to the Military Profession* (New York, NY: Cambridge University Press, 2006), 195–216.

¹⁸ Rosen, *Winning the Next War*, 11.

perspective on challenges to modernization, one that focuses less on the new equipment or structure created and more on how the organization will employ the new capability.¹⁹

In *The Challenge of Change* Winton and David Mets explore and compare modernization by Germany, Britain, and the United States. Their key contributions to this paper are a deeper exploration of the impact of senior leaders on modernization and the importance of developing suitable doctrine to guide both the integration and employment of innovation actions.²⁰ Rosen's work also highlights the importance of organizational restructuring to support modernization efforts, with Britain and Germany exemplifying slow but effective reorganization and the United States exemplifying the hazards of reorganizing much later in the templated modernization timeline.²¹

Three additional texts supported the development of the American case study. William Odom's *After the Trenches* explains the national/strategic conditions in America that set the tone for modernization and rearmament in the interwar years, and explores the employment of boards and what a later generation termed "after-action reviews" (AARs) that charted the path for innovation in the field.²² David E. Johnson's *Fast Tanks and Heavy Bombers* further explains the lessons learned from armor employment in WWI and the national "pacifist approach" to military policy that dominated the 1920s.²³ Finally, Starry's and George F. Hofmann's *Camp Colt to Desert Storm* provides a detailed summary of the development of armored formations within the US Army's cavalry branch, key contributions by modernization leaders in the field, and the concurrent development of doctrine and tactics that supported the innovations in armored warfare.²⁴

¹⁹ Rosen, 127–29.

²⁰ Harold R. Winton and David R. Mets, *The Challenge of Change: Military Institutions and New Realities, 1918-1941* (Omaha, NE: University of Nebraska Press, 2003), xiv.

²¹ Winton and Mets, 62–67, 80–87, and 187–95.

²² William O. Odom, *After the Trenches: The Transformation of U.S. Army Doctrine, 1918-1939* (College Station, TX: Texas A&M University Press, 1999), 27–35.

²³ David E. Johnson, *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army, 1917-1945* (Ithaca, NY: Cornell University Press, 1998), 36–39 and 65–71.

²⁴ Donn A. Starry and George F. Hofmann, eds., *Camp Colt to Desert Storm: The History of the U.S. Armored Forces* (Lexington, KY: The University Press of Kentucky, 1999), 38–53.

Methodology

As mentioned above, this study employs an analytical framework distilled from the writings of a series of theorists in the field of organizational change. Considering the five theories collectively, some thematic conditions become apparent. Table 1 provides a color-coded, visual representation of the theorists' modernization conditions and thematic similarities.

Table 1. Conditions for Modernization

GEN (R) Donn Starry Former Army Officer, Doctrine Writer and TRADOC CDR 1983	Drs. Williamson Murray and Allan Millett Marine Corps University & Ohio State University 1996	Dr. Harold Winton Former Army Officer, Professor of Military History and Theory 1988	Dr John Kotter Harvard Business School Professor 1996	LTG(R) Thomas W. Spoehr Director, Center for National Security 2019
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An institution or mechanism to identify the need for change	Clear institutional concept and interest to innovate	A close relationship between the purpose of the institution and the form it takes	Create a sense of urgency	Prevent over-specification - modernize for the Army's whole mission profile
Rigorous education of officers responsible for change to develop common cultural bias	Culture of officer corps - intellectually, professionally and traditionally open to innovation	Senior leaders to articulate the vision for the future continuously	Form powerful guiding coalitions	Promote critical thinking and avoid "groupthink"
There must be a Spokesman for change	Utilization of history and lessons learned	Intellectual mastery of the nature of war and develop doctrine to fight future wars	Develop a vision and a strategy	Ensure continuity in key leaders of change
Building of consensus and gaining of converts	Flexibility of systems, thought, and doctrine	Validate doctrine through field testing to shape change	Communicate the vision	Develop an education system that prepares leader to execute change
Continuity among the architects of change to induce consistency		High level of support and consensus to overcome habits and parochialisms of branch or service	Empower broad based action	
Support from the top (senior members) - Supporter or Champion		Reformers must remain accepted by the body and not become marginalized	Generate short term wins	
Conduct field trials to test the validity of the change			Consolidate gains	
			Anchor change in the corporate culture	

The first condition (represented in yellow above) is the requirement for an organization to realize change is required and to generate action. Starry refers to this as a “need for change,” while Murray and Millett refer to

the condition as a “clear institutional concept and interest” to innovate.²⁵ Kotter takes a slightly different approach in assuming that the requirement to change is clear and the institution requires only a “sense of urgency” to generate cooperation and productivity.²⁶ Consolidating these into a single modernization condition results in, “*Has the organization identified a need for modernization and mobilized a commitment to action?*”

A second theme (represented in green) concerns senior leaders and coalitions within the organization required to stimulate and sustain change. Starry references this requirement when he states that an organization requires a “spokesman for change,” and further, that this spokesman must garner the support from senior organizational leaders who will become either a “champion” or, at the least, a “supporter” of change.²⁷ Winton concurs with the need for senior leadership to stimulate innovation by stating, “There is a requirement for senior military leaders to articulate a vision” and thus generate a belief in the necessity for change within the organization.²⁸ Kotter represents this requirement with a description of “creating the guiding coalition,” a force within an organization that is powerful enough to sustain the change process.²⁹ Formulating these into a single condition results in, “*Does the organization possess senior leader(s) and coalitions positioned and empowered to drive change?*”

The third condition (represented in blue) concerns the need to build a population in support of change within an organization. Starry refers to this as the ability to leverage a “consensus” or a “wider audience of converts and believers” to stimulate the creation of new ideas and set the conditions for their adoption.³⁰ Winton also employs the term “consensus” and views this population as a tool enabling the organization to “overcome ingrained habits and branch parochialisms.”³¹ Likewise, Kotter acknowledges the importance of an

²⁵ Starry, “To Change An Army,” 23; Murray and Millett, *Military Innovation in the Interwar Period*, 312.

²⁶ Kotter, *Leading Change*, 35–36.

²⁷ Starry, “To Change An Army,” 23.

²⁸ Winton, *To Change an Army*, 239.

²⁹ Kotter, *Leading Change*, 51.

³⁰ Starry, “To Change An Army,” 23.

³¹ Winton, *To Change an Army*, 239.

organizational population supporting change by stating in his fourth condition, “The real power of a vision is unleashed only when most of those involved in an enterprise, or activity, have a common understanding of its goals and direction.”³² Spoehr concurs with the requirement for critical thinking, but cautions against it becoming “groupthink” and derailing the intellectual effort due to partisanship. Given Starry’s “wide audience” and Winton’s “consensus,” this condition infers a broader institutional receptivity to modernization and an organizational mindset to support change. In consideration of these observations, this study uses, “*Does the organization possess a consensus toward modernization that will overcome parochialism and resistance?*” as the third assessment condition in the rubric.

The final of the four conditions (represented in purple in Table 1) addresses the requirement for organizational doctrine to guide both the creation and the employment of modernization capabilities. Winton addresses doctrine in two aspects of his modernization theory. In the first instance, he states an effective military modernization requires a doctrine that reflects an organization’s “intellectual mastery of the nature of war,” one built around “sound ideas concerning how future wars should be waged.”³³ In this, Winton endeavors to tie the effectiveness of a modernization program to an understanding of how a nation views war and the concepts through which a nation envisions prosecuting it in the future. In his fourth condition, Winton states further that a military’s doctrine must be “field-tested” to ensure validity. Doing so will refine implementation “in terms of organization, weapons and equipment, and methods for training.”³⁴ Murray also discusses doctrine as a condition for successful modification, with the important caveat that overly rigid or prescriptive doctrine can presuppose failure in modernization. Both urge flexibility in systems, thought, and doctrine to set conditions for successful innovation.³⁵ From these considerations, the fourth condition employed in this study’s

³² Kotter, *Leading Change*, 85.

³³ Winton, *To Change an Army*, 239.

³⁴ *Ibid.*, 239.

