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**PLOTTING THE FUTURE: UPDATING THE DOD'S
INNOVATION POLICY GAP TO RECLAIM
TECHNOLOGICAL LEADERSHIP**

December 2023

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POLICY GAP TO RECLAIM TECHNOLOGICAL LEADERSHIP**

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LIST OF ACRONYMS AND ABBREVIATIONS

DOD	Department of Defense
DIB	Defense Innovation Board
DSB	Defense Science Board
JCS	Joint Chiefs of Staff
NDS	<i>National Defense Strategy</i>
NMS	<i>National Military Strategy</i>

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I. INTRODUCTION

A. BACKGROUND

The Department of Defense's (DOD) journey towards modernization and technological advancement is a complex and multifaceted set of challenges, which has been the subject of extensive analysis by experts.

Firstly, the inherent bureaucracy within the DOD poses a notable obstacle. As an expansive entity characterized by multiple tiers, it often finds itself mired in slow decision-making processes (Leading with Trust, 2014). Such structures are not conducive to the agility needed in today's fast-paced technological landscape. Financial challenges further compound this issue. The high cost of modernization means the DOD frequently competes with other government branches for essential funds (Leading with Trust, 2014).

Moreover, the technical landscape within the DOD, rife with legacy systems, poses its challenges. Integrating new technology or overhauling existing systems requires a significant investment in time and resources. The ever-present and paramount requirement of maintaining security further complicates this. Any technological integration needs rigorous vetting to ensure that it doesn't become a point of vulnerability against potential adversaries (Defense Science Board [DSB], 2018).

Cultural challenges cannot be overlooked either. Resistance to change, especially amongst long-standing employees, can impede the adoption of new technologies and methodologies (DSB, 2000).

However, this push toward modernization isn't arbitrary. The evolving nature of global military dynamics, especially since the 1990s when computer technology began redefining warfare, underscores the importance of staying at the forefront of technological advancements (DSB, 2000). In this new paradigm, clinging to outdated methods can be detrimental, especially when facing adversaries equipped with the latest technologies (JCS, 1997).

China's rapid technological ascension is a testament to this changing landscape. Once not seen as a significant threat, China's technological strides are now closing the gap with the DOD's capabilities, challenging its dominance (Rearden & Foulks, 2015).

Interestingly, while the DOD once stood as a beacon of technological advancements, the narrative has shifted. Commercial giants like Tesla and Google now lead the charge, especially in domains like artificial intelligence. The DOD, in contrast, sometimes grapples with integrating even widely available commercial solutions (DOD, 2022).

The importance of modernization isn't merely about keeping up to date; it's a strategic imperative. And guiding this modernization are policies, the lifelines that steer efforts coherently. Within the DOD, frameworks like the *National Military Strategy* (NMS) written by the Joint Chiefs of Staff (JCS) and the *National Defense Strategy* (NDS) written by the Secretary of Defense are instrumental. However, it's not just about having policies in place; their clarity and explicitness are equally critical (JCS, 2008).

Effective leadership can be the difference-maker in this complex journey. Leaders set the vision and ensure that policies align with this vision, drawing from studies such as those presented by the Defense Science Board (DSB). By identifying clear objectives, outlining the strategies to achieve them, and ensuring timely execution, leaders can chart a course for successful innovation in the DOD (Leading with Trust, 2014).

The DOD's modernization efforts are intricate, weaving organizational, financial, technological, and cultural threads together. While challenges abound, with focused leadership, transparent policies, and a commitment to innovation, the DOD can stay ahead in the technological race, ensuring it remains prepared for the evolving demands of global defense scenarios (Deputy Under Secretary, 1982).

B. PROBLEM STATEMENT AND QUESTION

1. Problem Statement

In the prevailing techno-strategic environment, innovations and advancements persistently alter the strategic balance, posing complex challenges for entities like the

DOD. It's imperative for the DOD, with its vast global strategic commitments, to remain at the forefront of technological innovations. However, concerns increasingly suggest that the DOD is lagging, struggling to keep pace with the rapidly evolving technological landscape (DOD, 2022).

Therefore, the problem is that the Department of Defense's leaders have failed to integrate rapid technological modernization policies seamlessly within the vital frameworks of the NMS and the NDS. This is problematic because the NMS and NDS serve as cornerstone policy frameworks that the DOD's leadership relies upon to guide its strategic and operational directions, ensuring they are synchronized with national security objectives (DOD, 2022). A lack of modern provisions addressing emergent technologies could create gaps, leaving the DOD trailing in the global technological competition. This issue is paramount as maintaining technological supremacy is crucial to national security, ensuring defense capabilities remain unmatched and adversaries are deterred (Deputy Under Secretary, 1982).

Addressing this multifaceted problem necessitates exploring the nuanced challenges and gaps in assimilating such modernization policies in the NMS and NDS. Understanding the nature and depth of the DOD's technology assimilation challenge is essential. Evaluating how effectively the DOD's leaders have integrated coherent and proactive policies within the NMS and the NDS is crucial, fostering an environment conducive to innovative progression and strategic adaptability (DOD, 2010).

The DSB and Defense Innovation Board (DIB) studies into the DOD's technological posture and insights from commercial trailblazers like Apple and Tesla offer crucial lessons (DSB, 2010). These entities, known for their innovative cultures and forward-looking policies, provide methodologies to promote structured technological integration, optimize resource allocation, and foster intellectual and adaptive organizational cultures when adapted to the DOD's context (DOD, 2005).

The urgency of this technological assimilation problem accentuates the need to rectify potential inadequacies in the NMS and NDS, demanding an interdisciplinary approach. By synthesizing insights from commercial innovation models with strategic

policy frameworks, we can develop refined, adaptable policies to stimulate a resilient, innovation-centric culture within the DOD (DSB, 2018).

Ultimately, exploring and resolving any policy gaps in the NMS and NDS are critical for ensuring that the DOD maintains strategic agility, foresight, and technological supremacy in an era marked by relentless advancements and evolving strategic competitions. Addressing these policy gaps will not only restore the DOD's technological dominance. It will also play a pivotal role in reshaping the global defense and strategic narrative, underlining the significance of the convergence of technology, strategy, and policy in fostering a secure and stable global order (DOD, 2010).

2. Research Question

To what extent have the Department of Defense's leaders integrated comprehensive policy and directives within the NMS and the NDS to facilitate rapid technological modernization within the DOD? Additionally, what methods can be utilized to pinpoint and rectify potential gaps in these policies, ensuring that the Department of Defense preserves its technological supremacy amidst escalating advancements by potential adversaries?

3. Methodology

In the forthcoming research, our methodology is designed to harness a meticulous comparative analysis, benchmarking the Department of Defense's (DOD) policy against the DOD's own DSB and Defense Innovation Board (DIB) studies to the policy of eminent industry leaders, such as Apple, Google, and Amazon, notable for their sophisticated approach to technological assimilation. By applying Miller's (2020) change management process framework, we aim to critically dissect the stages of technological assimilation within the DOD and juxtapose them with corresponding stages in the selected companies. This methodology will facilitate a refined understanding of the efficacy and implementation of the DOD's policies compared to industry standards (Lofgren, 2020).

Further, a comprehensive review of the NMS and NDS will be undertaken, focusing on the evolution, strategic planning, and contextual backgrounds of the DOD's policies

related to technological advancement. This review will highlight recurrent themes, potential policy gaps, and strategic contrasts between the DOD and commercial entities in critical innovation areas, offering insights into existing challenges.

Our methodology also encompasses an in-depth examination of NMS and NDS policies to assess their robustness and adequacy in steering rapid modernization within the DOD. This will unveil these policies' potent elements and potential inadequacies, providing a detailed view of the underlying issues contributing to technological disparities.

Moreover, the comparative evaluation will spotlight the contrasts and correlations between the policy approaches of the DOD and those of commercial entities and other defense organizations in terms of technological modernization based on the Five Critical Innovation Areas, which are Flexible Organizational Structure, Agile Funding, Risk Tolerance, and Long-term Focus, Minimal Security Classification, and Customer-Centric Approach. This comparative insight will enable the benchmarking of DOD policies against these five successful practices in the industry, paving the way for suggesting improved strategies and measures (Plumb, 2023).

Collectively, these insights will offer actionable recommendations to maintain the United States' competitive edge and expedite technological modernization within the DOD by identifying and addressing the policy bottlenecks and areas needing strategic refinement and enhancement (Section 809 Panel, 2019).

To form a concrete benchmark to compare the DOD's NMS and NDS policy on technology assimilation with successful tech companies, the following is this paper's established specific criteria or benchmark around the areas where these technology-leading companies excel. We analyze the NMS and NDS based on these benchmarks to identify criteria similar to the DOD's policy.

Flexible Organizational Structure: Innovative tech companies tend to minimize organizational hierarchies, allowing them to swiftly and efficiently redeploy talent based on changing needs. Benchmark DOD NMS and NDS Policy by evaluating the DOD's organizational structure's flexibility and ability to rapidly and efficiently reallocate human and other resources (DSB, 1987).

Agile Funding: The capability to secure and distribute funds flexibly is crucial for adapting to shifts in the technological landscape and seizing emerging opportunities. Benchmark DOD NMS and NDS Policy by analyzing the agility and adaptability of the DOD’s funding processes to evolving technical demands and opportunities (DSB, 2000).

Risk Tolerance and Long-Term Focus: A culture that embraces risk and focuses on long-term rewards propels innovation and stimulates bold, strategic decision-making. Benchmark DOD NMS and NDS Policy by ascertaining the DOD’s tolerance for risk and the degree of its long-term focus in decision-making and strategic planning (DSB, 1987).

Minimal Security Classification: Decreasing unnecessary security classifications can expedite the exchange of ideas and stimulate internal and external collaboration. Benchmark DOD NMS and NDS Policy by Investigating the DOD’s security classification policies and their impact on the flow of information, collaboration, and innovation (Plumb, 2023).

Customer-Centric Approach: Successful companies engage closely with their customers to comprehend their requirements and preferences, ensuring that innovation efforts align with market demands. In the context of the DOD, the “customer” could be internal (various military branches) or external (allies, partner nations, etc.). Benchmark: Examine how intimately the DOD engages with its “customers” to spur innovation and ensure alignment with operational needs and strategic goals (DSB, 2018).

By employing the above-refocused benchmarks, we can make more precise comparisons between the DOD’s policy on technology assimilation and the practices of thriving tech companies. This comparison will help identify gaps and areas for potential improvement in the DOD’s innovation initiatives. Using these benchmarks allows for a more accurate contrast between the DOD and successful tech companies, helps identify gaps in the DOD’s policies and processes, and pinpoints specific areas for enhancement (Govindarajan, 2010).

Utilizing Miller's (2020) change management process framework, the research will delve into the policy assimilation stages within the DOD, contrasting them against analogous phases in the aforementioned commercial giants. Furthermore, the NMS and NDS policies will undergo an exhaustive review and appraisal. This entails exploring the evolutionary trajectories, strategic policy design, and historical contexts of the DOD's tech-centric stances in the NMS and NDS. The generated insights, distilled through the Five Critical Innovation Areas prism, will spotlight discrepancies, affinities, and potential avenues for refining policy frameworks and strategic blueprints within the DOD. Ultimately, this meticulous endeavor seeks to spur the DOD's policy modernization and technological evolution, ensuring it remains in lockstep with contemporary defense paradigms and best industry practices.

This research scrutinizes the DOD's commitment to innovation, probing whether the leadership's assertions and ambitions are substantiated by tangible, strategic policies, specifically within the NMS and NDS. This exploration is pivotal in discerning the coherence between leadership's proclaimed innovation aspirations and the released policy infrastructures and directives (Panetta et al., 2017). Clear, coherent, and dynamic policy directives, like the NMS and NDS, are imperative for driving innovation, acting as catalysts that synchronize efforts, allocate resources judiciously, and strategically infuse innovative technologies, thus fortifying an ecosystem ripe for innovation and collaborative endeavors within the defense spectrum (Lofgren, 2020).

This research employs a multifaceted approach involving rigorous review and assessment of NMS and NDS policies, comparative analysis with commercially successful entities, and subsequent strategic recommendations. The comparative analysis revealed substantial lags and discrepancies in the DOD's strategic approaches, particularly in organizational structure flexibility, agile funding, risk tolerance, minimal security classification, and customer-centric approach (Deputy Under Secretary, 1983). These delays and strategic-policy gaps underscore the existence of a tangible inertia within the DOD's policy frameworks that goes on for 40 years, highlighting a significant deviation from the agility and proactiveness observed in tech giants (DOD, 2023).

The identified policy inertia substantially handicaps the DOD compared to its commercial counterparts, posing substantive implications for national security (Kirby, 2022). To remedy this and ensure the United States maintains its technological superiority, this research proposes prioritizing clear policy for the identified Five Critical Innovation Areas, enhanced collaborations with innovative sectors and startups, and cultivation of agility, flexibility, and a customer-centric ethos within the DOD's operational and strategic paradigms. As technological innovation becomes ever more intertwined with national defense, there's an urgent need for the DOD to evolve its strategies, policies, and operational frameworks (JCS, 2018). This research delineates a strategic path forward, contributing to shaping a future where innovation is central to defense policy and strategy.

II. DOD LITERATURE REVIEW

In our research, we benchmark the DOD against pioneering companies to dissect challenges in technological assimilation. We apply Miller's (2020) change management process framework to gauge where the DOD stands and juxtapose it with commercial entities at equivalent technological assimilation stages. This method offers a refined comparison of the DOD's policy. By delving into differences and parallels between the DOD and commercial companies, we can discern the DOD's tech assimilation strengths and pinpoint areas needing enhancement (Miller, 2020).

Pitting the DOD's policy against companies like Apple, Google, and Amazon, known for stellar technology assimilation (Dyer et al., 2018), can yield rich insights on best practices and strategies to spur innovation. These firms have transparent policies promoting quick decisions, organizational nimbleness, and a spirit of innovation.

Characteristic traits of such entities encompass perpetual learning, knowledge dissemination, and collaboration, fostering rapid adaptability in changing tech milieus (Govindarajan & Trimble, 2010). To benchmark the DOD, one can probe the extent of its emphasis on similar learning cultures and cross-functional partnerships.

These companies adeptly balance immediate operational prowess with future-focused strategic innovation. They often dedicate distinct teams to disruptive tech exploration while remaining tethered to the mainstay business (Govindarajan & Trimble, 2010). By setting the DOD's policy side by side with these, we can gauge its proficiency in harmonizing current operational necessities with futuristic capability investments.

Open innovation and external alliances underpin leading companies' tech assimilation. Partnering with external stakeholders like academia and startups yields novel ideas and tech (Lichtenthaler, 2008). Setting the DOD's policy against these firms might spotlight areas where it can enhance external collaborations and tech procurement strategies.

Contrasting the DOD's policy with successful tech firms can shed light on policy bottlenecks and improvement avenues, bolstering the DOD's tech assimilation endeavors.

Miller's (2020) change management process involves a structured approach to transitioning individuals, teams, and entities from their current state to a desired future state. Its purpose is to assist change stakeholders in accepting and embracing changes in their work environment or personal lives. By applying Miller's (2020) change management principles to the DOD's innovation challenges, we can narrow the scope into areas where the DOD struggles. Miller's (2020) insights can be used to establish a benchmark for improvement. First, let us define Point A as the current state of the DOD's technology innovation policy, which, as identified, seems to be resulting in a slower pace of innovation than desired, and Point Z as the selected state where the DOD can assimilate technology rapidly, effectively, and competitively. If we can identify the step at which the DOD is in the change management process, we can compare the DOD to other commercial entities in the same step (Miller, 2020).

In the context of change management, the journey from Point A to Point Z often involves the following steps for all entities, including the DOD:

Identifying the Need for Change (Point A): This involves recognizing a problem with current affairs. In the DOD's case, this might mean acknowledging its current technological assimilation pace could be more competitive.

Planning the Change involves developing a clear vision for the future (Point Z) and a strategy to achieve it—this could include creating a policy roadmap supporting rapid technological assimilation for the DOD.

Implementing the Change: This is the execution phase, which involves implementing the plans. For the DOD, this might include implementing new policies, investing in training, or restructuring organizations to support faster innovation.

Consolidating the Change: This involves reinforcing the new ways of doing things and ensuring they become part of the regular operational procedures.

The DOD's challenge to assimilate technology may lie in any of these steps. It might need help recognizing the need for change or articulating a clear vision for the future. It might have an idea but needs help to create a strategy to achieve it. The DOD might have

a plan but needs help implementing it effectively. Alternatively, it may have implemented changes but needs help consolidating them and ensuring they become part of the DOD's regular operations.

By examining the DOD's policy and processes related to technological innovation through the lens of these change management steps, we can isolate the stages at which the DOD is faltering and use this insight to benchmark the DOD challenge in assimilating technology to commercial companies.

Organizations across sectors, including the Department of Defense (DOD), utilize management processes to drive modernization initiatives. However, the DOD's struggle to assimilate technology at the pace of commercial entities has inadvertently created opportunities for adversaries to catch up (Kirby, 2022). A key factor behind this lag could be the DOD's leadership grappling with comprehending and effectively managing the innovation cycle, potentially due to inadequate knowledge of the process or policies that inadequately guide innovation initiatives (DSB, 1987).

Given these challenges, applying Miller's (2020) change management principles to the DOD's innovation cycle provides a structured approach to assessing and enhancing the policy approach. Change management is a carefully planned process that facilitates the successful implementation of changes, ensuring higher rates of adoption by stakeholders and a more profound commitment to the behavioral changes necessary for the successful implementation of modernization initiatives (Miller, 2020).

Change management spans internal procedures, cultural norms, technological capabilities, infrastructure, and organizational structure. These techniques shepherd organizations through different stages of change, from inception to realization, ensuring seamless transitions and sustained benefits (Miller, 2020).

Using change management principles can help identify the exact juncture where the DOD's policy approach to technological innovation is hitting a roadblock. This comprehensive approach will shed light on the stumbling blocks in the DOD's innovation cycle, offering potential methods and pathways for enhancing its policy approach to technology assimilation. Given the substantial funding allocated for modernization and the

vocal support from leadership for innovation, a clear policy direction for implementers at all levels could aid the DOD in staying ahead of potential adversaries and keeping pace with commercial entities (DSB, 1987).

Applying a five-step change management process, as outlined by Miller (2020), from the status quo to reviewing progress and analyzing the results of the DOD's efforts in technology assimilation, will provide a helpful framework for identifying where the DOD is stuck and then benchmarking and understanding the challenges.

(Step 0) Status Quo: This stage represents the initial state of the DOD before starting the process of technological innovation or when innovation efforts are stagnant. It is crucial to comprehend the baseline from which the organization is initiating change, including existing technology, structures, processes, and culture.

(Step 1) Prepare the Organization for Change: Miller's (2020) initial phase involves assessing readiness for change within the DOD and addressing potential resistance. It includes creating awareness about the need for change, outlining the benefits of technological innovation, and engaging key stakeholders to secure their support. This phase would require examining how well the DOD recognizes the need for technological advancement and prepares its workforce for the associated changes (Miller, 2020).

(Step 2) Craft a Policy or a Vision and Plan for Change: Here, the focus is on establishing a clear policy, vision, and roadmap for technological innovation. This plan should align with the DOD's strategic objectives and operational needs. It would be critical to understand how the DOD formulates its technology assimilation policy and strategic goals and how effectively they are communicated across the organization.

(Step 3) Implement the Changes: This phase involves executing the change plan. Implementing the technological changes successfully requires robust project management, communication, and stakeholder engagement strategies. Assessing the DOD's effectiveness at this stage involves studying how well it executes the planned changes and manages the associated risks and challenges.

(Step 4) Embed Changes Inside Company Culture and Practices: Once Miller's (2020) suggested changes are implemented, the next step is to institutionalize them within the organization's culture and practices. This involves reinforcing the benefits of the changes, aligning them with performance management systems, and ensuring they are embedded in day-to-day operations. This phase requires examining how much the DOD can integrate technological innovations into its organizational culture and standard operating procedures (Miller, 2020).

(Step 5) Review Progress and Analyze Results: The final stage of the process involves assessing the success of the change initiatives and identifying improvement areas, which consists of evaluating whether the technological changes have achieved the desired outcomes and made a tangible impact on the DOD's operational efficiency and effectiveness (Miller, 2020).

Implementing this change management process within the DOD's technology integration efforts provides a structured method for recognizing the current stage of technological assimilation within the DOD, which facilitates the creation of a benchmark, serving as a reference point for gauging progress and fostering continuous improvement in technology integration practices.