³⁵ Murray and Millett, *Military Innovation in the Interwar Period*, 322–25.

rubric will be “*Does the modernization incorporate a doctrinal development that guides innovation and employment?*”

To the above conditions, this study adds one additional condition that addresses an external circumstance with which all modernizations contend – resource sufficiency. Although external in nature, national resources—and the prioritization of those resources—determine the energy and attention of a modernization effort’s execution. While money is the resource most commonly considered when discussing modernization, other resources are also important, to include but not limited to, manpower, technology, and intellectual capital. While the US Army controls and manages some of these resources internally, some are exclusively external to the organization, such as funding for the national defense budget. This condition stems from discussion of “under- and over-specificity of modernization goals” and use of a “hedging strategy,” as discussed by Andrew Krepinevich in “Needed: A Smaller and Very Different U.S. Military.”³⁶ Two additional sources support the applicability of this condition; the first comes from a discussion on “modernization risk tolerance,” as discussed with Army Futures Command project director COL Christopher Coglianese.³⁷ Spoehr further reinforces this idea with his observation that modernization must address the entirety of the army’s mission sets.³⁸ Due to the disparity in various national budgets during the period in which these case studies occurred, and the varied application and prioritization of funds and resources toward a modernization effort, this paper structures this condition as, “*Are the military resources sufficient and prioritized to support modernization?*” Viewed collectively, the list of conditions used as a rubric in this work are:

- 1) *Has the organization identified a need for modernization and mobilized a commitment to action? (Need and Commitment)*
- 2) Does the organization possess senior leader(s) and coalitions positioned and empowered to drive change? *(Leaders and Coalitions)*
- 3) Does the organization possess a consensus toward modernization that will overcome parochialism and resistance? *(Consensus)*

³⁶ Andrew F. Krepinevich, “Needed: A Smaller and Very Different U.S. Military,” *Policy Sciences* 29, no. 2 (1996): 98.

³⁷ COL Christopher Coglianese, “Modernization in the US Army,” presentation to the AY2020 Advanced Strategic Leadership Studies Program, School of Advanced Military Studies, Ft Leavenworth, KS, October 25, 2019.

³⁸ Spoehr, “Rebuilding America’s Military Project,” 61.

- 4) Does the modernization incorporate doctrinal development that guides innovation and employment? (*Doctrine*)
- 5) Are the resources sufficient and prioritized to support modernization? (*Resourcing*)

With the rubric complete, one final aspect of this study requires clarification. Due to the breadth and scope of modernization efforts by the United States, United Kingdom, and Germany during this period, space limitations of this study allow only an assessment of modernization in a single field – the incorporation of developments in tank and armored doctrine and formations. This works for several reasons. Firstly, the tank (and combined arms warfare in general) existed in the doctrine of all three countries during the interwar years, and each country had experimented in this field in the latter years of the WWI. Secondly, combined arms warfare was a central facet of ground combat in the Second World War. Additionally, technical innovation and the development of mechanization in civilian and business fields paralleled and contributed to the development of armored vehicles. Thus, with respect to this concept, no country had an outright advantage. Finally, the employment of tanks and armored formations in battle, both during and after the WWI, enabled the identification, analysis, and dissemination of lessons that led to doctrinal and conceptual innovations in this field.³⁹ This work validates the applicability of the five modernization conditions to tanks and armored warfare leading up to the Second World War, with the intent of expanding the same logic holistically to the larger modernization strategy of the US Army in 2020 and beyond. In other words, the results answer the paper’s research question, namely: What conditions must the Army set internally, and what external factors must it address (and, if necessary, mitigate) to enable the US Army to modernize most effectively?

Case Studies

This section presents case studies on tank and armored force modernizations conducted by the US, UK, and German armies following the conclusion of WWI up to the beginning of World War II. Each study provides a short assessment of the national army’s strategic environment, considering significant political, social, economic, and demographic conditions that might influence a modernization effort. Most of these

³⁹ Stuart D. Goldman, *Nomonhan, 1939: The Red Army’s Victory That Shaped World War II* (Annapolis, MD: Naval Institute Press, 2012), 166–68.

strategic and national level impacts will equate to an “external condition,” as described in this work’s introduction, and lay outside the army’s ability to control. However, to prepare for future challenges in modernizations, these conditions are useful to consider. Following this, each case study reviews the modernization program, and assesses the impact of the principal conditions, as discussed in the methodology section. Each case study closes with an analysis of the observations and assesses each modernization condition’s contribution to success or failure.

American Case Study - Tank and Armor Modernization in the Interwar Years

The return of the American Expeditionary Forces (AEF) from WWI began a confusing and fractious time for the United States military. Having successfully raised a modern army of four million men from a small “constabulary force” and rapidly built formations of minimally trained citizens, the United States contributed decisively to a victory over Germany, one of the most militarily capable nations in history. This outcome positioned the United States as the world’s leading military power. However, various social, political, and economic trends relating to international relations quickly reasserted control over American foreign policy, and the nation reverted to its “isolationist” tradition, for which a large and modern military was not required.

Socially and politically, the United States’ involvement in WWI, and in particular its citizens’ dissatisfaction with its political outcomes, led to disillusionment and a desire not to commit to global treaties or alliances that would require military force.⁴⁰ From a cultural and social perspective, the American people have traditionally declined to maintain a large, standing professional military. Both the absence of a credible military opponent and the sense of security afforded by oceans securing both the east and west coasts supported this belief and further decreased the perceived necessity to have one.⁴¹ Economically, the 1920’s represented a period of “financial stringency in government,” followed immediately by the Great Depression of the 1930’s,

⁴⁰ Williamson R. Murray and Allan R. Millett, *Military Effectiveness: Volume II, The Interwar Years* (New York, NY: Cambridge University Press, 1988), 71.

⁴¹ Johnson, *Fast Tanks and Heavy Bombers*, 66.

both eras creating periods of extreme fiscal hardship for the military. The confluence of these external factors limited the US Army's ability and willingness to focus on reform or reorganization during the interwar years.⁴²

These handicaps notwithstanding, the environment in which the US Army existed between the wars was not unique. Historically, national militaries have always had to innovate and modernize to remain relevant. As Samuel Huntington states, "the art of fighting is an old accomplishment of mankind. The military profession, however, is a recent creation of modern society."⁴³ General John J. Pershing, the AEF's commander, understood professionalization and recognized the war as America's entry into the world of global military engagement. As such, prior even to redeploying to America, he initiated a series of reviews to capture the lessons of the WWI. Pershing commissioned over twenty boards, each led by a general officer, to formulate and collect these lessons, compare them to the current Field Service Regulations (FSR), and submit them for study and consideration to the Army War College and other professional military schools.⁴⁴ A single board, the AEF Board of Organization and Tactics, consolidated the sundry reports and drafted a report for submission to the War Department.⁴⁵ Despite Pershing's knowledge of the advantages gained by employing tanks in WWI, his personal relationship with then-LTC George S. Patton, Jr., and his personal observation that tank use in the future will increase "many fold," only two pages of the 184-page document contained any discussion of their use in the future. Despite this omission, Pershing submitted the final report to Army Chief of Staff General Peyton C. March and Secretary of War Newton D. Baker. The report ultimately informed the provisions of the 1920 National Defense Act, which abolished the AEF Tank Corps as an operational formation and aligned all tank units and personnel under the Infantry Branch.⁴⁶ Viewed merely as an infantry support system, both

⁴² Odom, *After the Trenches*, 13.

⁴³ Samuel P. Huntington, *The Soldier and the State* (Cambridge, MA: The Belknap Press of Harvard University Press, 1957), 19.

⁴⁴ Odom, *After the Trenches*, 26–35.

⁴⁵ Starry and Hofmann, *Camp Colt to Desert Storm*, 38.

⁴⁶ *Ibid.*, 39.

mechanization and tank modernization stalled for much of the 1920s; not until 1927 did a renewed interest in mechanization resurface.