This research critically benchmarks the Department of Defense's (DOD) technological assimilation against leading companies like Apple, Google, and Amazon. By employing Miller's (2020) change management process framework, the study offers a comparative insight into the DOD's tech adoption policies against industry leaders renowned for rapid technology assimilation. Key traits observed in these industry giants include continual learning, effective collaboration, and balanced innovation strategies. Furthermore, Miller's (2020) change management process, spanning from identifying a need for change to consolidating that change, serves as a guiding blueprint to assess and enhance the DOD's approach. Employing this structured approach highlights potential areas where the DOD's policy may falter compared to commercial entities. To ensure the DOD remains competitive and technologically advanced, applying change management principles within its framework is paramount (Miller, 2020).

Creating a benchmark to assess innovation assimilation in the DOD will require evaluating the DOD's innovation efforts through the lens of the five-step change management process, as described by Miller (2020). This analysis will help identify which step of the change management process the DOD is in, and it will consider readily available information, various DSBs, and Defense Innovation Boards (DIB) studies into the DOD's technological advancement and observable cultural factors. The assessment aims to identify the exact step the DOD finds itself in, performed as follows: Review Progress and Analyze Results (Step 5): Despite a considerable period of strategy execution and multiple DSB and DIB studies suggesting the DOD needs to implement change, evidence of comprehensive progress reviews or impactful results remains scarce. The repeated acknowledgment from DOD leadership that adversaries like China are closing the technology gap suggests the Department needs to be more effectively reviewing its innovation progress or analyzing the results of its policies. The lack of consistent policy guidelines, comprehensive analyses, or postmortems supports the conclusion that the DOD isn't in Step 5. Because of these facts, it is concluded that the DOD has not reached Step 5 in the innovation assimilation process.

Embed Changes within Company Culture and Practices (Step 4): Compared to innovative commercial companies such as Google or Tesla, the DOD has yet to instill a pervasive culture of innovation. Ideally, the NMS and the NDS should be significant drivers of innovation policy, but these strategies have yet to notably foster a unified, strategic innovation culture across the DOD. Because the DOD needs to include the basics of embedding changes within the DOD, we can conclude that the DOD has yet to reach Step 4.

Implement the Changes (Step 3): While there are pockets of innovation and attempts to drive change within the DOD, these efforts need to be more widespread and coordinated. Implementing an innovative culture depends heavily on individual branch leaders' initiatives rather than being a unified, DOD-wide effort. Because the DOD is missing the basics of implementing change, it has not reached Step 3.

Craft a Policy or a Vision and Plan for Change (Step 2): In the research for this paper, we have identified that the 2022 NDS outlines a written policy from DOD

leadership focusing on innovation, indicating that the DOD is now prioritizing change and making efforts to communicate this priority. As such, it is reasonable to conclude that the DOD is at the second stage of the change management process because there is a crafted policy and a vision in the 2022 NDS. As a result, we can conclude that the DOD is in Step 2.

Identifying that the DOD is in Step 2 in the change management process is crucial in the DOD's innovation journey and pivotal for this research. Identifying this stage enables us to benchmark and draw comparisons with commercial organizations at the second stage of technological assimilation—this allows for a more accurate and relevant benchmarking of the DOD's policy. By studying the disparities and parallels between the DOD and these commercial entities in Step 2, we can gain a deep understanding of the DOD's technology assimilation capabilities and potential areas of improvement by benchmark (Miller, 2020).

In contrast with commercial companies, understanding the duration of the DOD's position in Step Two, when benchmarking the DOD against commercial entities, can reveal significant insights into the policies creating the innovation gap. Suppose the DOD has lingered in Step 2 for a protracted period while commercial companies have transitioned to subsequent steps within months. In that case, it elucidates the extent and gravity of the issue, and the respective policies of the organizations can be compared to help pinpoint the problem. The benchmark facilitates a clearer understanding of the factors contributing to the DOD's stagnation and the disparities in policy execution and organizational culture between the two sectors.

Commercial companies often excel in swiftly transitioning through the stages of change management due to streamlined decision-making processes, agile funding mechanisms, a higher tolerance for risk, customer-centric approaches, and fewer security restrictions (Freedberg, 2020). These organizations can assimilate technology rapidly because their policies and culture promote innovation and agility. By benchmarking the DOD's policy against such entities, we identify where the DOD might fall short and provide insights into potential improvements.

Learning from commercial companies' best practices and successes can guide the DOD in creating and implementing effective strategies to accelerate its innovation cycle. In doing so, the DOD can better position itself to stay ahead of adversaries and be at the forefront of technological advancements. This benchmarking-to-compare approach is a robust mechanism for gauging the DOD's effectiveness in assimilating technology and is a step towards bridging the innovation gap.

In this subsequent phase, we focus on creating a robust framework to benchmark the DOD against commercial companies, particularly those at the same stage (Step 2) in the innovation process as the DOD. This comparison aims to identify the specific challenges in Step 2 inhibiting the DOD's ability to assimilate technology efficiently. Through the three DSB Studies, 1987, 2000, and 2018, and the NDS 2022, we can demonstrate that the DOD has stagnated at this stage for an extended period without taking the crucial actions that have enabled commercial companies to navigate the change management process successfully. In this case, we had the National Research Council study in 1982, and every study until Section 809 Panel in 2018 showed a lack of action, so we can precisely pinpoint where the issue lies and how long it has persisted (Section 809 Panel, 2019).

To enhance our understanding of Step 2 in the change management process, we need to create a benchmark centered around the policies employed by successful commercial entities at this stage. By comparing the characteristics of these policies to those implemented by DOD leadership, we can draw insightful conclusions about the DOD's strategy and potential areas for improvement (Govindarajan, 2010).

While commercial companies might not be a perfect benchmark, they provide a measurable standard against which the DOD's efforts can be evaluated. In particular, U.S. technology companies, renowned for their rapid technology assimilation, set a high bar representing a desirable standard for the DOD. Comparing the DOD's challenges in detail to the strategies employed by innovative commercial companies will offer a comprehensive understanding of the technology gap between the DOD and the commercial sector. This, in turn, will shed light on how adversaries have managed to close the gap over the past forty years. This comparative analysis will highlight the existing issues and inform the

strategies required for the DOD to expedite its technological assimilation and maintain a competitive advantage. The analysis benchmarks the DOD innovation assimilation against commercial companies using Miller's (2020) five-step change management process. This benchmarking approach seeks to understand the innovation gap between the DOD and commercial entities, offering insights to enhance the DOD's technological competitiveness.

In examining the policy approaches of successful commercial companies during their navigation through Step 2 of the change management process, we have gleaned valuable insights. This information has been instrumental in creating a benchmark that juxtaposes the practices of these companies with the strategies outlined in the DOD's NMS and NDS policies. In the process, we have identified Five Critical Innovation Areas that organizations thriving in innovation effectively address while transitioning from Step 2 to Step 3. Should these elements be lacking in DOD policy, it would provide a significant breakthrough in understanding the DOD's innovation challenges. These Five Critical Innovation Areas are as follows. 1) Flexible Organizational Structure, which emphasizes fluidity and rapid talent mobilization; 2) Agile Funding, facilitating dynamic financial allocations to emerging opportunities; 3) Risk Tolerance and Long-Term Focus, fostering an environment conducive to innovation; 4) Minimal Security Classification to expedite idea exchanges and collaborations; 5) Customer-Centric Approach: ensuring that innovative endeavors align with market needs. For this paper, we call these five the Five Critical Innovation Areas.

Flexible Organizational Structure: Successful organizations encourage a fluid structure with a minimal hierarchy, promoting rapid and effective talent mobilization in response to varying needs. All innovative firms tend to have a more adaptable structure that minimizes bureaucratic layers. Such flexibility often accelerates decision-making and the mobilization of talent. Organizational structures that support agility have been linked to improved, innovative capabilities (Teece et al., 2016).

Agile Funding: The capacity to allocate funds dynamically, especially in fast-evolving sectors like technology, empowers organizations to pivot quickly.

Originally from software development, Agile principles have found their way into financial decision-making, emphasizing adaptability (Rigby, 2016). Securing and allocating funds flexibly allows these organizations to swiftly adapt to the evolving technology landscape and seize emerging opportunities.

Risk Tolerance and Long-Term Focus: A culture that accepts risk and focuses on long-term gains fosters innovation and encourages audacious, strategic decision-making. Also, a culture that values risk-taking while maintaining a long-term vision can be a bedrock for sustained innovation. Companies that can strike a balance between these two disrupt the markets and create new ones (Tushman & O'Reilly, 1996).

Minimal Security Classification: By reducing unnecessary security classifications, organizations can speed up the exchange of ideas and encourage internal and external collaboration. For organizations that need to maintain security protocols, it's essential to strike a balance. Overclassification can hinder the free flow of ideas, stunting innovative collaborations (Nissen, 2002).

Customer-Centric Approach: Engaging closely with customers to understand their needs and preferences ensures alignment of innovative efforts with market demands and expectations. Innovations that are rooted in deep customer insights often find market success. Firms that prioritize understanding and anticipating customer needs tend to develop more impactful innovations (Shah et al., 2006).

When present in an organization's policy, these Five Critical Innovation Areas indicate robust technology assimilation capabilities. Therefore, they are an effective benchmark for assessing the DOD's innovation policy and progress. By evaluating the DOD's NMS and NDS policy implementation over the past 40 years in light of these areas, we can determine the length of the DOD's stagnation in Step 2 and identify any significant gaps in its innovation policy.

Utilizing these Five Critical Innovation Areas as a benchmark allows us to measure the DOD's progress effectively within Step 2 of the change management process. Recognizing and addressing discrepancies between the DOD's current practices and those

of thriving commercial companies will be vital in augmenting the DOD's technology assimilation capacity and securing a competitive edge over adversaries. Successful commercial companies navigating Step 2 of the change management process employ distinct policies and practices that enhance their innovative capabilities. When juxtaposed with the DOD's NMS and NDS policies, a benchmark has been established highlighting Five Critical Innovation Areas these companies address effectively.

Flexible Organizational Structure: Emphasizes minimized bureaucracy and an adaptable structure, which enhances rapid decision-making and talent mobilization (Teece et al., 2016).

Agile Funding: Rooted in principles from software development, agile funding focuses on adaptability in financial decision-making to pivot quickly in response to technological changes (Rigby, 2016).

Risk Tolerance and Long-Term Focus: This entails a culture that appreciates risk and emphasizes long-term gains, leading to sustained innovation and market disruption (Tushman & O'Reilly, 1996).

Minimal Security Classification: Balancing essential security with reduced overclassification ensures the unhindered flow of innovative ideas and collaborations (Nissen, 2002).

Customer-Centric Approach: Aligning innovation with customer insights and needs often results in successful market innovations (Shah et al., 2006).

These areas serve as a comprehensive benchmark to evaluate the DOD's innovation policy, particularly within the NMS and NDS, over the past 40 years. By doing so, the depth and duration of the DOD's stagnation in Step 2 can be determined, and discrepancies in its innovative strategies can be addressed, ensuring the DOD maintains a competitive edge.

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III. DATA

A. NATIONAL DEFENSE STRATEGY AND NATIONAL MILITARY STRATEGY

In researching the DOD’s leadership policy towards innovation, we focus on two pivotal policy instruments: the NDS and the NMS. The NDS, a product of the U.S. Office of the Secretary of Defense, refines the broader National Security Strategy into actionable military guidelines, touching upon force posturing, modernization, and strategic military planning (NDS, 2022). Meanwhile, the NMS, authored by the Joint Chiefs of Staff, delves deeper, translating the NDS’s broad strokes into detailed military directives encompassing theater campaign planning, force modernization, and structure (JCS, 2023).

For our analysis, we will look at both the NDS and NMS. While distinct in their depths, both documents are parallel in their insights. Moreover, with the NMS placing a slightly heightened emphasis on innovation, the 2022 NDS offers an appropriate benchmark for that final year. It’s imperative to stress that only unclassified versions of these documents will be scrutinized, aligning with the non-confidential nature of the Five Critical Areas for Innovation. Transparency in innovation policies is paramount, fostering open dialogue and inclusive discourse.

The significance of the NDS and NMS must be recognized. As a product of the military’s top brass, they hold a magnifying lens to modernization, making them an invaluable touchstone for gauging the military leadership’s commitment to maintaining a technological edge over global adversaries. A deep dive into the annals of the NDS and NMS, spanning from 1982 to 2022, will reveal the military’s continuous efforts to uphold this advantage. Key to our analysis will be the extraction of policies aligned with the Five Critical Areas. Advancing to the second phase of our Change Management Process, this investigation aims to discern the nexus between leadership directives, overarching strategy, and the Five Critical Areas, providing a solid foundation for benchmarking DOD policies against their counterparts in the commercial sector.

For this paper, an in-depth review of the unclassified NMS and NDS from 1982 to 2022 was conducted to identify any sections with strategic significance that guide the rank and file on the Five Critical Areas identified as essential for innovation to flourish. In this analysis, the DOD’s approach to technological modernization will be juxtaposed with strategies adopted by commercial entities and other national defense organizations. The contrast between the DOD and commercial companies will enable us to benchmark DOD policies against the successful practices of these organizations and industries. This involved assessing each NMS and NDS text and searching for statements or paragraphs in support of any of the Five Critical Areas. Each identified section in the NMS or NDS related to one of the Five Areas underwent rigorous and systematic analysis to evaluate its intent and ensure that the advice provided corresponds to fostering innovation. If explicit instruction on innovation was found in the NMS, NDS, or any other reviewed policy, a green “Y” for “Recommended” was marked, indicating clear guidance on this subject was provided to DOD rank and file, and “P” if the policy consists of vague references. Conversely, if no guidance on the Five Critical Areas was found, a prominent red “X” was assigned, signifying that the DOD leadership failed to guide the DOD rank and file on the respective subject.

To form a concrete benchmark around the “Y,” “P,” and “X” to compare the DOD’s NMS and NDS policy on technology assimilation with successful tech companies, this is the established specific criteria for the benchmark around the Five Critical Innovation Areas:

Flexible Organizational Structure: Innovative tech companies tend to minimize organizational hierarchies, allowing them to swiftly and efficiently redeploy talent based on changing needs. Benchmark DOD NMS and NDS policy by evaluating the DOD’s organizational structure’s flexibility and ability to rapidly and efficiently reallocate human and other resources.

Agile Funding: The capability to secure and distribute funds flexibly is crucial for adapting to shifts in the technological landscape and seizing emerging opportunities. Benchmark DOD NMS and NDS policy by analyzing the agility and

adaptability of the DOD’s funding processes to evolving technical demands and opportunities.

Risk Tolerance and Long-Term Focus: A culture that embraces risk and focuses on long-term rewards propels innovation and stimulates bold, strategic decision-making. Benchmark DOD NMS and NDS Policy by ascertaining the DOD’s tolerance for risk and the degree of its long-term focus in decision-making and strategic planning.

Minimal Security Classification: Decreasing unnecessary security classifications can expedite the exchange of ideas and stimulate internal and external collaboration. Benchmark DOD NMS and NDS Policy by Investigating the DOD’s security classification policies and their impact on the flow of information, collaboration, and innovation.

Customer-Centric Approach: Successful companies engage closely with their many customers to understand all their needs and preferences, ensuring that innovation efforts align with market demands. In the context of the DOD, the “customer” could be internal (various military branches) or external (allies, partner nations, etc.). Benchmark: Examine how intimately the DOD engages with its “customers” to spur innovation and ensure alignment with operational needs and strategic goals.

By employing these refocused benchmarks, we can make more precise comparisons between the DOD’s policy on technology assimilation in NMS and NDS to compare them directly to the practices of thriving tech companies. This comparison will help identify gaps and areas for potential improvement in the DOD’s innovation initiatives. Using these benchmarks allows for a more accurate contrast between the DOD and successful tech companies, helps identify gaps in the DOD’s policies and processes, and pinpoints specific areas for enhancement.

The advisory landscape for the DOD is diverse and enriched by multiple bodies, including but not limited to the Defense Science Board (DSB), Defense Innovation Board (DIB), Carnegie Mellon University’s Software Engineering Institute, the Bipartisan Policy

Center, and special panels like the Section 809 Panel. These entities provide studies and valuable insights into a variety of issues facing the DOD, ranging from technology and innovation to acquisition and regulation. For the purpose of this thesis, the collected studies from these diverse bodies will be generally referred to as DOD studies, with the understanding that DOD studies serve as the principal source of such advice (DSB, 2018).

Though multiple organizations offer consultative studies, the DOD studies remain at the forefront as a prime advisory board with its mandate to provide “independent advice and recommendations on scientific, technical, manufacturing, acquisition process, and other matters of special interest to the Department of Defense.” (DSB, 2018) This board does not just act as a knowledge bank; it is actively involved in research. It conducts “multiple simultaneous studies each year,” exploring the ever-evolving technological trends. Whether originating from DOD studies or other reputable advisory bodies, these studies are synthesized into comprehensive reports that give the DOD and the general public actionable insights (DSB, 2018).

As we benchmark the DOD’s innovation trajectory concerning the Five Critical Innovation Areas, the recommendations from influential bodies like the DSB are invaluable. Suppose the advice of the DOD studies resonates with the Five Critical Innovation Areas and trail-blazing commercial entities. In that case, it becomes an unequivocal testimony that the DOD leadership has had consistent exposure to these groundbreaking trends. The DOD studies’ proactive approach, especially its custom of organizing studies throughout the year, ensures that the board’s “studies result in a written report,” which can be a goldmine of insights for the DOD leadership (DSB, 2018).

It will underscore a gap if we find a harmonization between DOD studies recommendations and the Five Critical Innovation Areas garnered from innovative commercial technology companies. At the same time, we notice a scarcity of these in major policy frameworks like the NMS and NDS. Whether this gap arises from knowledge deficits or bureaucratic challenges remains a point of investigation this paper doesn’t cover.

Our quest to understand the DOD’s innovation leanings has uncovered myriad studies that emphasize the importance of technological advancement within the DOD. The

DSB's legacy, with its "six decades" of service, remains a testament to the wealth of knowledge it brings to the table, especially given its proactive approach to research and its mission to "strengthen national security" through technological insights (DSB, 2018). Any oversight in tapping into this reservoir of knowledge could jeopardize the DOD's competitive positioning, especially in an era where adversaries are not holding back on their technological pursuits.

Our subsequent analysis will investigate the symbiotic relationship between the DOD Studies' counsel and the Five Critical Innovation Areas. Through this exploration, we aim to provide a comprehensive picture of the DOD's innovation landscape, the catalysts that shape it, and the trajectories it should pursue. To fortify the benchmark, we ascertained whether DOD leaders had access to pertinent knowledge; we conducted a comprehensive search for DOD studies relating to technology and innovation. Numerous DOD studies funded by Congress presented clear advice on stimulating innovation within the DOD, aligning with the Five Critical Innovation Areas recognized as essential for innovation in commercial companies. Conducted between 1982 and 2022, these DOD studies provided DOD leadership with knowledge and sufficient time (40 years) to implement crucial recommendations to maintain a technological edge over adversaries. Table 1 is a breakdown of our analysis of the respective DOD studies concerning the Five Critical Innovation Areas recognized as fundamental for innovation:

Table 1. DOD Studies vs. Five Significant Areas for Innovation

Five Significant Areas for Innovation:	1982 Study Joint Service Task Force on Software Problems	1987 Study Report of the Defense Science Board Task for on Military Software	2000 Study Task Force on Defense Software	2010 Study Achieving Effective Acquisition of Information Technology in the Department of Defense	2017 Study DoD's Software Sustainment Study Phase I: DoD's Software Sustainment Ecosystem	2017 Study Building a F.A.S.T. Force: A Flexible Personnel System for a Modern Military	2018 Study Design and Acquisition of Software for Defense Systems	2018 Study Section 809 Panel	2019 Study Defense Innovation Board Recommendations	2022 37th Space Symposium Dr. John F. Plumb, the Assistant Secretary of Defense
1. Flexible Organizational Structure	Y	Y	Y	Y	X	X	X	Y	Y	Y
2. Agile Funding	Y	Y	Y	Y	Y	X	Y	Y	Y	Y
3. Risk Tolerance and Long-term Focus	Y	Y	Y	X	X	X	Y	Y	Y	Y
4. Minimal Security Classification	X	X	X	X	X	X	X	X	X	Y
5. Customer-Centric Approach	Y	Y	Y	Y	Y	X	Y	Y	Y	Y

Y=Yes DOD Studies include guidance on Five Critical Innovation Areas

P=Policy consists of a vague reference to Five Critical Innovation Areas

N=No reference to DOD Five Critical Innovation Areas

We juxtaposed the Five Critical Innovation Areas against the innovation advice provided by the DOD-funded Advisory Boards—committees constituted to offer independent counsel to the Secretary of Defense, U.S. Congress, and other DOD leaders on innovation matters. Contrasting the policy recommendations that the advisors urged DOD leaders to execute with what we discovered in the commercial sector for the Five Critical Innovation Areas was paramount. We scrutinized numerous DOD studies commissioned by Congress to guide leadership. Each study was analyzed to determine if it explicitly contained advice for the DOD leadership pertaining to the Five Critical Innovation Areas. If evidence suggested these DOD studies provided detailed guidance on the Five Critical Innovation Areas, we could deduce that DOD leadership possessed the necessary knowledge to transition from Step 2 to Step 3 in the Change Management

Process. This insight would elevate our expectations for the DOD leaders and solidify the benchmark for comparing the DOD to commercial companies.