In 1927, US Secretary of War Dwight Davis attended combined arms and mechanized field trials by the British Experimental Mechanized Force at Salisbury Plain in the United Kingdom. Intrigued by the capabilities displayed, Davis directed the US Army to establish a similar unit to serve as a military laboratory and to test mechanization concepts and capabilities.⁴⁷ By July 1928, the Army had established the Experimental Mechanized Force (EMF), a combined arms formation of tanks, infantry, engineers, artillery, cavalry, and assorted support formations. Assembled at Camp Meade, Maryland, the EMF experimented with offensive and defensive mission sets, combined arms maneuver, and defined a baseline for logistical support requirements.⁴⁸ Concurrent with the creation of the EMF, the War Department initiated planning for a long-range mechanization program for the US Army.⁴⁹ Three months after its creation, however, the War Department disbanded the EMF based on accomplishment of its narrowly defined mission.⁵⁰ Despite the EMF's demise, the experiment resulted in key observations that would serve as the beginning of the Army's tank modernization effort.

One of the major outcomes from the EMF experiment was the realization that mobility would have to accompany firepower on future battlefields. Specifically, BG Frank Parker, War Department Assistant Chief of Staff for Operations and Training, recognized that tank capabilities, utilizing shock effect and mobility, eclipsed the platform's infantry support mission and could achieve strategic impacts through tactical maneuver. Parker's concepts envisioned tanks not just as weapon systems, but also as the core around which he recommended the army build an expanded structure, one that included entire mechanized, combined arms formations, with initial concepts up to division size. Parker, with the support of Secretary Davis, formulated recommendations to

⁴⁷ Ibid., 40.

⁴⁸ Johnson, *Fast Tanks and Heavy Bombers*, 96–97.

⁴⁹ Starry and Hofmann, *Camp Colt to Desert Storm*, 41.

⁵⁰ Ibid., 40.

Congress in 1928 to establish a permanent mechanized formation. This new unit would require the phasing out of old equipment and establishment of an ambitious procurement program that included both light and medium tanks, self-propelled artillery, and reconnaissance cars.⁵¹ Parker's estimated cost for the creation of this formation was \$270 million. Army Chief of Staff GEN Charles P. Summerall understood Parker's logic and concurred with the emerging concepts of mechanized formations. He reaffirmed the requirement in his 1930 annual report, but recognized that the US Army could not fund such a costly action only by reprogramming of funds. In fact, in 1932 Congress allocated just \$2.4 million for US Army tests and procurement, a paltry sum for which multiple systems competed, including a new infantry rifle and a new anti-aircraft gun. Congress later reduced the allocation to \$1 million. With input from the force, Secretary Davis chose to invest in what he assessed was the highest priority, the infantry rifle, further delaying the development of tanks and armored systems.⁵²

Espousing perspectives and ideas not widely held at the time, Parker served as a leading innovator by shaping the initial stages of mechanization's development. Garnering support from senior leaders like Summerall was critical for the expansion of the mechanization concept; however, the modernization effort still faced many challenges. Multiple chiefs of infantry, namely MGs R.H. Allen in 1927 and Stephen O. Fuqua in 1928, foresaw the expansion of tanks into a separate branch, and thus a threat and competitor for funding.⁵³ Despite their contrary opinions, the War Department approved Parker's recommendations and established a mechanization board, composed of representatives from all the branches, to develop the details of a separate, standing Mechanized Force.⁵⁴

In November 1930, COL Daniel Van Voorhis, a cavalryman, activated the Mechanized Force at Ft. Eustis, Virginia. Replicating the earlier experiments of the EMF, the Mechanized Force focused initially on

⁵¹ Ibid., 41.

⁵² Johnson, *Fast Tanks and Heavy Bombers*, 112.

⁵³ Johnson, 96; Starry and Hoffman, *Camp Colt to Desert Storm*, 40.

⁵⁴ Starry and Hofmann, *Camp Colt to Desert Storm*, 43.

individual training, then expanded to collective operations focusing on mobility and maneuvers in support of both “tactical and strategic missions.”⁵⁵ Both the experiments and the unit itself were short-lived, however. When GEN Douglas MacArthur replaced Summerall as army chief of staff in late 1930, he assumed the position with a new vision and strong, pre-existing beliefs on mechanization across the Army. Shortly after assuming his duties, MacArthur published his guidance in his “General Principles to Govern Mechanization and Motorization throughout the Army.”⁵⁶ In this document, MacArthur disbanded the Mechanized Force, directed all combat branches to develop mechanized or motorized capabilities internally, and apportioned tanks to the branches of infantry and cavalry. Further, MacArthur directed the establishment of a mechanized cavalry regiment in January 1933. The 1st Cavalry Regiment, from Ft. D.A. Russell, Wyoming, became one of two maneuver units in the 7th Cavalry Brigade (Mechanized) at Ft. Knox, Kentucky.⁵⁷ COL Van Voorhis assumed command, with LTC Adna R. Chaffee, Jr., again serving as his deputy. While Van Voorhis commanded the unit, Chaffee, in his role as the Executive Officer, drove the intellectual development of tactics and procedures within the unit that would guide its employment as a combined arms formation. The brigade possessed tanks, intended to vector toward enemies identified by armor-protected “combat car” troops executing traditional cavalry missions. These tactics, employing depth and speed of maneuver, differentiated its mission significantly from that of the infantry.

The establishment of the Mechanized Brigade, with Chaffee’s intellect and tactical acumen to drive it, generated the first detailed exploration of mechanized doctrine and tactics under a mission set other than that of supporting infantry. In August 1939, the mechanized cavalry brigade conducted a field exercise in Plattsburg, New York, displaying the effectiveness of “a wide enveloping movement and complete[ing] a successful deep

⁵⁵ Ibid., 44. In this instance, the term “strategic missions” meant that the outcomes of a particular tactical operation would have impacts on the enemy force outside of the bounds of the local battlefield.

⁵⁶ Starry and Hofmann, 45–46.

⁵⁷ Matthew D. Morton, *Men on Iron Ponies: The Death and Rebirth of the Modern U.S. Cavalry* (Dekalb, IL: Northern Illinois University Press, 2009), 26–30.

operation.”⁵⁸ Such operations ran contrary to the “methodical battle” concept of firepower and linear infantry tactics present in the Field Service Regulations (FSR) of 1923.⁵⁹ Chaffee’s experimentation and contribution to the future armored force continued even after his reassignment from the Mechanized Brigade to the Budget and Legislative Liaison Branch of the War Department General Staff, where he channeled \$5 million—of a \$45 million dollar budget—to the procurement of new tanks and other mechanized vehicles. Outside of such substantive support, Chaffee was also a member of boards that investigated the technical aspects of the tank as a weapon system, and lectured broadly to the US Army’s leaders on the advantages of mechanized warfare.⁶⁰ Based on his advances in the study and development of cavalry and tank tactics, contributions toward innovation in organizations and equipment, and continuous support of innovation in mechanization, Chaffee remains a “leading pioneer of American armor.”⁶¹

While much of the development of tank and mechanized tactics occurred in the Cavalry Branch, the Infantry Branch focused exclusively on the technical development of the tank as a weapon system. In 1933, the Infantry Branch determined it needed a mix of both light and medium tanks to fulfil the purpose of supporting infantry operations and, in 1936, the Ordnance Branch delivered the M2 light tank version for test and evaluation. However, development and fielding of a medium tank lagged. No consensus on this version emerged, due to disagreements within the branches on armor and survivability requirements, assigned missions, and roles of the weapon, armament capability, and initial observations from the combat theater in Europe highlighting the development and use of anti-tank systems.⁶²

With the December 1939 test firing and fielding of a T5 medium tank armed with a 75-mm howitzer, the peacetime development of the American tank ends.⁶³ Modernization from this point forward became

⁵⁸ Starry and Hofmann, *Camp Colt to Desert Storm*, 126.

⁵⁹ *Ibid.*, 112.

⁶⁰ *Ibid.*, 111–12.

⁶¹ *Ibid.*, 52.

⁶² Johnson, *Fast Tanks and Heavy Bombers*, 119–22.

⁶³ Johnson, 121–23.

reactive, driven by the technological developments and tactics employed on the European battlefields of Poland, and later, the rest of Europe.⁶⁴

To conclude this case study, it is helpful to review the American modernization effort in according to the rubric developed earlier in this paper. For the first condition, *Need and Commitment*, it is apparent that the US Army did identify a need to modernize. Based on Pershing's opinion and those of other senior officers, tanks would be a necessity in future wars and the US Army needed this capability. The in-depth analysis conducted on WWI operations, and the establishment of exploratory boards, indicate that the US Army was committed to mechanization the acquisition of tanks when resources became available. However, there were key leaders within the organization who disagreed with the means and techniques with which the army aimed to modernize.

Identification of these dissenting voices contributed to consideration of the second condition *Leaders and Coalitions*. The army did possess senior leaders who foresaw the importance of armor in future conflicts. These same leaders, including Pershing, Summerall, MacArthur, and Lindsay, held positions to drive change. However, they differed on the details of how to innovate and what the endstate of the change would be. Other powerful leaders, such as Chiefs of Infantry Allen and Fuqua, lobbied against the development of separate tank and armored formations due to the fiscal threat they presented to current force structure and existing branches. While the army possessed highly intelligent and advanced thinkers like Parker and Chaffee, who greatly contributed to the exploration of systems and tactics, they were too junior in rank to drive change from below. Given the incongruent guidance by its senior leaders, the US Army failed to build the coalitions required to execute a synchronized and large-scale modernization.

The failure of senior leaders to construct a congruent modernization approach contributed to challenges in the third condition, *Consensus*. With the lack of continuity and harmony of opinion by the senior leaders within the army, it was difficult to generate sufficient support for modernizations with external organizations,

⁶⁴ Ibid., 122.

such as Congress, who have the budgetary control to fund or cancel modernization efforts. Further, internal disagreements prevented the creation of a coherent, long-term modernization plan, which is crucial in guiding modernization, even if properly funded. In sum, the army failed to build a consensus. This failure allowed branch parochialisms and personal opinions to stymie innovation. As described by Carl H. Builder in *The Masks of War*, organizations formulate identities and personalities based on their histories, which forecast future actions.⁶⁵ The lack of a consensus toward tank modernization enabled parochialism and resistance that inhibited effective innovation.

The US Army exhibits slightly more success in the fourth condition, *Doctrine*. Despite a fractious and bifurcated strategy that split the employment of the tank into the infantry and cavalry, both branches attempted to modernize tactics to employ tank systems. With infantry's focus on the tank as a support system for attacking infantry formations, it did evolve its tactics and doctrine, but only within the "linear" attack concepts resident in infantry doctrine. Alternatively, cavalry's exploration of speed, depth, expanded mobility, and reconnaissance developed doctrine that informed alternative missions for its tanks; the branch released its first such publication in 1933, entitled *Mechanized Cavalry*.⁶⁶ Despite tactical experimentation and development of doctrine internal to the branches, the US Army failed to consolidate and encapsulate the subordinate tactics into overarching publications, such as FSR 1923, which served as the guiding doctrine until updated in 1939. As a result, America entered World War II with inadequate doctrine. Not until 1940, after observing German employment of tanks, did military leaders realize that FSR 1923 was insufficient and outdated.⁶⁷ Had the army consolidated the various branch tactics into a synchronized, combined arms doctrine earlier, it would have been better prepared for the combined arms warfare it faced entering into World War II.

⁶⁵ Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore, MD: John Hopkins University Press, 1989), 17–30.

⁶⁶ John L. Daley, *From Theory to Practice: Tanks, Doctrine, and the U.S. Army, 1916-1940* (Kent, OH: Kent State University, 1993), 447–48.

⁶⁷ Kenneth A. Steadman, *The Evolution of the Tank in the US Army* (Combat Studies Institute, US Army Command and General Staff College, 1982).

In the final condition, *Resourcing*, the answer is clearly negative. The political position of “isolationism” of the 1920s, married with the financial crisis of the Great Depression of the 1930s, significantly constrained the funding available to the US Army. Funding shortages throughout the 1930s were so severe that, not only could the US Army not conduct the research and development that would support an effective modernization; it could not financially sustain the readiness of its existing force structure.⁶⁸ Thus, even if senior leaders had provided prioritization, the nation did not have the resources to finance modernization successfully.

British Case Study - Tank and Armor Modernization in the Interwar Years

Like the United States, the United Kingdom emerged from WWI a victor. Dissimilarly, the British had experience as a world power, a position requiring commitments around the globe. These commitments, combined with the social and political turbulence associated with a long, costly, and bloody war, set challenging conditions for the modernization of the British armor force.

The United Kingdom emerged from WWI filled with both the pride of victory and revulsion at the cost in terms of lives lost. This position, combined with the creation of the League of Nations and the comforting buffer of the English Channel, led a majority of the population to believe that future war was a slim possibility.⁶⁹

From a strategic perspective, the economic conditions of the nation and its overseas commitments boded ill for modernization and rearmament. The United Kingdom had shouldered a majority of the Allies’ initial war costs, and then incurred crushing foreign debts to win it. These debts accelerated the economic decline with which the British Empire had struggled prior to the war. As the British Army demobilized, it faced nationalist riots in India, tribal attacks against the Northwest Frontier, and guerrilla attacks in Ireland and Palestine, further challenging the government’s fiscal solvency.⁷⁰

⁶⁸ Odom, *After the Trenches*, 92–97.

⁶⁹ Murray and Millett, *Military Effectiveness*, 98–99.

⁷⁰ *Ibid.*, *Military Effectiveness*, 100–101; Murray and Sinnreich, *The Past as Prologue*, 215.

Faced with these social and fiscal conditions, in 1919 the British government adopted the “Ten-Year Rule,” a fiscally expedient policy that prevented the military services from planning or anticipating major war within ten years. Renewed every year until 1932, this policy significantly affected defense planning and military expenditures.⁷¹ Specifically, it steeply reduced military budgets, resulting in drastic cuts in force structure. With successive governments focused on propping up the British Empire, such policies reduced the British Army to a “colonial police force.” Considering these social, economic, and political conditions, historians assess that the United Kingdom initiated its rearmament and preparation much later in the 1930s than was prudent, given indicators of future conflict on the European continent.

Not only did the British Army not think about future war, it failed to study the lessons of the last one. With the exception of some personal reflection and observations on experiences by military authors, the army delayed studying WWI until 1932.⁷² Even after a committee completed an official study, Field Marshal Archibald Montgomery-Massingberd, Chief of the Imperial General Staff (CIGS), determined the findings were not complimentary to the army and intentionally had them altered to reflect more favorably on the force.⁷³ This delay allowed the army to dwell on the most memorable battles of the Somme and Passchendaele, which utilized infantry and artillery tactics and limited tank operations. Thus, lessons in mechanization were eclipsed or forgotten, and the British Army failed to preserve its tactical knowledge on the effectiveness of tank employment.

Despite official disapproval, some innovative thinkers did explore concepts of mechanization and tanks in the 1920s. J. F. C. Fuller, chief of staff for the Royal Tank Corps in the Great War, became the army’s “best known writer on tanks and mechanization.”⁷⁴ B .H. Liddell Hart, a captain at the end of the war, served as a doctrine writer for the Infantry Branch and was instrumental in early formulations on mechanization. While

⁷¹ Ibid., *Military Effectiveness*, 103.

⁷² Murray and Millett, *Military Innovation in the Interwar Period*, 20.

⁷³ Ibid., 21.

⁷⁴ Murray and Sinnreich, *The Past as Prologue*, 199.

both men filled an intellectual gap for the British Army, personality conflicts between them and inflammatory attacks against senior leaders discredited their early contributions and encouraged opposition to modernization.⁷⁵

From this modest start, the British Army slowly pursued tank and mechanized modernization through the early 1920's. In addition to the cost of demobilization and the competition for resources in the various service branches, the government slashed the British Army budget by 50%, from £93.7 million to £42.5 million. Despite this reduction, the army was able to field a new medium tank, the Vickers, in small numbers by 1923. The Vickers, achieving speeds of 20 miles an hour, presented new capabilities and options for innovators looking to develop concepts in the speed and mobility of mechanized warfare.⁷⁶ The British defense industry, however, underwent a significant post-war reduction from thirty large manufacturers in 1918 to just one by 1930; it was unable to produce the tank quickly or in high quantities.⁷⁷ Despite these challenges, conceptualization continued in the officer corps and Fuller formulated a model for an experimental armor formation. Fuller's concept resonated with the Secretary of State for War, Sir Laming Worthington Evans, who authorized its experimentation.⁷⁸

Britain's Experimental Mechanized Force (EMF), activated in May 1927, consisted of a battalion of medium tanks, an armored car and light tank battalion, a machine gun battalion, a field artillery brigade with light artillery battery attached, and a field engineer company. GEN George Milne, Montgomery-Massingberd's predecessor as CIGS, offered the command to Fuller, but personality conflicts and opinions led Fuller to decline. Unfortunately, this incident created a fissure of discontent and friction between Fuller, his contemporary and confidant Liddell Hart, and the senior leaders of the British Army.⁷⁹ The EMF experiments

⁷⁵ Winton and Mets, *The Challenge of Change*, 98–100.