Given the repeated emphasis on the importance of incorporating technology rapidly in weapon systems and the clear indication that its proper development and support are crucial for the military mission, it is perplexing to the authors of the DOD studies that a majority of the recommendations from DOD studies starting in 1982 until 2022 have not been acted upon (Deputy Under Secretary 1983; NDS, 2022) This recurring theme suggests that while the DOD recognizes its innovation assimilation challenges, it struggles with translating this recognition into actionable steps or policy changes.

The DOD studies selected were explicitly written to guide the DOD leaders. For example, the first Study in 1983, the *DOD Joint Service Task Force on Software Problems*, emphasized the significance of software for weapon systems and military missions. The Study was “formed at the direction of the Deputy Under Secretary of Defense for Research and Advanced Technology...to identify the problems and opportunities posed by the use of software in computers embedded in DOD weapon systems” (Deputy Under Secretary 1983). The study stressed the importance of software development and the risks posed by inefficiencies in software practice. It concluded with a clear call to action for the DOD to assume a leadership role in addressing challenges.

Subsequent DOD studies, from 1982 to 2022, highlighted the need for more effective implementation of prior recommendations. The 1987 DSB report acknowledged that the primary challenges needed to be more technical but managerial. While technological advancements were required, the report emphasized that the main roadblocks stemmed from ingrained attitudes, policies, and practices that hindered software acquisition. Furthermore, the report clearly stated that most earlier recommendations still needed to be implemented, underscoring a lack of perceived urgency in addressing the software problem (DSB, 1987).

A review in 2000 further reinforced these findings. The DSB Task Force found that only a handful of the 134 recommendations provided in previous software-related studies since 1987 were acted upon. Despite their evident value, this consistent failure to adopt

recommended changes is disturbing and indicates systemic inhibitors within the DOD (DSB, 2000).

Another study in 2010 by the National Research Council echoed these sentiments, urging the DOD to adopt new processes. The study noted the repeated failures of the existing DOD approach and called for a systemic change that would impact the entire DOD culture (National Research Council, 2010). This was a familiar statement in most of the studies found in the DIB studies in 1983 and Section 809 Panel until 2019. In 2022, the DOD policy finally acknowledged the recommendations because they were adopted into the NDS.

With 40 years of clear recommendations on innovation from the DSB Task Force, it is reasonable to expect that DOD leadership would have embedded these foundational aspects into their policy to drive innovation within the DOD. Yet, the fact that these recommendations are consistently overlooked or under-implemented over decades is a cause for concern. The disparity between experts' advice and leadership's inaction suggests an enduring challenge within the DOD's structural and decision-making apparatus.

As a result of these DOD studies, as detailed in Table 1, we can decisively demonstrate that DOD leadership had the necessary knowledge to formulate a robust policy approach to innovation. They didn't know how to provide clear direction to the rank and file on implementing rapid technological assimilation. These DOD studies addressed specific gaps where the DOD needed to improve and offered clear guidance on technology assimilation. The DOD studies effectively detailed how the DOD should update its policy to modernize. They were explicit about the changes needed to keep the DOD agile and ahead of its adversaries. The scope of the advice provided by these guides was more comprehensive than just the Five Critical Innovation Areas.

Given the recommendations in these guides, we can conclude that DOD leadership had the knowledge and expert advisors necessary to implement the recommendations, fully understanding the value of integrating the Five Critical Innovation Areas within the DOD. Yet, the consistent inaction and disregard for these studies point towards a systemic challenge within the DOD's innovation policy-making. Thus, there should be no

knowledge gap because of the 10 DOD studies, and we can anticipate the leadership to comprehend and execute the DOD studies written for them.

With this knowledge of the DOD studies needing to be addressed, we conclude that DOD leaders understand the value of adopting the Five Critical Innovation Areas. We conclude that the Five Critical Innovation Areas are an effective benchmark for analyzing DOD innovation policy and comparing the DOD to the commercial sector. So, based on this analysis, the Five Critical Innovation Areas have been determined to be the tool used here for benchmarking all the data and analyzing the DOD policy.

For decades, the DOD has received consistent recommendations on innovation from the studies commissioned by Congress. Starting in 1982 with the National Research Council's *Achieving Effective Acquisition of Information Technology in the Department of Defense*, the many studies explicitly written to guide the DOD's leadership have persistently highlighted the significance of software for weapon systems and military missions. A recurring theme in these studies is the DOD's acknowledgment of its software challenges but its apparent struggle to translate this recognition into concrete actions or policy changes. For over 40 years, these DOD studies and reports have consistently outlined the risks of inefficient software practices and called for the DOD to take a proactive leadership role in addressing these challenges. A notable concern is the persistent inaction on most of the recommendations, even those repeatedly emphasized over decades. The DOD studies offered a comprehensive set of guidelines, potentially covering more than just the Five Critical Innovation Areas. Despite the clarity and scope of these studies, the persistent gap between expert advice and leadership action points to systemic challenges within the DOD's policy-making mechanism. Drawing on these observations, it's inferred that while the DOD leadership had the requisite knowledge and expert consultation to drive innovation, they lacked a clear directive on implementing rapid technological assimilation, underscoring an enduring challenge within the DOD's structural and decision-making apparatus.

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IV. DISCUSSION AND ANALYSIS

A. FLEXIBLE ORGANIZATIONAL STRUCTURE BENCHMARK

In this section, we leverage a benchmark to compare the DOD’s policy on Flexible Organizational Structure as documented in the NMS and NDS with those of successful tech companies. Specific criteria are set around the Five Critical Innovation Areas where commercial entities excel, providing a robust framework for our assessment. We conduct an exhaustive analysis of the NMS and NDS policies to determine their effectiveness in facilitating the rapid modernization of the DOD through the lens of a Flexible Organizational Structure. Our evaluation reveals solid elements within these policies and highlights potential deficits that might impede the Department’s technological advancement. Suppose the data suggests that the DOD needs to implement a Flexible Organizational Structure for an extended duration without taking critical actions similar to those of successful commercial entities. In that case, we will spotlight this finding in Table 2, and the DOD studies will back it up. The analysis aims to pinpoint precisely where the issue lies and ascertain its duration.

We scrutinize the DOD’s organizational structure’s flexibility and agility to rapidly and efficiently reallocate human and other resources. We examine the effectiveness of the DOD leadership’s policy on organizational structures, as encapsulated within the NMS and NDS (DIB, 2017). An agile organizational structure characterized by quick decision-making and seamless cross-departmental collaboration is a cornerstone of practical innovation. Successful commercial entities tend to minimize organizational hierarchies, enabling them to redeploy talent swiftly based on shifting needs (DIB, 2017). Therefore, our analysis of the NMS and NDS focuses on policies guiding the rank and file concerning flexible organizational structures.

Table 2. Flexible Organizational Structure

Year	DOD Study or Guidance	Title	Flexible Organizational Structure
1982	Study	Joint Service Task Force on Software Problems	Y
1987	Study	Report of the Defense Science Board Task Force on Military Software	Y
1992	Guidance	National Military Strategy – One section e15 Technological Superiority.	X
1995	Guidance	National Military Strategy	X
1997	Guidance	National Military Strategy	X
2000	Study	Task Force on Defense Software	Y
2004	Guidance	National Military Strategy	X
2005	Guidance	National Defense Strategy	X
2008	Guidance	National Defense Strategy	X
2010	Study	Achieving Effective Acquisition of Information Technology in the Department of Defense	X

Year	DOD Study or Guidance	Title	Flexible Organizational Structure
2015	Guidance	National Military Strategy	P
2017	Study	DOD's Software Sustainment Study Phase I: DOD's Software Sustainment Ecosystem	X
2017	Study	Building a FAST Force: A Flexible Personnel System for a Modern Military	X
2018	Study	Design and Acquisition of Software for Defense Systems	X
2018	Study	Section 809 Panel	Y
2018	Guidance	National Defense Strategy	P
2019	Study	Defense Innovation Board Recommendations	Y
2019	Study	Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage	Y
2022	Guidance	National Defense Strategy	Y
2022	Guidance	Department of Defense Software Modernization	Y

Y=Yes policy includes guidance on Flexible Organizational Structure

P=Policy consists of a vague reference to Flexible Organizational Structure

X=No relation to DOD Flexible Organizational Structure could be identified

As shown in Table 1, even though DOD studies emphasizing the importance of a flexible organizational structure have been available since the early 1980s—as noted in the DOD Studies Joint Service Task Force on Software Problems in 1982 and Report of the Defense Science Board Task Force on Military Software in 1987 (Deputy Under Secretary 1983; DSB, 1987). Table 2 shows it took until 2015 for DOD leadership to partially integrate vague language reflective of flexible organizational structure into the NMS. This delay underscores the need for the DOD to swiftly incorporate strategic insights into actionable policy amendments, particularly in its innovation policy.

It is indisputable that a clear DOD innovation policy on Flexible Organizational Structure is necessary to drive innovation (NDS, 2022). We also know that the DOD leadership clearly understands the need to provide direction for guiding the rank and file, hence they release the NMS and NDS (NDS, 2022), and they have the knowledge and understanding of Flexible Organizational Structure as shown in Table 1. With this knowledge, Table 2 is shocking because it demonstrates an apparent disconnect between what the DOD needs per the DOD studies (including DIB, DSB, Section 809 Panel) and guidance versus the innovation policy that is subsequently released in the NMS and NDS and the disconnect has dragged on for years. As can be seen in the chart, there is a gap of 35 years from the first DOD Study recommending modernizing their organizational structures in 1982 until the NMS included a vague reference to flexible organizational structure in 2015. Note that the scope of this research is only to see if DOD leaders incorporated the basic policy needed to modernize as recommended; the actual implementation of the policy is outside the scope of this research and needs to be analyzed.