⁷⁶ Murray and Millett, *Military Innovation in the Interwar Period*, 25.

⁷⁷ Murray and Millett, *Military Effectiveness*, 103. By 1930, only Vickers Armstrong and the defense arsenals remained of the formerly robust, World War I manufacturing infrastructure.

⁷⁸ Winton and Mets, *The Challenge of Change*, 79–80.

⁷⁹ Murray and Millett, *Military Innovation in the Interwar Period*, 24.

themselves proved extremely insightful. As an example, during one iteration the brigade out-maneuvered a conventional infantry formation three times its size, and ultimately, threatened a flank, exhibiting exceptional mobility.

The Salisbury maneuvers generated significant lessons for both the EMF and the army, which were widely disseminated. The demonstration converted MG John Burnett-Stuart, an infantry officer, commander of the 3d Infantry Division and the officer responsible for the oversight of the experimental unit, from “an open-minded commander into a convinced advocate of armored units built around the tank.”⁸⁰ Burnett-Stuart would play an integral part in the army’s mechanization from this point forward. In 1934, Burnett-Stuart would go on to command experimental maneuvers of the army’s capstone armored concept that would “display flexibility, mobility, and firepower superior to any existing conventional force.”⁸¹ Additionally, COL Charles Broad captured the key insights of the trials and codified them in his publication, *Mechanised and Armoured Formations*, one of the first doctrinal publications and a work upon which Broad continued to expand over the next five years.⁸²

The Experimental Mechanized Force ended field trials in 1931, due both to a shortage of funding (the result of the Great Depression hitting Britain) and from the replacement of Milne by Montgomery-Massingberd. Montgomery-Massingberd, much like MacArthur, believed the entire army should engage in a gradual evolution to both motorization and mechanization. Further, he anticipated that the mechanized formation would intrude upon the capabilities and resources of the current conventional branches of the force.⁸³

As consensus for mechanization grew slowly across the British Army, fiscal constraints continued to restrict a broadening of the mechanization initiative. In 1934, the British service chiefs agreed that the growing threat from Germany meant that the time had come for rearmament, of which mechanization was a large

⁸⁰ Winton and Mets, *The Challenge of Change*, 83–84.

⁸¹ Murray and Millett, *Military Innovation in the Interwar Period*, 26–27.

⁸² Winton and Mets, *The Challenge of Change*, 86–88.

⁸³ Murray and Millett, *Military Innovation in the Interwar Period*, 26.

component. However, Neville Chamberlain, then Chancellor of Exchequer, stridently opposed rearmament and lobbied for a reduction in military spending, ultimately reducing the army budget by fifty percent.⁸⁴ With limited resourcing and unable to expand the organizational structure, the army emphasized intellectual development with the General Staff's publication of "The Future Reorganisation of the British Army." This forward-thinking document aligned the army's structure against the anticipated conflict it would face in Europe and detailed the initial combat requirements expected of the British force.⁸⁵ Additionally, the document produced a doctrinal template guiding tank employment, with heavy tanks dedicated to the support of non-motorized infantry formations and lighter tanks, known as "cruisers," operating ahead of mechanized units and oriented on the flanks and rear of enemy formations. Ultimately, this strategic document defined the concepts under which the army could now nest its developing subordinate doctrine to formulate a clearer understanding of the role of tanks and mechanized units.

In 1937, now-Prime Minister Chamberlain once again severely restricted funding for the army and explicitly banned rearmament, effectively killing further work on the fielding and preparations of field forces designed for continental warfare.⁸⁶ In an attempt to preserve modernization efforts to date, the British War Department broadened mechanization efforts outside of the Royal Tank Corps, specifically within the cavalry regiments.⁸⁷ However, in 1939 the British government began rapidly to transition to a full-scale rearmament in preparation for war with Germany.⁸⁸

Reviewing the British modernization effort relative to the five-condition rubric, condition one, *Need and Commitment*, reveals the British exhibited both a social and organizational ambivalence toward military modernization. Delayed study of WWI, paired with the isolationist, socio/political opinion that war was not likely, put the British Army in a position to misidentify a need to modernize. This delay likely induced

⁸⁴ Murray and Sinnreich, *The Past as Prologue*, 203–4.

⁸⁵ *Ibid.*, 204–5.

⁸⁶ *Ibid.*, 209.

⁸⁷ Murray and Millett, *Military Effectiveness*, 122.

⁸⁸ Winton and Mets, *The Challenge of Change*, 92.

opportunity costs that, if avoided, would have enabled the British to construct a much more coherent modernization and better positioned them for when war did come.

The delay in identifying a need for change affected the setting of the second condition, **Leaders and Coalitions**. While the British Army possessed progressive and forward-thinking leaders, allegiance to its traditions and history stymied early modernization efforts. Without the guiding effort driving a need for change, innovators were experimenting and researching individually and within their fields of experience. Thus, coalitions failed to form and, like the first condition, modernization progress was slow.

The third condition addresses *Consensus*. Clearly, the British did not have it. The British Army possessed the potential to socialize ideas and build consensus through leaders and innovators, like Fuller and Liddell-Hart, prolific writers who published broadly in both professional and civilian journals. Based on the debacle over Fuller's refusal of command of the EMF, schisms grew which drove a wedge between these personalities and the modernization effort. Although both writers remained active in the developing modernization effort, they failed to gain senior leaders' allegiance and support, marginalizing their contributions, at best. Further, the existing British Regimental System created a natural impediment to innovation. In a time of lean resources, established regiments competed directly with the Royal Tank Corps for funding, and, after Montgomery-Massingberd dissolved the EMF, pursued innovation without a central guiding strategy.

Contrary to the prior conditions, the British Army exhibited progress in pursuit of the fourth condition, **Resourcing**. At the tactical level Broad successfully leveraged the Salisbury Plain maneuvers to formulate a base doctrine for armor and mechanized operations that could guide both future experimentation and employment. Progress on tactical doctrine continued from this point, and within four years had begun to address control and employment of large armored formations. Strategically, "The Future Reorganisation of the British Army," constituted a guiding document that implemented mechanization from the top down, provided direction on employment, and developed a tactical concept that oriented different force structures on specific mission

sets.⁸⁹ In summation, the development of the British Army's doctrine not only served to guide modernization when it did begin in earnest, it also set conditions for the employment of the armored force once it was created in the closing years of the 1930s.

The army's doctrinal advances were a leading contributor to the modernization effort's survival in consideration of the final condition, *the sufficiency of resources and their prioritization to support modernization*. This condition proved to be the least attainable for the British. Staggered by war debt, burdened with imperial defense, and the fiscal impacts of the Great Depression, funding became a catastrophic challenge for the British Army during the interwar years. Despite notable efforts to maintain the tempo and continuity of innovation, political realities severely hampered the army's ability to modernize and prepare for future conflict under any coherent strategic approach.

German Case Study - Tank and Armor Modernization in the Interwar Years

The conditions following the end of WWI were far different for Germany than for either the United States or the United Kingdom. In defeat, the Treaty of Versailles determined Germany's immediate future. This settlement, in addition to significant internal political changes, set the stage for a challenging strategic situation within which Germany would aim to modernize.

Politically, Germany's defeat in WWI resulted in the collapse of the imperial system and the establishment of the Weimar Republic in 1918.⁹⁰ For the military, this transition of government systems enabled a consolidation of the formerly separate armies from the imperial federal structure into a single national army, the *Reichswehr*. With a new government and a host of economic, territorial, and military restrictions, the new republic faced daunting economic challenges over the next decade, including crushing war reparations, two bouts of hyperinflation, an industrial depression, and sustained high unemployment.⁹¹ While the economic impacts on German society were significant, they never stanching the support and admiration it conferred upon

⁸⁹ Murray and Sinnreich, *The Past as Prologue*, 204.

⁹⁰ Winton and Mets, *The Challenge of Change*, 66.

⁹¹ Albert Seaton, *The German Army, 1933-1945* (New York, NY: St. Martin's Press, 1982), 21.

its military, despite defeat in the last war. In fact, a majority of Germans never reflected the same social outcry and revulsion of war that was present in the United States or United Kingdom. The relative invisibility of the anti-war cohort in the German arts of the period reflects this social balance.⁹² However, the struggling economy did set the stage for the evolution and emergence of the National Socialist (Nazi) Party, which came to power in 1933 and displaced the Weimar Republic.

The rise of the Nazi Party indicates another significant difference that distinguished German modernization efforts from those of the British and Americans, namely, the independence of the military service. The *Reichswehr*, as a newly centralized and single force, benefited from significant freedom from direct, governmental oversight and control in direction and action. Under the Nazi Party, the Army was free to develop and employ its own independent strategy, constrained only by the constraints of the Treaty of Versailles and without significant political guidance.⁹³ Adolf Hitler possessed insufficient political capital to wrest power from the army, but as long as the *Reichswehr* was building capability in support of a resumption of regional power in Europe, a goal that Hitler shared, the government supported modernization by providing only generalized guidance and a plentiful funding stream.⁹⁴ With this strategic setting as a start point, this case study explores the functions of the German modernization.

Versailles set in motion some of the initial positive steps toward modernization within the *Reichswehr*. Limited to an army of 100,000 men, GEN Hans von Seeckt, Chief of the *Truppenamt* and later de facto *Reichswehr* commander-in-chief, managed a post-war force reduction program that focused on building a cadre of professional soldiers based on intellect, and not purely on experience and war service.⁹⁵ In so doing, von Seeckt built an officer corps that was mentally equipped for the challenges of modernization. This effort

⁹² Murray and Millett, *Military Effectiveness*, 16.

⁹³ Murray and Millett, *Military Innovation in the Interwar Period*, 16.

⁹⁴ *Ibid.*, 17

⁹⁵ *Ibid.*, 36. From 1919-1920, GEN von Seeckt served as the Chief of the *Truppenamt* (literally translated as “Troop Office”), a formation operating as a general staff in a time when such a formation was banned by the Versailles Treaty, and then as the Commander in Chief of the *Reichswehr* (*Chef der Heeresleitung*), from 1920-1926.

continuously yielded value in the form of *Denkschriften* (Idea Papers), which circulated ideas and spawned intellectual innovation across the army.⁹⁶ Further, von Seeckt commissioned a comprehensive study of WWI, establishing over fifty committees and manning them with over 400 army officers, to study the lessons of the last war.⁹⁷ Finally, von Seeckt proposed a program of army reform that, combined with the results of the aforementioned study, he circulated across the general staff and the army.⁹⁸ These efforts built a common understanding across the officer corps and outlined the intended direction of army's reformation.

The early 1920s also saw the emergence of an early doctrinal structure to guide tank and mechanized modernization. Expounding on the studies completed on WWI, von Seeckt published "Army Regulation 487, Leadership and Battle with Combined Arms," a two-part document with the first issued in 1921 and the final part published in 1923.⁹⁹ In this doctrine, von Seeckt elucidated five principal tenets of army operations: 1) the importance of maneuver, 2) emphasis on the offense, 3) decentralization of missions by commanders to the lowest level, 4) the importance of judgement in battle, and 5) the criticality of leadership at all levels. "All army officers were required to be thoroughly familiar with this doctrine" and it served as a basis for all operations.¹⁰⁰

In addition to constructing an officer corps amenable innovation and change, the *Reichswehr* also successfully organized to support effective reform. In 1925, the *Reichswehr* was composed of two principle subordinate organizations, the *Truppenamt* and the *Waffenamt* (Armaments Office). Both organizations operated under the direct guidance and instructions of the *Reichswehr Chef de Heeresleitung (CdHL)*.¹⁰¹ This structure streamlined the reporting and control of the two "offices" and enabled the CdHL, who had his own

⁹⁶ Winton and Mets, *The Challenge of Change*, 57. Notable topics, which generated development as a result of these idea papers, included; the professionalism of the army and concepts for maneuver (1919), technical expertise and the incorporation of engineering skills in army officers (1920), and the incorporation of tanks in support of the infantry formations, which led to the development of assault guns (1935).

⁹⁷ Murray and Millett, *Military Innovation in the Interwar Period*, 37.

⁹⁸ *Ibid.*, 37.

⁹⁹ *Ibid.*, 37.

¹⁰⁰ *Ibid.*, 37–38.

¹⁰¹ Murray and Millett, *Military Effectiveness*, 220. The *Chef de Heeresleitung* was an important member of the senior governmental bureaucracy with significant referent power, who represented the interests of the *Reichswehr* without reference to political control.

military budget to prioritize efforts and resources. Further streamlining the structure, the general staff assigned representatives from each of the combat branches to the *Waffenamt*, thus improving coordination in modernization requirements.¹⁰²

As important as structure and organization was to the success of modernization, equally important was the *Reichswehr's* focus on wargames and field tests. Even in the shadow of the defeat in WWI, the *Reichswehr* still conducted annual war games to test and evaluate their strategic and operational assessments. The wargames conducted in both 1927 and 1928 were important; their results indicated to the *Reichswehr* leadership that, at its current level, it was not sufficiently equipped and manned to defeat Poland's military, much less one fielded by a European great power.¹⁰³ In addition to war games, the *Reichswehr* conducted many field tests and maneuvers to support modernization. In 1926, the army conducted its first post-war, large-scale maneuver employing division- and corps-sized formations. From these beginnings, the army proceeded to its first motorized maneuvers in 1932, and then its first mixed experiments (testing the concept of intermixed horse-mounted and motorized formations) in 1932. This experiment proved to the Germans that horse-mounted forces could not sustain the speed and distance of motorized and mechanized forces, further supporting the necessity for mechanization.¹⁰⁴ As with the wargames, these field tests were critical in validating doctrinal concepts.

German modernization used more than just the maneuvers and field trials of the German army; it also assessed and participated in innovation efforts with foreign forces. Two German officers attended the British field trials conducted on the Salisbury Plain in England, transmitting the observations and lessons to the *Reichswehr* for analysis and consideration.¹⁰⁵ The German army also established a relationship with the Soviet Red Army to explore armor formations, training, and tactics, specifically opening a German tank school in Kazan on the Kama River.¹⁰⁶ This "off-site" training academy was a necessity for the Germans, as the

¹⁰² Winton and Mets, *The Challenge of Change*, 44.

¹⁰³ Murray and Millett, *Military Effectiveness*, 237–38.

¹⁰⁴ Winton and Mets, *The Challenge of Change*, 50.

¹⁰⁵ Murray and Millett, *Military Innovation in the Interwar Period*, 39.

¹⁰⁶ Seaton, *The German Army*, 62.

Versailles Treaty specifically prohibited them from having or employing tanks. The tank school at Kazan is important, as it was the recipient of the first post-war, German-built tanks, six heavies and three mediums, covertly shipped to Kama in 1928. This fielding restarted the industrial production of armored vehicles in Germany.¹⁰⁷ Beginning with these international cooperative events, Germany initiated the transition of its modernization effort from merely a conceptual effort to a tank-equipped army in being.

Initial stages of this restructuring began under von Seeckt's leadership in the mid-1920s. Instead of attempting the evolution of armor formations from within the infantry or cavalry branches, the *Reichswehr* based the armor branch within the existing *Kraftfahrabteilungen* (motor transport battalions). This decision served two principal purposes: 1) it obscured the creation of a new combat branch, specifically tanks which were forbidden by the Versailles Treaty, from Allied observation by placing it in divisional transportation units that served as service support and not combat troops, and 2) it aligned the technically-intensive formation with the motorized units, who were already acclimated to the increased logistical and maintenance requirements of motorized or mechanized forces.¹⁰⁸ Two additional benefits of this structure were that the *Kraftfahrabteilungen* had an established chain of command, eliminating the requirement to create an entirely new branch, and it obviated the potential for competition and friction between the other combat branches, as occurred in both the American and British armies.