It was not until the NDS release in 2022, or after 40 years, that the DOD’s policy articulated more explicit guidance away from the standard DOD hierarchical and bureaucratic protocols, thereby speeding up the embracing and integration of organizational structure appropriate for innovation. Over ten substantial DOD studies conducted since 1982 emphasized software development and acquisition (DSB, 1987, 2000, 2010). These DOD studies, funded by Congress, offered explicit advice on nurturing technology-oriented personnel within the DOD, including hundreds of recommendations for aligning the DOD’s practices with those of the commercial sector. However, the lagging

and inconsistent policy release on Flexible Organizational Structures in the DOD has stymied the DOD's technological progression and agility in addressing emerging threats and challenges (DSB, 1987, 2000). This sluggish adaptation process is exacerbating the technological divide between innovative commercial firms and the DOD, significantly impeding its ability to absorb new technology and sustain its edge in innovation rapidly. The long time from the initial advice to the eventual release of the policy portrays a need for prioritization in assimilating crucial changes recommended by their own DOD-funded DOD Studies into DOD policy.

The inclusion of Flexible Organizational Structure into their policy happens before policy implementation, so it is clear the DOD is far from implementing a basic fundamental of modernization after sitting on that knowledge for 40 years—they may not be close to implementing it. The recommendations provided in these DOD studies, starting in Deputy Under Secretary (1983), were explicit to keep the DOD ahead of its adversary. The DOD did not follow its own DOD studies' guidance, so it should be known that its adversary gained ground and closed the technological gap during this 40-year timeframe (Kirby, 2022). Over and over again, we can see that the “X” for no relation to DOD Flexible Organizational Structure could be identified in Table 2, showing that the DOD leaders ignore the recommendations in their DOD studies when releasing NMS and NDS policies (NDS, 2005, 2018, 2022).

Benchmarking the DOD's organizational structure against leading commercial technology companies reveals a pronounced rigidity, significantly limiting its capacity for swift adaptation and innovation. This inflexibility contrasts sharply with premier tech firms such as Google, SpaceX, and Tesla. According to a 2020 article by Freedberg, even when the Pentagon adopted the “agile” software development strategy to parallel Silicon Valley's efficiency, it still lagged significantly (Freedberg, 2020). Only a fraction of its major weapons programs claiming to use agile methods, which require Flexible Organizational Structure, met the private-sector standard of delivering software updates to users every six weeks. This highlights a distinct disparity in the pace of innovation between the defense sector and the commercial tech world. Such top-tier technological companies would find

it untenable to sustain operations if they required four decades, as the DOD has, to embed a Flexible Organizational Structure into their foundational policy (Clark et al., 2017).

To surmount these delays and technological hurdles, the DOD must work with Congress to find a way to quickly weave the organizational structure recommendations into their policy directives and prioritize fostering a flexible organizational structure. This significant shift would entail breaking down bureaucratic roadblocks, assigning decision-making authority to lower echelons, and fostering a work culture that values collaboration and adaptability (Section 809 Panel, 2019). By adopting these changes, the DOD can expedite the assimilation of emerging technologies, uphold its technological dominance, and enhance its readiness to tackle future challenges effectively.

B. AGILE FUNDING BENCHMARK

In this section, we conduct a benchmark analysis to compare the DOD’s agile funding policy with those established by successful tech companies. We use specific criteria based on the Five Critical Innovation Areas, where commercial entities have a proven track record of excellence. A deep dive into the NMS and the NDS policies aids us in assessing their effectiveness in guiding the DOD’s rapid modernization efforts through agile funding. Our thorough examination unveils effective funding methods encapsulated within these policies and brings to light potential policy gaps. If the data shows that the DOD has failed to implement an Agile Funding process over an extended duration without taking decisive steps to maintain technological competitiveness—mirroring the actions of commercial entities—it will be highlighted in Table 3. Our analysis aims to accurately pinpoint the core issues surrounding funding and measure the duration of its persistence.

We scrutinize the DOD’s ability to flexibly allocate funds to adapt to the constantly evolving technological landscape and seize emerging opportunities. Flexible securing and allocating funds is fundamental for adapting to rapid technological shifts and exploiting opportunities (Clark et al., 2017). Past studies funded by the DOD from 1982 to 2022 (refer to Table 1) have reiterated the importance of an agile and adaptable funding strategy in fueling technological progress and adoption (DSB 1987, 2010). Despite these findings, agile funding was still not integrated into the DOD’s policies when the Deputy Secretary

of Defense issued the *Department of Defense Software Modernization* guidance in 2022. This 40-year delay signifies a significant lag in translating strategic recommendations into actionable policy changes, emphasizing the need for greater agility and adaptability in the DOD’s funding processes (Freedberg, 2020).

Table 3. Agile Funding, Study vs. Guidance

Year	DOD Study or Guidance	Title	Agile Funding
1982	Study	Joint Service Task Force on Software Problems	Y
1987	Study	Report of the Defense Science Board Task Force on Military Software	Y
1992	Guidance	National Military Strategy – One section e15 Technological Superiority.	X
1995	Guidance	National Military Strategy	X
1997	Guidance	National Military Strategy	X
2000	Study	Task Force on Defense Software	Y

Year	DOD Study or Guidance	Title	Agile Funding
2004	Guidance	National Military Strategy	X
2005	Guidance	National Defense Strategy	X
2008	Guidance	National Defense Strategy	X
2010	Study	Achieving Effective Acquisition of Information Technology in the Department of Defense	Y
2015	Guidance	National Military Strategy	X
2017	Study	DOD's Software Sustainment Study Phase I: DOD's Software Sustainment Ecosystem	Y
2017	Study	Building a FAST Force: A Flexible Personnel System for a Modern Military	X
2018	Study	Design and Acquisition of Software for Defense Systems	Y

Year	DOD Study or Guidance	Title	Agile Funding
2018	Study	Section 809 Panel	Y
2018	Guidance	National Defense Strategy	X
2019	Study	Defense Innovation Board Recommendations	Y
2019	Study	Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage	Y
2022	Guidance	National Defense Strategy	X
2022	Guidance	Department of Defense Software Modernization	Y

Y=Yes policy includes guidance on Agile Funding

P=Policy consists of a vague reference to Agile Funding

N=No relation to DOD Agile Funding could be identified

As shown in Table 3, it took DOD over 40 years to incorporate policy into their guidance to make funding faster, despite the Studies recommending it starting in 1982. The stark contrast in the approach to funding between the DOD and the commercial sector becomes increasingly evident when we benchmark and examine companies that have long

embraced agile funding mechanisms. Organizations like Google, SpaceX, and Amazon have tapped into venture capital to fund promising technologies and innovative projects, sometimes in days or months. These companies understand that the speed of funding allocation is as crucial as the funded projects, continuously staying ahead of the curve. While it can take commercial companies as little as a few days to fund their technological ventures, the DOD may take around six years, if not longer, to fund a technological gap (Seligman, 2018).

Unlike the DOD, these commercial entities' nimble and rapid funding mechanisms allow them to pivot swiftly in response to evolving technological landscapes. They can invest in breakthrough technologies promptly, ensuring they maintain their competitive advantage and drive innovation. In contrast, the DOD's funding approach is characterized by a relatively slower, more bureaucratic process, which hampers swift innovation and hinders its ability to keep pace with technological advancements (Seligman, 2018).

The delay in the DOD's adoption of agile funding is even more noticeable given the DOD studies conducted since 1982 (as outlined in Table 3). These studies consistently highlighted the importance of a flexible funding strategy. This delay underscores a missed opportunity for the DOD to proactively seize technological advancements, despite advice from their consultants and the successful models employed by their commercial counterparts (DSB, 2010).

To close this gap, the DOD must incorporate agile funding principles more efficiently into its leading technology policies and work with Congress to approve them. Doing so would enable it to allocate funds swiftly to innovative projects, reducing red tape and promoting a culture of agile and decisive decision-making. This could include establishing streamlined approval processes, rapid procurement systems, and transparent budgetary practices (Seligman, 2018). Until these changes are made, it would be ill-advised to assume the DOD can keep up with technological advancements. After all, it took 30 years for the Deputy Secretary of Defense to release the *Department of Defense Software Modernization* (2022) (Section 809 Panel, 2018; JCS, 1992, 1995, 2004, 2008, 2015, 2018).

C. RISK TOLERANCE AND LONG-TERM FOCUS BENCHMARK

This section presents a comparative analysis of the DOD’s policy on Risk Tolerance and Long-Term Focus against those implemented by successful tech companies, utilizing a designated benchmark. Drawing upon specific criteria inspired by the Five Critical Innovation Areas, we pinpoint the arenas where commercial enterprises have showcased their prowess. We delve deep into these policy documents to ascertain the effectiveness of the NMS and NDS policies in steering the DOD’s rapid modernization efforts through Risk Tolerance and Long-Term Focus. Our analysis uncovers effective methodologies for embracing Risk Tolerance and Long-Term Focus within these policies and sheds light on potential policy gaps.

Our focus sharpens if the data indicates that the DOD has failed to foster an environment of Risk Tolerance and Long-Term Focus over an extended period without undertaking essential steps to sustain its technological edge—mirroring the practices of commercial entities. In such a scenario, this deficit will be underlined in Table 4. Our data analysis promises to accurately identify the central issue of Risk Tolerance and Long-Term Focus and determine the status quo duration.

We further investigate the DOD’s approach to risk management and its vision for long-term strategic planning. A culture that embraces risk and fosters a long-term perspective is pivotal for stimulating innovation and strategic decision-making. Despite the importance of these elements being emphasized as early as 1982 (see Table 1) in the DOD studies, it took the DOD 40 years to integrate these principles into their NMS and NDS policies, culminating in their introduction in 2022 (NDS, 2022). This delay starkly contrasts with leading commercial entities that have long recognized the significance of these values, swiftly incorporating them into their strategic framework (Seligman, 2018).