As the *Reichswehr* continued to modernize in both doctrine and structure, resources continued to flow unhindered. The German military budget of 1932, which committed 73% of the entire budget to the army, evidences this political support. Hitler's ascension to the chancellorship in 1933 heralded a stiffening of political stances toward direct engagement and expansionism, sustaining funding and setting conditions for a massive rearmament in 1933.¹⁰⁹ This level of resourcing put the German Army in a significantly different position for modernization than its future opponents, the United States and the United Kingdom. Not only was

¹⁰⁷ Ibid., 62.

¹⁰⁸ Ibid., 61.

¹⁰⁹ Murray and Millett, *Military Effectiveness*, 229; Murray and Millett, *Military Innovation in the Interwar Period*, 41..

Germany heavily funding rearmament, it was doing it far earlier than the Allies.

The rearmament period had both positive and negative impacts on the *Reichswehr*, now renamed the *Wehrmacht*. Despite sufficient resourcing, some challenges accompanied the massive growth of the army. For instance, the quick growth of the force exceeded the institutional training and education systems that existed under the smaller force, which led to a decrease in the education and skills of its officer and enlisted corps.¹¹⁰ However, the force still possessed the forward thinkers and innovators that it had leveraged through the 1920s, continued the doctrinal development and maneuvers to refine what these intellectual leaders produced, and now could openly manufacture the equipment and vehicles required in the concepts. In the maneuvers of 1935, Heinz Guderian, a long-time innovator in the *Reichswehr*, published a doctrinal concept for a tank division. Guderian's concept utilized a tank-heavy ratio within its force structure (sixteen tank battalions to nine infantry). Upon testing, the army identified that the formation possessed insufficient infantry to accomplish required security tasks. Modifying the organization to a balanced ratio (twelve battalions each) rectified the issue and, after further testing, convinced the new army chief of staff, GEN Ludwig Beck, and *Wehrmacht* Commander-in-Chief, GEN Werner von Fritsch, of the feasibility of a tank division.¹¹¹ While neither Beck nor von Fritsch actively pursued innovation or exploratory thinking, both were smart enough to sustain and support the innovation leaders who advocated change during this expansive period of growth in the army.¹¹²

With the rearmament program initiated in 1933, and operational employment of new military capabilities in 1938, this case study closes a couple of years earlier than the preceding two. However, this time differential does not affect a review of the case with respect to the modernization rubric. In respect to the first condition of **Need and Commitment**, the German army successfully met this condition. The goal to regain hegemony in Europe aligned military and political aims. To compete militarily, Germany needed to rebuild its military after the reduction of the Versailles Treaty. In light of significant economic depression and post-war

¹¹⁰ Murray and Millett, *Military Effectiveness*, 244–45.

¹¹¹ Murray and Millett, *Military Innovation in the Interwar Period*, 41-42.

¹¹² *Ibid.*, 51.

debts, its uninterrupted military funding signified a clear national commitment. Retaining both the most intellectually- and experientially-qualified officers, Germany focused on modernization and rearmament.

For the second rubric condition, *Leaders and Coalitions*, the German case study does successfully meet this condition. GEN von Seeckt actively empowered change with his mandate to study the lesson of WWI. His assignment of over 400 officers to the review committees built a willing coalition of like-minded and informed officers who were prepared to support innovation with the *Reichswehr*. Further, both his consolidation of the committee's reports and his publication of a reform memo not only instituted change but also provided a common vision and a tangible aspiration within a clear expression of intent and guidance.

For the third criterion, *Consensus*, the results of the study indicate that the German army did meet this condition. In *Military Innovation in the Interwar Period*, Murray and Millett identify that, regardless of the rank of the speaker or how narrowly supported the opinion, the German Army both considered and valued the contribution of outspoken officers. Further, and as shown above, the German Army encouraged freethinking officers such as Guderian, whereas the British marginalized dissonant opinions like those presented by both Fuller and Liddell Hart.¹¹³ Moreover, the Germans took steps to minimize internal resistance by establishing their armored force within their transportation corps, thus reducing friction and competition between the infantry and cavalry branches.

For the fourth condition, *Doctrine*, the *Reichswehr* successfully met this condition with the publication of *Army Regulation 487*. Without exploring the strategic reasons for the loss of the war, this doctrine's deep tactical study provided an opportunity to help explain it, while also establishing five central principles of military operations that shaped modernization during the force's reformation and into the next war. Further, the flexibility of the German doctrine, supported by the continuous testing of annual wargames and field trials, ensured its principles remained relevant and consistent.

For the final condition, *Resourcing*, the minimal size of the force and lack of large weapon systems

¹¹³ Ibid., 24.

directed by the Versailles Treaty minimized operating costs and preserved funds for transformation. Military fiscal independence, followed by Hitler's ascension to the chancellorship and prioritization of aggressive rearmament clearly supported modernization. With Hitler's goals to expand land holdings on the European continent, the army became the clear funding priority. Of the three modernizing countries, Germany clearly benefitted the most from accessible funding and resourcing.

Conclusion

To conclude this study, this section collates the results of each case study by modernization conditions, and assesses their applicability to the US Army's current modernization strategy. After discussing the findings, the conclusion then formulates recommendations, based on lessons learned from the research in these cases, to facilitate effective modernization.

Case Study Analysis

A review of the first modernization condition, *Need and Commitment*, reveals that the American and German Armies identified a clear necessity to modernize their force structures, despite possessing different strategic drivers for change. The US Army, newly emerged from WWI as a global power, required a modern army to preserve the world order it had fought to establish. The German Army, significantly reduced by the Treaty of Versailles, needed to rebuild an army to reassert hegemony in Europe. Contrarily, the United Kingdom, reverting to a military policy in defense of the Empire, failed to recognize a need to modernize and delayed transforming its army. As a result, "the British in the Second World War, as in the First, found themselves trying to improvise a large army, on an inadequate foundation, in the course of an enormous war."¹¹⁴ Further, historians opine that they "got away with it," only "because other armies bore the brunt of the fighting until they got their respective acts together."¹¹⁵

In analyzing this first condition, it is evident that clarity in the necessity for change is not only

¹¹⁴ Murray and Sinnreich, *The Past as Prologue*, 214.

¹¹⁵ *Ibid.*

important, but is directly dependent on the strategic focus and priorities of the nation. Applying this condition to the current strategic environment, *Investing in the Future* posits that the United States is approaching a transition point where the near-term pacing threat (Russia) transitions to a “mid-to-long-term” pacing threat (China).¹¹⁶ While both are near-peer competitors, they are “two distinct and changing adversaries,” with Russia being a ground-centric force structure and China an air- and maritime-centric.¹¹⁷ Concurrently, the army needs to retain the capability to counter actions by “rogue regimes” and transnational terrorism, all within a new operating concept of Multi Domain Operations.¹¹⁸ Given this situation, *Investing in the Future* explicitly states a need to modernize and demonstrates a commitment to action in doing so.

If the armies of the interwar period possessed a clearly stated need and commitment, did they possess the *Leaders and Coalitions* to drive change? Once again, we identify a disparity across the three case studies, with the American and German armies meeting the criteria and the British not. In the American case, the army contained senior leaders, including Pershing, MacArthur, and Lindsay, who both recognized a need to modernize and took steps to facilitate it. These leaders possessed both the position and the power to drive change. Further, the US Army possessed junior officers, such as Parker, Chaffee, and Van Voorhis, who understood the modernization requirement and aggressively pursued experimentation. These leaders enlisted a coalition of supporters that sustained progressive modernization. The shortfall for the Americans, however, was that the senior leaders differed on the means by which to execute the modernization. While not inducing failure in the effort, this bifurcation of guidance induced friction and delayed progress. Comparatively, the German Army also possessed senior leaders who pursued and drove change. Likewise, they built coalitions by involving junior leaders directly in the change process (i.e., 400 officers tasked to identify the lessons of WWI), “connecting the intellectual drive within their army to the operational world.”¹¹⁹ As a counterpoint, the British

¹¹⁶ *Army Modernization Strategy*, 3.