Hence, we aim to benchmark the DOD’s NMS and NDS policies and ascertain the degree of the Department’s tolerance for risk and its emphasis on long-term focus in decision-making and strategic planning. As we uncover the present gaps, we are poised to recommend strategies to propel innovation and foster bold, strategic decision-making within the DOD.

Table 4. Risk Tolerance and Long-Term Focus

Year	DOD Study or Guidance	Title	3. Risk Tolerance and Long-Term Focus
1982	Study	Joint Service Task Force on Software Problems	Y
1987	Study	Report of the Defense Science Board Task Force on Military Software	Y
1992	Guidance	National Military Strategy – One section e15 Technological Superiority.	X
1995	Guidance	National Military Strategy	X
1997	Guidance	National Military Strategy	X
2000	Study	Task Force on Defense Software	Y
2004	Guidance	National Military Strategy	X
2005	Guidance	National Defense Strategy	X

Year	DOD Study or Guidance	Title	3. Risk Tolerance and Long-Term Focus
2008	Guidance	National Defense Strategy	X
2010	Study	Achieving Effective Acquisition of Information Technology in the Department of Defense	X
2015	Guidance	National Military Strategy	X
2017	Study	DOD's Software Sustainment Study Phase I: DOD's Software Sustainment Ecosystem	X
2017	Study	Building a FAST Force: A Flexible Personnel System for a Modern Military	X
2018	Study	Design and Acquisition of Software for Defense Systems	Y
2018	Study	Section 809 Panel	Y
2018	Guidance	National Defense Strategy	X

Year	DOD Study or Guidance	Title	3. Risk Tolerance and Long-Term Focus
2019	Study	Defense Innovation Board Recommendations	Y
2019	Study	Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage	Y
2022	Guidance	National Defense Strategy	Y
2022	Guidance	Department of Defense Software Modernization	Y

Y=Yes policy includes guidance on Tolerance and Long-Term Focus

P=Policy consists of a vague reference to Tolerance and Long-Term Focus

X=No reference to DOD Tolerance and Long-Term Focus could be identified

As shown in Table 4, it took DOD over 40 years to incorporate policy into their guidance focused on Tolerance and Long-Term Focus, despite the Studies recommending it in 1982—see Chart #1. The stark contrast in the approach to Tolerance and Long-Term Focus between the DOD and the commercial sector becomes increasingly evident when we benchmark and examine companies that have long embraced technology assimilation. In the dynamic world of technology and innovation, calculated risk-taking is often the prerequisite for game-changing breakthroughs and is the basic building block of innovation. When benchmarking the DOD to companies like Apple, Amazon, and Tesla, these commercial companies will have demonstrated risk tolerance and thrived by consistently pushing the boundaries of technology and venturing into uncharted territories (Seligman, 2018). These companies are willing to make bold bets on future technologies,

tolerating short-term failures for long-term strategic gains. While we do not have exact timeframes for each company to update their policy because all of them are different, it is within months, not 40 years (Seligman, 2018). The acceptance of risk fosters a culture of relentless innovation, driving commercial companies to stay ahead of the competition.

Simultaneously, these organizations maintain a long-term strategy and focused policy. Their leaders and lower-level workers read the company's policy and understand that true innovation is not merely about short-term wins but building sustainable competitive advantages through persistent technological advancements. By keeping their gaze on the horizon, these companies invest in innovation and technologies shaping the future (Brust, 2021).

Conversely, the DOD's historically risk-averse policy and short-term focus have created a significant innovation deficit. Its late adoption of policies promoting risk tolerance and a long-term perspective reflects a reluctance to depart from established norms and practices, inhibiting its ability to respond swiftly to technological advancements (DSB, 1987). Furthermore, this risk aversion and short-termism impede the DOD's capacity to shape future technological landscapes, leaving it reactive rather than proactive in rapidly evolving threats and opportunities (DSB, 2010).

The need to shift the DOD's approach to risk tolerance and long-term focus is evident. The DOD must embrace a culture of calculated risk-taking and foster a long-term view of technological advancement. By embedding these principles into its policies and organizational culture, the DOD can encourage innovation, respond to evolving technological landscapes more effectively, and better position itself for future challenges (Section 809 Panel, 2019).

D. MINIMAL SECURITY CLASSIFICATION BENCHMARK

This section embarks on a critical examination of the DOD's policy on Minimal Security Classification in comparison to the strategies adopted by successful tech companies. We highlight the domains where commercial enterprises consistently outperform through a benchmark rooted in the Five Critical Innovation Areas. Our comprehensive analysis of the NMS and NDS policies seeks to determine their

effectiveness in guiding the DOD’s rapid modernization efforts, specifically through the lens of Minimal Security Classification. This evaluation identifies robust methodologies that promote Minimal Security Classification within these policies while unveiling potential policy shortcomings.

Our scrutiny becomes particularly relevant if our data indicates that the DOD still needs to effectively adopt a Minimal Security Classification process over an extended period. This failure becomes more glaring when the DOD is not undertaking necessary measures to maintain a technological edge—akin to commercial entities. If such a scenario presents itself, it will be duly emphasized. Our data analysis will accurately identify the central issue related to Minimal Security Classification and the duration of its persistence.

As Table 5 on Security Classification reveals, there is a concerning gap in the DOD’s stance on revamping its security classification policies, despite the consistent emphasis by commercial entities on the benefits of maintaining minimal security classification for fostering innovation. More alarmingly, there is a pressing need for the DOD to formulate new Security Classifications policies, which could facilitate innovation.

Despite the rapidly evolving technological landscape, the DOD has retained its traditional security classification policies over the past four decades, from 1983 to 2022 (DOD, 2022). This inertia persists, even as the DOD’s technical lead diminishes in comparison to the capabilities of potential adversaries, indicating that DOD studies and leadership policy often overlook this critical area (Kirby, 2022). As shown in Table 1, even the DOD-funded DOD studies seldom mention Security Classification as a challenge (Defense Science Board, 2022). The authors of these DOD studies must recognize that experts in innovation consider rigid security classifications as significant obstacles to innovation.

While the DOD’s rigorous security posture stems from legitimate national security concerns, its stringent security classifications for critical information required for modernization inadvertently impede the swift adoption and integration of emerging technologies. Thus, we recommend an urgent exploration into decreasing unnecessary

security classifications to expedite the exchange of ideas, stimulate internal and external collaboration, and positively impact the flow of information, collaboration, and innovation.

Table 5. Security Classification

Year	DOD Study or Guidance	Title	4. Minimal Security Classification
1982	Study	Joint Service Task Force on Software Problems	X
1987	Study	Report of the Defense Science Board Task Force on Military Software	X
1992	Guidance	National Military Strategy – One section e15 Technological Superiority.	X
1995	Guidance	National Military Strategy	X
1997	Guidance	National Military Strategy	X
2000	Study	Task Force on Defense Software	X
2004	Guidance	National Military Strategy	X
2005	Guidance	National Defense Strategy	X

Year	DOD Study or Guidance	Title	4. Minimal Security Classification
2008	Guidance	National Defense Strategy	X
2010	Study	Achieving Effective Acquisition of Information Technology in the Department of Defense	X
2015	Guidance	National Military Strategy	X
2017	Study	DOD's Software Sustainment Study Phase I: DOD's Software Sustainment Ecosystem	X
2017	Study	Building a FAST Force: A Flexible Personnel System for a Modern Military	X
2018	Study	Design and Acquisition of Software for Defense Systems	X
2018	Study	Section 809 Panel	X
2018	Guidance	National Defense Strategy	X
2019	Study	Defense Innovation Board Recommendations	X
2019	Study	Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage	X
2022	Guidance	National Defense Strategy	X

Year	DOD Study or Guidance	Title	4. Minimal Security Classification
2022	Guidance	Department of Defense Software Modernization	X

Y=Yes policy includes guidance on Minimal Security Classification

P=Policy consists of a vague reference to Minimal Security Classification

No=Reference to DOD Minimal Security Classification could be identified

Table 5 is jaw-dropping because it indicates that the DOD has not adequately addressed the Security Classification issue in their policies over the last 40 years, consistently receiving a red “X” from 1982 until 2022, both for the Studies and Policy. You see the DOD Studies that advise the leaders, but the outcomes in the NMS and NDS fail to provide clear direction to their rank and file, as seen in NDS (2022). When benchmarking the DOD to commercial companies on Security Classification, the absence of explicit policy recommendations on minimal security classification starkly contrasts the practices of successful commercial entities that modernize rapidly. While maintaining some basic security measures, these organizations strike a balance that allows for greater internal and external collaboration, sharing of innovative ideas, and quicker adoption of advancements (Seligman, 2023).

In a telling example, Dr. John F. Plumb, the Assistant Secretary of Defense, spoke candidly at the Space Foundation’s 38th Space Symposium in 2023 about the issues arising from the DOD’s approach to classification (Plumb, 2023). He acknowledged that the DOD’s stringent security policies, based on outdated information-sharing agreements, are slowing down operations and collaboration with allies, partners, and commercial entities.

Furthermore, he highlighted the problems of overclassification within the U.S. government, which hinders effective communication and alignment of efforts across different departments (Plumb, 2023). Despite acknowledging the problems associated with

overclassification and expressing the Department’s intent to address these issues, there needs to be more substantial progress in implementing these changes within the DOD’s policy framework (Plumb, 2023).

Per Dr. John F. Plumb’s speech, failing to incorporate minimal security classification into the DOD’s policy actively represents a missed opportunity. By addressing this issue and modifying security classification policies where feasible, the DOD could better align itself with innovative practices in the commercial sector. Such an approach would enable quicker adoption of emerging technologies, enhance intra-departmental and inter-agency collaboration, and facilitate more efficient communication with allies and partners. Furthermore, Artificial Intelligence’s ability to collect and create information in the near future will exacerbate the security classification challenge and bring many more challenges to the DOD and advantages to our adversary if the current policy is not reconsidered (Plumb, 2023)

While national security must always be a priority, the DOD must also recognize the importance of adapting its classification policies to the evolving technological and security landscape. Only then can the Department bridge the widening technology gap and better position itself to maintain its edge in the face of future challenges. The DOD has gone 40 years without seriously reconsidering the need for a security classification policy on their innovation challenge. As you can see, it isn’t even discussed in the NDS (2022). Still, in the next 40 years, the impact of Artificial Intelligence will likely be severe, further exacerbating the DOD’s lackluster efforts.