¹¹⁷ Spoehr, “Rebuilding America’s Military Project,” 36.

¹¹⁸ Spoehr, 30–31.

¹¹⁹ Murray and Millett, *Military Innovation in the Interwar Period*, 47.

lacked any senior leaders who championed significant change. While it possessed junior leaders who foresaw the need for change and experimented and socialized modernization concepts, the army not only failed to support them, it castigated their efforts.

Recently, the US Army implemented organizational changes to set conditions for the current modernization strategy, and that appear to satisfy this condition. With the establishment of Army Futures Command (AFC), the army created a new four-star headquarters with the express mission of leading change. Further, GEN Milley, then Army Chief of Staff, stated a desire to keep this senior commander in position longer than was typical, thus achieving the “continuity” recommended by both Starry and Spoehr.¹²⁰ Finally, AFC employs six modernization priorities and eight Cross-Functional Teams to coordinate and synchronize modernization efforts by portfolio; in so doing it has formalized the creation of guiding coalitions.¹²¹ The structure is there, now the army must await the results.

The third criterion, **Consensus**, again, exhibited mixed results. The US Army proved unable to generate consensus of thought and action by allowing unsynchronized tank employment in both the Infantry and Cavalry branches. With no single proponent, both branches pursued parochial approaches that minimized threats to their traditions and identities, maintained the status-quo, and, ultimately, diluted effectiveness of modernization. Likewise, the British experienced parochialism between the younger Royal Tank Corps and the established regiments, driven by competition for scarce funding and reverence for traditional approaches. As mentioned above, ostracizing Fuller and Liddell Hart, and other young leaders who supported exploring new ideas and concepts for tank employment handicapped the army’s ability to generate consensus. In fact, Liddell Hart and Fuller proved much more instrumental in shaping the intellectual exploration and modernization in both Germany and the US than they did in the British army.¹²² Contrarily, the German Army experienced very little

¹²⁰ Spoehr, “Rebuilding America’s Military Project,” 33–34.

¹²¹ *Army Modernization Strategy*, 6–7.

¹²² John L. Daley, *From Theory to Practice: Tanks, Doctrine, and the U.S. Army, 1916-1940*, 330; Staff and Hoffman, *Camp Colt to Desert Storm*, 536.

resistance or parochialism. Intentionally or not, the establishment of new tank formations within the transportation corps prevented much of the branch friction experienced by the US and UK. Concomitantly, the open sharing of ideas, both internally through Idea Papers, and externally with foreign nations, created conditions suitable for consensus and a rich environment of intellectual exploration that countered resistance.

As the US Army only recently published *Investing in the Future* in November 2019, it is too early to ascertain its success in generating consensus and mitigating the risks of parochialism and resistance, either internally and externally. However, there are capabilities nested in the strategy to set conditions for success in this area. First, the strategy employs an MDO concept to focus modernization efforts, providing a unified modernization goal to account for the challenges of a multi-polar threat environment.¹²³ Secondly, this modernization plan incorporates a strategic approach, engaging all aspects of the Army's doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P), to ensure "collaboration across the entire Army," and to mitigate a potential "haves and have nots" outcome.¹²⁴ Finally, the strategy provides a simple narrative construct, "how we fight, what we fight for, and who we are," which is broadly comprehensible, from the most junior soldier to the most senior senator, and suitable as an engagement tool in support of resourcing. The army is building consensus.

The fourth condition assesses *Doctrine*. In the American case, it lacked a consolidated combined arms doctrine to align the tactics by which its subordinate branches would employ tanks in combat. The means by which tanks would variously be used, heavily armored infantry tanks supporting penetrations and frontal attacks as opposed to lighter, speedier cavalry tanks that looked to envelop and threaten flanks, complicated the specifications and capabilities needed in the tanks as weapons platforms. Alternatively, the British and the German Armies benefitted from strategic publications to inject focus and clarity into their modernization plans. The British Army's publication, "The Future Reorganization of the British Army," forecasted how the Germans

¹²³ Spoehr, "Rebuilding America's Military Project," 2. Despite the US Army's continuing effort to refine this operational concept, and Spoehr's position that it requires an update, the operational concept provides, at a minimum, a solid description of the challenges the army will face in nearly every possible future conflict.

¹²⁴ *Army Modernization Strategy*, 3–7.

might fight and recommended development of tanks with the appropriate capabilities and specifications to employ their new tank formations coherently in response. This doctrinal effort likely demonstrated the most critical element in enabling the British army to recover from a sluggish modernization in time to rearm sufficiently to meet the German threat. The Germans, like the British, codified their approach to warfare in *Army Regulation 487*, which outlined a combined arms concept that defined the required capabilities of its tank platforms. Considering German doctrine writ large, Williamson Murray identifies its coherency as the “most important single factor in German innovation.”¹²⁵

Acknowledging the criticality of doctrine in the modernization process, the US Army is positioned to leverage success. Its current modernization strategy utilizes MDO as an operational framework to define “*how we fight*” and “*what we fight with*,” guiding facets that aim to synchronize capabilities during development instead of after fielding, and informed by the way the army plans to fight, without being overly directive.¹²⁶ Further, with AFC relieving Training and Doctrine Command (TRADOC) of responsibility for equipment modernization, TRADOC is now free to apply additional focus to updating and modernizing army doctrine, concurrent with the modernization of equipment and capabilities. Finally, as with the Germans, the US Army possesses the ability and intent to test and exercise its doctrine as it develops it, via the multi-echeloned, live-virtual-constructive training system.¹²⁷ Ultimately, the army’s current training and doctrine structures provide linkages offering the ability to quickly transition from doctrinal development to employment, without lengthy delays to develop and refine tactics.

This study’s final assessment considers **Resourcing**. As with the other conditions, the applicability of this varied across the three case studies. In the American case, the Great Depression amplified postwar budget austerity and paralyzed the army’s ability to fund modernization. While there were internal efforts to prioritize tank modernization, such as Chaffee’s support while assigned to the General Staff, internal army decisions

¹²⁵ Murray and Millett, *Military Innovation in the Interwar Period*, 41.

¹²⁶ *Army Modernization Strategy*, 3–7. Italics indicate emphasis as published in the original document.

¹²⁷ Spoehr, “Rebuilding America’s Military Project,” 37. The US Army intends to update its MDO framework after feedback from wargames and exercises.

supplanted tank modernization with development of a new infantry rifle. The British suffered the impacts of the Great Depression also, limiting their economic abilities to fund tank modernization. Along with fiscal limitations, the UK's emphasis on colonial defense, as opposed to conventional warfare, further restricted tank development. Alternatively, the German Army possessed a clear prioritization, outlined in its definition of how it intended to fight, and a clear prioritization, both within the national budget and between its sister services. This clarity enabled the Germans to modernize its tank corps despite the fiscal limitations induced by a war-torn economy, war debts, and economic depression.

Applying conclusions from this criterion toward *Investing in the Future*, the US Army currently faces global commitments and conflicts unknown to the army of the interwar period. After a "precipitous" downsizing in budget and manpower from 2011-2016, the army faced readiness and resource challenges revealing that, "as many as two-thirds of Army brigades (were) not ready for combat."¹²⁸ Despite recent budget increases, and accepting projections that these increases will remain flat while defense costs continue to grow, the army must be ready to balance modernization continuously, while maintaining readiness. While the army may not control its authorized budget directly, it can emplace internal prioritizations to ensure the most important modernizations are completed.

From budgets to leadership, the above cases demonstrate that each of these five conditions does significantly affect modernization. The most significant lesson, however, is that, while none did by itself either guarantee success or failure, each contributed directly to a level of military preparedness for the nation as it approached its next war. Restated in accordance with the focus of this study, the current US Army modernization effort should employ these five conditions as guides to assess continuously the effectiveness of the program. Whether the US Army can maximize its control over these five criteria, however, will not ensure success, but will provide a better gauge of avoiding the mistakes that we see from history. In this respect, the army aims to counter Michael Howard's comment that opened this work, and not "get it (modernization)

¹²⁸ Ibid., 12.

wrong,” in order to ensure we have the time and resources to get it as right as possible.

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