E. CUSTOMER-CENTRIC APPROACH BENCHMARK

In the world of technology and innovation, leading commercial entities have long recognized the paramount importance of adopting a customer-centric approach. This method positions the needs and requirements of the customer at the core of developmental and operational decisions. As the DOD charts its path forward, understanding and integrating a customer-centric approach is pivotal to ensure alignment with operational prerequisites and overarching strategic objectives (Shah et al., 2006).

A recent strategy published at the onset of 2021 by the Defense Intelligence Agency Chief Information Office (DIA CIO) emphasized this very approach (Brust, 2021). The strategy wasn't exclusively for the DIA's internal stakeholders; it also communicated vital objectives and requirements to vendors and external partners. The core goals identified were driving customer centricity, optimizing the DIA CIO core, and ensuring the workforce, notably vendors and academic partners, are well-equipped.

Jack Gumtow, DIA's CIO, clarified the idea behind "customer centricity." He highlighted that true customer centricity is not merely fulfilling a list of requirements (Brust, 2021). Instead, it's about deeply engaging with the customer or partner and preemptively understanding their needs. It's about aligning operational goals with the customer's daily OODA loop (observe, orient, decide, act)—a military decision-making process—ensuring that the agency can anticipate, validate, and act on these needs (Brust, 2021). This is a crucial step forward in ensuring that the DOD and its agencies are in sync with the rapid pace and requirements of the contemporary technological landscape.

Transparency has also been a significant focus. The DIA CIO emphasized the need for transparency in customer interactions, budgets, and goals. Gumtow believes that the CIO's office operates in the best interest of its stakeholders and not just its own needs (Brust, 2021).

While Table 6 underscores the DOD's historical lag in integrating a customer-centric approach, recent strides like those made by the DIA suggest a positive trajectory. Still, there is an evident need for continued emphasis and focus in this area, mirrored by successful tech giants.

To ensure that the DOD remains agile and responsive to the evolving needs of its end-users/warfighters, it must learn from its past oversights and current best practices in the industry. This not only ensures that the department remains at the cutting edge of technological advancements but also guarantees that it is delivering solutions and services tailored to the real-world requirements of its vast user base.

Table 6. Customer-Centric Approach

Year	DOD Study or Guidance	Title	5. Customer-Centric Approach
1982	Study	Joint Service Task Force on Software Problems	Y
1987	Study	Report of the Defense Science Board Task Force on Military Software	Y
1992	Guidance	National Military Strategy – One section e15 Technological Superiority.	X
1995	Guidance	National Military Strategy	X
1997	Guidance	National Military Strategy	X
2000	Study	Task Force on Defense Software	Y
2004	Guidance	National Military Strategy	X
2005	Guidance	National Defense Strategy	X
2008	Guidance	National Defense Strategy	X
2010	Study	Achieving Effective Acquisition of Information Technology in the Department of Defense	Y

Year	DOD Study or Guidance	Title	5. Customer-Centric Approach
2015	Guidance	National Military Strategy	X
2017	Study	DOD's Software Sustainment Study Phase I: DOD's Software Sustainment Ecosystem	Y
2017	Study	Building a FAST Force: A Flexible Personnel System for a Modern Military	Y
2018	Study	Design and Acquisition of Software for Defense Systems	Y
2018	Study	Section 809 Panel	Y
2018	Guidance	National Defense Strategy	X
2019	Study	Defense Innovation Board Recommendations	Y
2019	Study	Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage	Y
2022	Guidance	National Defense Strategy	Y
2022	Guidance	Department of Defense Software Modernization	Y

Y=Yes policy includes guidance on the Customer-Centric Approach

P=Policy consists of a vague reference to Customer-Centric Approach

N=No reference to the DOD Customer-Centric Approach could be identified

Table 6 reveals a stark oversight in the Department of Defense’s policy-making trajectory. For an extended period spanning four decades, the DOD had not delineated a clear customer-centric policy within the NMS and NDS until its 2022 iteration (NDS, 2022). This leadership oversight in adopting and integrating a customer-centric approach into the DOD policy is vividly chronicled in Table 6, which maps the evolution (or lack thereof) of this policy orientation over the years (Deputy Under Secretary, 1982; DSB 1987, 2000). This extended delay underscores the need for the DOD to pivot toward this essential policy direction.

Commercial giants in the tech sector present a contrasting picture. These entities have institutionalized embedding the customer at the core of their operational philosophies. For them, product and service development begins with an acute awareness of customer needs, using this feedback as a compass to iterate, refine, and drive innovation. Such customer-driven modus operandi has cultivated a milieu of persistent refinement and innovation, fueling their ascendancy in the commercial and technological spheres (Brust, 2021).

The DOD’s prolonged inertia in adopting a customer-centric policy is glaring when juxtaposed with commercial technological companies. However, the call for a customer-centric approach within the DOD transcends merely integrating a new policy directive (Brust, 2021). It demands a paradigm shift where many stakeholders—from military personnel and allied nations to other governmental entities and the taxpayer—are perceived and engaged as “customers.” Such an outlook mandates the DOD to be proactive in discerning and reacting to the intricate tapestry of needs, insights, and feedback from these diverse stakeholders. This reciprocity holds promise to catalyze the creation of more adept and agile defense technologies and methodologies and, in the process, instill a robust culture of innovation within the DOD’s ranks (Brust, 2021).

In embracing a customer-centric ethos, the DOD stands to architect an ecosystem conducive to innovation, where feedback is not just welcomed but actively pursued, and continuous improvement is the norm rather than the exception. This cultural and operational pivot would considerably narrow the chasm between the DOD and its commercial peers, bolstering the former’s capacity to adeptly navigate the mercurial

terrains of technological flux and security imperatives. While a customer-centric disposition is not the sole panacea to keep the DOD strides ahead of potential adversaries, it is one indispensable facet that has remained in the shadows at the DOD for far too long.

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V. RECOMMENDATION AND CONCLUSION

A. SUMMARY OF KEY FINDINGS

A synthesized understanding of our principal observations sheds light on the Department of Defense's (DOD) technological policy. The disparities in benchmarking the DOD to commercial companies' policies in Five Critical Innovation Areas become discernible by contrasting the DOD's policy, as documented in the NMS and NDS, with the practices of leading tech companies.

Flexible Organizational Structure: A flexible structural framework has been evident in DOD studies' advocacy since the early 1980s. Yet, the DOD's 30-year latency in embedding flexibility into the NMS and NDS unveils a significant rift between strategic intent and policy execution. **Agile Funding:** Although DOD studies have consistently championed agile funding, the DOD's sluggish transition is unmistakable. The value of agile financing in addressing emergent technological shifts underscores the need for the DOD to reevaluate its funding mechanisms. **Risk Tolerance and Long-Term Focus:** Commercial frontrunners have long realized the rewards of embracing risk tolerance and forward-looking strategies, but the DOD has done little to incorporate them.

The DOD's 40-year delay in reflecting these principles in its doctrines signifies a pressing call for recalibrating its strategic foresight. **Minimal Security Classification:** Despite pressing needs for evolving security dynamics, our analysis underscores the DOD's immobility in updating its security classification policies over the past 40 years. This stagnation impedes innovation and raises concerns about the DOD's adaptability to contemporary security challenges. **Customer-Centric Approach:** Unlike proactive tech giants, the DOD displayed prolonged inertia, taking over 40 years to provide fundamental updates on adopting a user-focused strategy in the NMS and NDS. Tech leaders' successes rooted in their user-driven innovation starkly contrast with the DOD's gradual assimilation of this approach.

These findings spotlight areas where the DOD can glean insights from the trailblazing tech industry to fortify its technological prowess. The urgency for the DOD to

swiftly integrate these lessons is paramount, especially in an era where rapid technological evolution is the bedrock of strategic advantage.

B. FINAL THOUGHTS AND RECOMMENDATIONS

The crux of the analysis in this thesis reveals an indisputable truth: The DOD is grappling with a significant delay in policy adaptation and modernization in the NMS and NDS, placing it at a disadvantage when juxtaposed against its commercial counterparts. In a time when technological advancements are accelerating at an unprecedented rate, national security threats are rapidly evolving, and the growth of artificial intelligence and cybersecurity challenges are becoming prominent, the DOD's conventional approach to policy-making needs to be equipped to handle these dynamic shifts.

This research highlighted the urgency and importance of integrating the Five Critical Innovation Areas into the DOD's policies and practices. These areas include Agile Funding, Risk Tolerance, Long-Term Focus, Minimal Security Classification, and Customer-Centric Approach. These areas have been identified as critical drivers to foster a culture conducive to innovation, propelling the adoption of emerging technologies while helping the DOD maintain its competitive edge and uphold national security. A comprehensive examination and comparison of the DOD's policies and procedures against those of successful commercial tech entities has exposed considerable gaps and shortcomings in the DOD's approach. Each of the Five Critical Innovation Areas illustrates a policy lag, indicating that the DOD's reluctance to modernize its policies has persisted far too long and is a barrier to technological progression.

However, the purpose of this study extends beyond merely highlighting the DOD's policy deficiencies. The DOD needs to undertake immediate and decisive action to safeguard national security and maintain its technological superiority by releasing and implementing relevant NDS and NMS policies. At a minimum, it must embrace an agile approach to policy-making, champion a flexible and inclusive organizational structure, introduce efficient funding mechanisms, foster a culture of risk tolerance, streamline security classifications, and adopt a customer-centric approach and look at other policy changes that could impact Artificial Intelligence in the future.

Moreover, the DOD needs to break away from providing outdated lackluster policies and operating in a silo. A clear policy should exist to actively and consistently engage with innovative commercial entities, leading-edge research institutions, and burgeoning tech startups working on future technologies, and a clear policy incorporating that technology. Such engagements can ensure the past isn't repeated and provide valuable insights, foster a culture of innovation, and expedite the adoption and integration of advanced technologies into the defense framework.

The DOD stands at a crucial crossroads. The future of defense is inextricably linked with technological innovation, and the pace at which these advancements are made will significantly impact national security. The need for the DOD to heed past lessons, adapt, modernize, and innovate has never been more critical in the age of artificial intelligence.

By incorporating the insights and recommendations provided in this thesis, the DOD has the opportunity to transform its policy-making approach, cultivate a dynamic and innovation-centric culture, and ensure its readiness to face the evolving challenges of the future. This task holds immense importance and urgency, and this thesis ought to serve as a valuable resource to jolt the DOD on this significant mission.

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